Modesto Junior College

Course Outline of Record Report

01/19/2022

EASCI161 : Introduction to Earth Science

General Information

Faculty Author:	• Noah Hughes • Richmond, Jennifer
Attachments:	EASCI 161 DE Addendum Spring 2021 Newest.pdf ASSIST CAS EASCI 161.pdf EASCI-161_SU15.pdf EASCI 161.pdf Download
Course Code (CB01) :	EASCI161
Course Title (CB02) :	Introduction to Earth Science
Department:	Earth Science
Proposal Start Date:	MJC Fall 2023
TOP Code (CB03) :	(1930.00) Earth Science
CIP Code:	(40.0601) Geology/Earth Science, General
SAM Code (CB09) :	Non-Occupational
Distance Education Approved:	No
Is Distance Education Course:	No
Course Control Number (CB00) :	CCC000545708
Curriculum Committee Approval Date:	02/04/2014
Board of Trustees Approval Date:	03/12/2014
External Review Approval Date:	09/01/2015
Course Description:	This course functions like a user guide for Spaceship Earth. It includes an introductory study of various branches of earth science: geology, oceanography, meteorology, and astronomy. Topics include the scientific method, natural resources, sustainability, minerals, rocks, volcanism, plate tectonics, earthquakes, weathering, erosion, geological time, fresh water, ocean water, ocean currents, the ocean floor, atmosphere, clouds, storms, climate, climate change, stars and stellar evolution, and the formation of the solar system.
Proposal Type:	Add Distance Education Mandatory Revision This course is being modified just to make some updates to catalog description, assignments, assessments, and textbook to reflect some recent changes that were made in the process of switching to a ZTC model for this course. Also, we are adding a DE Addendum.
Faculty Author:	• Noah Hughes

Discipline(s)

Master Discipline Preferred:
- Earth Science

Bachelors or Associates Discipline Preferred: No value

Course Coding

Basic Skill Status (CB08)

Course is not a basic skills course.

Course Special Class Status (CB13)

Course is not a special class.

Grading

- A-F or P/NP

☐ Allow Students to Gain Credit by Exam/Challenge

Repeatability

0

Course Prior To College Level (CB21)

Not applicable.

Rationale For Credit By Exam/Challenge

No value

Type of Repeat

No value

☐ Allow Students To Audit Course

Course Support Course Status (CB26)

Course is not a support course

Associated Programs

☑ Course is part of a program (CB24)

Associated Program	Award Type	Active
Anthropology for Transfer Degree	AA-T Associate of Arts for Transfer	MJC Summer 2020

CSU General Education Pattern	Certificate of Achievement	MJC Summer 2020 to MJC Summer 2021
Elementary Teacher Education for Transfer Degree	AA-T Associate of Arts for Transfer	MJC Summer 2020
General Studies: Emphasis in Natural Sciences	A.A. Degree	MJC Summer 2020
IGETC Pattern	Certificate of Achievement	MJC Summer 2020 to MJC Summer 2021
MJC-GE Pattern	MJC-GE Pattern	MJC Summer 2020 to MJC Summer 2021
CSU General Education Pattern	Certificate of Achievement	MJC Summer 2021 to MJC Summer 2022
IGETC Pattern	Certificate of Achievement	MJC Summer 2021 to MJC Summer 2022
MJC-GE Pattern	MJC-GE Pattern	MJC Summer 2021
Elementary Teacher Education for Transfer Degree (In Development)	AA-T Associate of Arts for Transfer	MJC Summer 2022
Anthropology for Transfer Degree (In Development)	AA-T Associate of Arts for Transfer	MJC Spring 2022
CSU General Education Pattern	Certificate of Achievement	MJC Summer 2022
IGETC Pattern	Certificate of Achievement	MJC Summer 2022

Transferability & Gen. Ed. Options

Course General Education Status (CB25)

