CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

ACADEMIC SENATE

GENERAL EDUCATION COMMITTEE

REPORT TO

THE ACADEMIC SENATE

GE-075-156

GSC 1120 – Earth, Time, and Life (GE Area B1)

General Education Committee	Date: 06/29/2016
Executive Committee Received and Forwarded	Date: 08/17/2016
Academic Senate	Date: 08/31/2016 First Reading

BACKGROUND:

This is a revisioned course. Under the quarter system it is known as GSC 112 and it currently has GE status.

RESOURCES CONSULTED:
Faculty
Department Chairs
Associate Deans
Deans
Office of Academic Programs

DISCUSSION:

The GE Committee reviewed the ECO for this course and found it to satisfy the GE Student Learning Outcomes and other requirements for GE Area B1.

RECOMMENDATION:

The GE Committee recommends approval of GE-075-156, GSC 1120 – Earth, Time, and Life for GE Area B1.

GSC - 1120 - Earth, Time, and Life

C. Course - New General Education* Updated

General Catalog Information

Department*	**Geological Sciences**
Semester Subject Area*	**GSC**
Semester Catalog Number*	1120
Quarter Subject Area	**GSC**
Quarter Catalog Number	112
Course Title*	Earth, Time, and Life
Units*	**(3)**
C/S Classification *	**C-02 (Lecture Discussion)**

To view C/S Classification Long Description click: http://www.cpp.edu/~academic-programs/scheduling/Documents/Curriculum%20Guide/Appendix_C_CS_Classification.pdf

Component*	**Lecture**
Instruction Mode*	**Face-to-Face**
Grading Basis*	**Graded Only**
Repeat Basis*	**May be taken only once**

If it may be taken multiple times, limit on number of enrollments	**1