Y

Transferability	Transferability Status

Transferable to both UC and CSU	Approved

MJC General Education (MJC-GE)	Categories	Status	Approval Date	Rationale (include Comparable Course, C-ID Descriptor, etc. if applicable.
Area A: Natural Sciences	(MJC-GE:A)	Approved	No value	C-ID: GEOL 121

CSU General Education Breadth Pattern (CSU-GE)	Categories	Status	Approval Date	Rationale (include Comparable Course, C-ID Descriptor, etc. if applicable.
Area B1:Physical Sciences	(CSU-GE:B1)	Approved	No value	C-ID: GEOL 121
Area B3: Laboratory Activity	(CSU-GE:B3)	Approved	No value	

Intersegmental General Education Transfer Curriculum (IGETC) (for CSU and UC)	Categories	Status	Approval Date	Rationale (include Comparable Course, C-ID Descriptor, etc. if applicable.
Area 5A: Physical Sciences	(IGETC: 5A)	Approved	No value	C-ID: GEOL 121
Area 5C: Laboratory Activity	(IGETC: 5C)	Approved	No value	

C-ID: California's Course Identification Numbering System	Categories	Status	Approval Date	Rationale (include Comparable Course, C-ID Descriptor, etc. if applicable.
Geology (GEOL)	(GEOL)	Approved	No value	C-ID: GEOL 121

YCCD Intra-district Equivalencies	Categories	Status	Approval Date	Rationale (include Comparable Course, C-ID Descriptor, etc. if applicable.
Columbia College Equivalent Course	(CC)	Approved	No value	CC: ESC 33

Field Trips

Field trips are required.

- (●) Yes
- ( ) No
- ( ) Maybe

Comparable Lower-Division Courses at UC/CSU v2

Courses numbered 100-299 require identification two comparable lower-division courses from CSU or UC from the current institutional catalog (not schedule). At least one course from CSU, and if requesting/maintaining UC general elective transfer, one course from UC. Please identify the CSU campus offering this course. (Term type is indicated in parentheses)

CSU, Stanislaus (SEM)

CSU Catalog Year

2021-2022

Provide the CSU course code (e.g., ENGL 1A) from the most current official Catalog (not schedule). Curriculum changes each year.

GEOL 2400

CSU Course Title

Introduction to Earth Science

Does course-to-course or lower-division, "major prep" articulation with this course exist for this academic year?

Yes

Select the institution that offers the second comparable course from CSU or UC. If seeking or maintaining UC transferability, you must supply a UC campus. (Term type is indicated in parentheses)

UC San Diego (QTR)

CSU/UC Catalog Year

2021-2022

Provide the CSU course code (e.g., ENGL 1A) from the most current official Catalog (not schedule). Curriculum changes each year.

SIO 10

CSU Course Title

The Earth

Does course-to-course or lower-division, "major prep" articulation with this course exist for this academic year?

Yes

Select the institution that offers the third comparable course from CSU or UC. If seeking or maintaining UC transferability, you must supply a UC campus if not already provided above. (Term type is indicated in parentheses)

No Value

CSU/UC Catalog Year

No Value

Provide the CSU/UC course code (e.g., ENGL 1A) from the current official Catalog (not schedule). Curriculum changes each year.

No Value

CSU Course Title

No Value

Does course-to-course or lower-division, "major prep" articulation with this course exist for this academic year?

No Value

Units and Hours

Summary

Minimum Credit Units (CB07) 4

Maximum Credit Units (CB06)	4
Total Course In-Class (Contact) Hours	108
Total Course Out-of-Class Hours	108
Total Student Learning Hours	216

Credit / Non-Credit Options

Course Credit Status (CB04)

Credit - Degree Applicable

Course Non Credit Category (CB22)

Credit Course.

Non-Credit Characteristic

No Value

Course Classification Code (CB11)

Credit Course.

Funding Agency Category (CB23)

Not Applicable.

☐ Cooperative Work Experience Education Status (CB10)

☐ Variable Credit Course

Weekly Student Hours

	In Class	Out of Class
Lecture Hours	3	6
Laboratory Hours	3	0
Activity Hours	0	0

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	52.5
Course In-Class (Contact) Hours	
Lecture	54
Laboratory	54
Activity	0
Total	108
Course Out-of-Class Hours	
Lecture	108
Laboratory	0
Activity	0
Total	108

Time Commitment Notes for Students

No value

Units and Hours - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

Prerequisites, Corequisites, and Advisories

No Value

Requisite Skills

Requisite Skills	Description
No value	No value

Specifications

Methods of Instruction

Methods of Instruction (Typical)	INSTRUCTIONAL METHODS
MOI	1. Lecture (live or recorded) 2. Demonstrations 3. Assigned readings 4. Instructor supervised group problem solving (labs) 5. Instructor led field trip with facilitation of problem solving that involve observation, synthesis, and application of geologic principles

Assignments (Typical)

Evidence of Workload for Course Units (Quantity)

1. current event article summary/analysis (weekly)
2. sustainability-related Discussion activities (biweekly)
3. textbook (ZTC) readings (weekly)
4. questions sets (weekly)
5. pre-lab reading and video (weekly)
6. group research project (each semester)
7. study and prepare for lecture exams (two/semester)
8. field trip (once/semester)

Evidence of Critical Thinking (Quality)

1. Typical assignment:
    1. Access and read an earth-science related article, summarize its main points, explain how it is related to one of the principle fields of earth science, and examine ways in which the topic of the article could affect your life.
2. Lecture exam question:
    1. In what ways are rivers and streams important as a natural resource?
3. Discussion Activity prompt (after assigned readings on the topic):
    1. Lithium ion batteries are the rechargeable power source that runs so many devices that we all use everyday: cell phones, laptops, earbuds, and even electric vehicles. Let's analyze our use of this natural resource *through the lens of sustainability*. Is our usage of this natural resource sustainable? Why or why not? Do you think there is there anything we could do to increase the sustainability of our lithium usage?
4. Group Research Project
    1. Students work cooperatively within their groups to develop, plan, execute, and present the results of a research project from beginning to end using publicly available, published Earth Science data

Methods of Evaluation (Typical)	Rationale
FORMATIVE EVALUATION	1. Article Summary/Analysis 2. Lab Activity Participation 3. Online Discussions 4. Lecture Discussions
SUMMATIVE EVALUATION	1. Weekly Reading/Lecture Quizzes 2. Weekly Pre-Lab Quizzes 3. Weekly Group Lab Activity 4. Exams 5. Final Group Research Project

Equipment

No Value

Textbooks

Author	Title	Publisher	Date	ISBN
William Hopper et al	Earth Science (Lumen)	Open Education Resource (OER) LibreTexts Project (https://LibreTexts.org)	1/13/21	N/A

Other Instructional Materials

Description	Earth Science Lab Manual
Author	Noah Hughes
Citation	Canvas
Online Educational Resources	Examples of publicly available published datasets: Global Multi-Resolution Topography (https://www.gmrt.org/about/index.php), Google Earth imagery, OSCAR (Oceans Surface Currents Analysis in Realtime), RTGSST (Realtime Global Sea Surface Temperature), Plate Outlines (Bird, P. (2003) An updated digital model of plate boundaries, *Geochemistry Geophysics Geosystems*, *4*(3), 1027, doi:10.1029/2001GC000252.), United States Geologic Survey Earthquake Catalog, MJC Irrigation Technology weather station data archives, Global Forecast System (NCEP: https://www.emc.ncep.noaa.gov/emc_new.php), "The Climate Toolbox." (Applied Climate Science Lab, UC Merced, climatetoolbox.org/)

Textbook Exceptions and Supplementals

Title of Other Material

Instructor-generated lab materials: background reading, lab content, and various publicly available published datasets

Who prepared or published this supplemental material?

instructor of record and various government agencies and universities, as well as public-private partnerships that provide public access to peer-reviewed, published geoscience data. Examples of publicly available published datasets: Global Multi-Resolution Topography (https://www.gmrt.org/about/index.php), Google Earth imagery, OSCAR (Oceans Surface Currents Analysis in Realtime), RTGSST (Realtime Global Sea Surface Temperature), Plate Outlines (Bird, P. (2003) An updated digital model of plate boundaries, Geochemistry Geophysics Geosystems, 4(3), 1027, doi:10.1029/2001GC000252.), United States Geologic Survey Earthquake Catalog, MJC Irrigation Technology weather station data archives, Global Forecast System (NCEP: https://www.emc.ncep.noaa.gov/emc_new.php), "The Climate Toolbox." (Applied Climate Science Lab, UC Merced, climatetoolbox.org/)

Publish date

varies, but the nature of using online data sources is such that we will always be using the latest versions of all published datasets.

Are any of the textbook editions cited on this proposal considered "Classics" (typically with a publish date more than 5 years old)?

- [ ] Yes
- [x] No
- [ ] Unsure

If yes, explain why this older text is used in the course. Reasons should focus on content only.

No Value

Materials Fees v2

Is there a materials fee for this course?

No

Provide a cost breakdown for all items provided for a materials fee. Each item must become "tangible personal property" of student upon payment of the fee and completion of the course.

No Value

Explain how these materials are related to the Student Learning Objectives for the course.

No Value

Explain how the materials have continuing value outside the classroom.

No Value

Is the amount of the material the student receives commensurate with the fee paid AND with the amount of material necessary to achieve the Student Learning Objectives for the course AND provided as the district's actual cost?

No Value

If no is checked, explain why.

No Value

If the district is NOT the only source of these materials, explain why the students have to pay a fee to the district rather than supply the materials themselves. (Cost savings? Health/Safety? Consistency/Uniformity?)

No Value

Learning Outcomes and Objectives

Course Objectives
Describe the nature, methods, and importance of the Earth Sciences, including geologic time, dating methods, and fossils.
Describe the nature, classification, and importance of minerals.
Relate the three main types of rocks to the various Earth system processes that formed them.
Describe in words and drawings how the earth's external processes shape the earth's surface, pose natural hazards, and provide natural resources.
Relate the theory of plate tectonics to the physiographic features of the earth's surface and ocean basins and to the patterns of earthquakes, volcanoes, and mountain ranges.
Relate the elastic rebound theory to earthquake occurrence and earthquake hazards.
Describe in words and drawings the significant bathymetric features of the various ocean provinces and relate them to various processes that formed them.
Describe in words and drawings the characteristics, origins, and consequences of ocean currents, waves, and tides.
Describe in words and drawings the composition, structure, and thermodynamics of the Earth's atmosphere.
Relate the unique properties of water to its role in atmospheric thermodynamics, weather, and climate.
Relate patterns of air pressure variations within Earth's atmosphere to specific weather phenomena such as wind, air temperature changes, cloud formation, and precipitation.
Compare and contrast the various time and spatial scales, atmospheric processes, and weather associated with mid-latitude cyclones, thunderstorms and hurricanes.
Relate the physical and compositional patterns of the solar system to the processes that formed it and processes which still operate within it.

Describe how interstellar matter can evolve into stars and stellar evolution.

Lab Objectives

Use various models (topographic/bathymetric maps, satellite imagery, weather maps, block models, fluid dynamics tubs, and stream/landscape models) to identify features and properties of the earth system.

Observe the properties of minerals and use those properties to identify the mineral and its economic significance.

Observe the properties of the three main rock types and use those properties to identify the rocks and describe the processes and places where they were formed, as well as the methods used to date them (including fossils).

Use models to identify various types of stream channels and groundwater features and relate them to the processes that formed them.

Use models and data to identify features and processes of the earth and relate them to the tectonic processes that create or cause them.

Use models to investigate the relationship between plate boundaries and earthquake occurrence

Use models to identify features of the ocean floor and relate them to the processes that formed them in the past and that are likely to be occurring there today.

Use models to characterize dynamic features of the earths ocean (such as surface and deep currents, vertical mixing, and waves) in terms of temperature, salinity, density, and wave size and then relate these dynamic features to the processes that form them and their effects within the earth system (such as climate or coastal processes).

Use maps, models, and raw data to describe the air pressure, air temperature, and air density distributions at various locations within the earths atmosphere and near the earths surface across a range of scales of space and time and relate these patterns (such as seasonal shifts in temperature or spatial distributions of temperature) to their causes.

Use models, various lab apparati, and raw data to predict the likelihood of cloud or fog formation within the earths atmosphere.

Use maps and weather data to describe the patterns of wind within the earth's atmosphere and relate those wind patterns to various types of weather.

Use weather maps and other weather data, as well as various models and lab apparati, to identify storm-related features in the earths atmosphere (such as cyclones, clouds, fronts, and precipitation) and relate them to the weather they create (such as temperature and wind patterns).

Given a small-scale model of the sun, build a model of rest of the solar system at the same scale, identify compositional trends within it, and relate those trends to the processes that formed the solar system.

Use appropriate astronomical equipment to observe feature of the sun and visible planets and relate those features to processes operating within the sun and the solar system.

CSLOs

Identify and explain the formation and uses of the materials that make up the solid earth.

Expected SLO Performance: 0.0

ISLOs Core ISLOs	Students will develop skills that aid in lifelong personal growth and success in the workplace. Students will be able to: Identify and assess individual values, knowledge, skills, and abilities in order to set and achieve lifelong personal, educational, and professional goals. Practice decision-making that builds self-awareness, fosters self-reliance, and nourishes physical, mental, and social health. Apply skills of cooperation, collaboration, negotiation, and group decision-making. Exhibit quality judgment, dependability, and accountability while maintaining flexibility in an ever-changing world.
Earth Science UNIVERSITY PREPARATION, EMPHASIS IN EARTH SCIENCES, AS	Identify, describe, and explain the causes and consequences of the various chemical processes that control the transformation of matter within the earth system.
ISLOs GELO	Demonstrate proficiency in NATURAL SCIENCE by doing the following: Explaining how the scientific method is used to solve problems and escribing how scientific discoveries and theories affect human activities

Describe and explain the causes and consequences of the internal and external processes that control the shape of the earth's landforms and seafloor.

Expected SLO Performance: 0.0

Earth Science UNIVERSITY PREPARATION, EMPHASIS IN EARTH SCIENCES, AS	Identify, describe, and explain the causes and consequences of the various chemical processes that control the transformation of matter within the earth system.
	Identify, describe, and explain the causes and consequences of the various physical processes that transfer energy into, within, and out of the earth system.
	Identify, describe, and explain the causes and consequences of the various interactions between the biosphere and the physical components of the earth system.
ISLOs GELO	Demonstrate proficiency in NATURAL SCIENCE by doing the following: Explaining how the scientific method is used to solve problems and escribing how scientific discoveries and theories affect human activities
ISLOs Core ISLOs	Students will develop skills that aid in lifelong personal growth and success in the workplace. Students will be able to: Identify and assess individual values, knowledge, skills, and abilities in order to set and achieve lifelong personal, educational, and professional goals. Practice decision-making that builds self-awareness, fosters self-reliance, and nourishes physical, mental, and social health. Apply skills of cooperation, collaboration, negotiation, and group decision-making. Exhibit quality judgment, dependability, and accountability while maintaining flexibility in an ever-changing world.

Describe and explain the causes and consequences of the processes that control ocean circulation, waves, tides, and coastal processes.

Expected SLO Performance: 0.0

ISLOs GELO	Demonstrate proficiency in NATURAL SCIENCE by doing the following: Explaining how the scientific method is used to solve problems and escribing how scientific discoveries and theories affect human activities
Earth Science UNIVERSITY PREPARATION,	Identify, describe, and explain the causes and consequences of the various physical processes that transfer energy into, within, and out of the earth system.

EMPHASIS IN EARTH SCIENCES, AS	
ISLOs Core ISLOs	Students will develop skills that aid in lifelong personal growth and success in the workplace. Students will be able to: Identify and assess individual values, knowledge, skills, and abilities in order to set and achieve lifelong personal, educational, and professional goals. Practice decision-making that builds self-awareness, fosters self-reliance, and nourishes physical, mental, and social health. Apply skills of cooperation, collaboration, negotiation, and group decision-making. Exhibit quality judgment, dependability, and accountability while maintaining flexibility in an ever-changing world.

Describe and explain the causes and consequences of the processes that control atmospheric circulation, weather, and climate.

Expected SLO Performance: 0.0

ISLOs GELO	Demonstrate proficiency in NATURAL SCIENCE by doing the following: Explaining how the scientific method is used to solve problems and escribing how scientific discoveries and theories affect human activities
Earth Science UNIVERSITY PREPARATION, EMPHASIS IN EARTH SCIENCES, AS	Identify, describe, and explain the causes and consequences of the various chemical processes that control the transformation of matter within the earth system.
	Identify, describe, and explain the causes and consequences of the various physical processes that transfer energy into, within, and out of the earth system.
ISLOs Core ISLOs	Students will develop skills that aid in lifelong personal growth and success in the workplace. Students will be able to: Identify and assess individual values, knowledge, skills, and abilities in order to set and achieve lifelong personal, educational, and professional goals. Practice decision-making that builds self-awareness, fosters self-reliance, and nourishes physical, mental, and social health. Apply skills of cooperation, collaboration, negotiation, and group decision-making. Exhibit quality judgment, dependability, and accountability while maintaining flexibility in an ever-changing world.

Describe and explain the processes that formed the solar system and then place the solar system within the broader context of the cosmos.

Expected SLO Performance: 0.0

ISLOs GELO	Demonstrate proficiency in NATURAL SCIENCE by doing the following: Explaining how the scientific method is used to solve problems and escribing how scientific discoveries and theories affect human activities
Earth Science UNIVERSITY PREPARATION, EMPHASIS IN EARTH SCIENCES, AS	Identify, describe, and explain the causes and consequences of the various physical processes that transfer energy into, within, and out of the earth system.
ISLOs Core ISLOs	Students will develop skills that aid in lifelong personal growth and success in the workplace. Students will be able to: Identify and assess individual values, knowledge, skills, and abilities in order to set and achieve lifelong personal, educational, and professional goals. Practice decision-making that builds self-awareness, fosters self-reliance, and nourishes physical, mental, and social health. Apply skills of cooperation, collaboration, negotiation, and group decision-making. Exhibit quality judgment, dependability, and accountability while maintaining flexibility in an ever-changing world.

Content

Course Content

1. Earth Science and the Earth System
    1. The field of Earth Sciences
        1. natural resources and sustainability
        2. scientific method
    2. Nebular Hypothesis
    3. Earth as a System
        1. bio-geochemical cycles
2. The Solid and Not-So Solid Earth

1. Minerals
2. Rocks
    1. Igneous
    2. Sedimentary (age relationships)
    3. Metamorphic
3. Geological Time
    1. dating methods
    2. fossils

3. Shaping the Earth's surface
    1. External Processes
        1. mechanical and chemical weathering
        2. mass wasting
            1. types of events
            2. trigger mechanisms
        3. rivers and streams
            1. stream processes
            2. three types of stream channels
            3. stream valley evolution
        4. groundwater
            1. San Joaquin Valley
    2. Internal Processes
        1. plate tectonics and volcanism
            1. divergent plate boundaries
            2. transform fault plate boundaries
            3. convergent plate boundaries
        2. earthquakes
            1. elastic rebound
            2. seismic waves
            3. scales of measurement
            4. effects and hazards
4. Earth's Global Ocean
    1. Ocean Floor
        1. bathymetry: imaging the seafloor
        2. oceanic provinces
            1. margins: features and processes
                1. active vs. passive
            2. deep ocean basin features and processes
            3. oceanic ridges features and processes
            4. seafloor sediment
                1. types
                2. locations
                3. resources
    2. Ocean Dynamics
        1. salinity, temperature, density, and layering
        2. surface ocean currents
        3. upwelling/downwelling
        4. deep ocean currents
        5. waves and breaking waves
        6. coastal processes
            1. summer vs. winter beaches
            2. long-shore drift and long-shore transport
        7. tides and lunar tidal cycles
5. Earth's Atmosphere
    1. The Atmosphere
        1. structure
        2. composition
        3. thermodynamics
            1. radiation budget
            2. greenhouse effect/conduction/convection
            3. seasons
    2. Water in the Atmosphere
        1. humidity, dew-point, saturation, condensation
        2. cloud formation
        3. precipitation processes and types
    3. Air Pressure and Wind

            1. air pressure measurement and changes
            2. wind
                1. controlling forces
            3. surface pressure and wind patterns
                1. cyclones and anti-cyclones
                2. local winds
            4. upper air pressure and wind patterns
                1. ridges and troughs
            5. global atmospheric circulation (3-cell model)
        4. Storms
            1. mid-latitude cyclones
            2. thunderstorms
            3. tropical cyclones/hurricanes
        5. Climate and Climate Change
            1. Controls on Climate
            2. Climate Zones
            3. Climate Change
                1. short term drivers
                2. long term drivers
            4. The Modern Climate Crisis
                1. Evidence of rapid change
                2. Causes and Effects of Modern Climate Crisis
                3. Adaptation and Mitigation
    6. Earth's Context in Space
        1. General Structure of the Solar System
            1. terrestrial (inner) vs. jovian (outer) planets
            2. the moon
            3. comets
            4. asteroids
            5. meteors, -oids, - showers, and -ites
        2. The Big Picture
            1. stars and stellar evolution
            2. interstellar matter
            3. formation of the universe

Lab Content

1. Using Earth System Models
    1. Topographic maps
    2. Bathymetric maps
    3. Satellite imagery
    4. Block models
    5. Fluid dynamics tubs
    6. Stream/landscape models
    7. Weather maps
2. Minerals
    1. Properties
    2. Identification/classification
    3. Uses
3. Rocks: properties, classification, and interpretation
    1. Igneous
    2. Sedimentary
    3. Metamorphic
    4. Dating methods
4. Streams, Stream Processes, and Groundwater
    1. Stream channel types in our region
    2. Stream valley development
    3. groundwater processes
5. Plate Tectonics
    1. Relationship between tectonic boundaries and ocean floor features
    2. Patterns of seismicity and volcanism
    3. Seafloor ages, isochrons, and spreading rates

6. Earthquakes
    1. Ground shaking and ground types
    2. Fault types
    3. Active faults
        1. features
        2. rates of motion
        3. recurrence intervals
    4. Locating earthquakes
7. The Ocean Floor
    1. Bathymetric profiles
    2. Oceanic provinces
    3. Tectonic and sedimentary processes
8. Ocean Dynamics
    1. Surface currents and gyres
    2. Salinity, temperature, and density of seawater
    3. Water masses and ocean layering
    4. Wind-driven waves
    5. Coastal processes
9. The Atmosphere
    1. Vertical structure
        1. air pressure and density
        2. air temperature, layers, and boundaries
    2. Earth-sun relationship and seasons
    3. Temperature controls and climate
10. Water in the Atmosphere
    1. Psychrometers
    2. Relative humidity and dew-point temperature
    3. Saturation and condensation
    4. Fog and cloud formation
11. Wind in the Atmosphere
    1. Barometers
    2. Surface charts and surface winds
    3. Upper-level charts and upper-level winds
12. Fronts, Air Masses, and Mid-Latitude Cyclones
    1. Fronts and air masses on surface charts
    2. Weather radar
    3. Meteograms and frontal passage weather
13. Modern Climate Crisis
    1. future changes in San Joaquin Valley under various emissions scenarios
14. Structure of the Solar System and Cosmos
    1. Constructing a scale model of the solar system
    2. Interstellar matter and stellar evolution

Recommended Course Content

Recommended Course Content

No Value

Recommended Lab Content

No Value

Distance Education (DE) Addendum

Is this course being proposed for Distance Education? If so, select Yes below from the list in the dropdown and complete the questions. If no, select No and skip all questions.

- Yes

Modality Type:

- Hybrid
- Online

Methods of Instruction:

- Asynchronous Discussion
- Viewing and Listening to Videos
- Online Activities
- Written Assignments
- Reading Course Materials
- Collaborative Peer/Group Activities
- Facilitated Discussions
- Quizzes, Exams, and Surveys
- Multimedia Presentations
- Synchronous Discussion
- Group Meetings/Review Sessions (hybrid only)
- Interactive Activities
- On-campus Orientation Sessions (hybrid only)

If Other is selected for Methods of Instruction, please describe:

No Value

Describe how the methods of instruction selected above will allow students to meet the course's learning outcomes:

The methods listed above are currently in use already, under the emergency DE addendum. They are all housed within the Canvas LMS for simplicity. Together, they provide for a rich, interactive experience that has already shown positive results. Students are able to interact with one another in Discussions and Lab activities that emphasize cooperative group learning.

Describe how the methods selected will be presented in an accessible way (Title 5 §55206). For information about accessibility standards in online classes, see the OEI Rubric, Section D (Copy this link and paste in a separate browser to visit OEI Rubric: https://onlinenetworkofeducators.org/course-design-academy/online-course-rubric/)

All online content is created in compliance with section D of the OEI Rubric, including proper formatting for column headings, lists, links, and tables. All images used have alt text. All videos are captioned. Slides have a uniform format throughout.

Regular and Effective Contact (REC) Methods and Examples: Select the methods below that ensure regular effective contact (REC) will take place among students and among students and faculty (Title 5 §55204) by being initiated by the instructor, regular and frequent, and meaningful or of an academic nature. Select the methods of REC that may be used:

No Value

REC Among students: How will students interact with each other in the course? What methods will be used? Check all that apply.

- Discussion Boards
- Group Projects
- Q & A Discussion Boards

REC Among students and faculty: How will faculty interact with students in the course? What methods will be used? Check all that apply

- Announcements
- Assignment Feedback
- Discussion Boards
- Email
- Video Conferencing Technology (e.g. Zoom, MS Teams, etc...)
- Office Hours
- The Online Course Syllabus

Other Methods of REC among students and among students and faculty. Please describe and provide example(s).

No Value

In hybrid or teleclass courses, describe what parts of the course are done face-to-face and what parts are done online.

Labs will be face to face. All other aspects of course will be remote.

Checkoff List

Does this proposal meet the five development criteria as stated in the CCCCO Program and Course Approval Handbook (PCAH)?

Yes

Are library resources needed for this course?

No library resources are needed for this course.

Do you have any special concerns/needs or comments? If yes, describe.

No Value

Have you included documentation, if necessary, by uploading file(s) in the Cover Info tab? For example, advisory committee meeting minutes, C-ID descriptor, etc.)

Yes, I have uploaded file(s).

If this is a new course, have you attached the completed class capacity form, with required approvals, and uploaded the file in the Cover Info tab?

No, this is not a new course

If you are requesting Distance Education, did you complete the DE addendum tab?

Yes

If requesting transferability, have you completed the comparable courses field?

Yes

Add any additional comments you want reviewers to read.

No Value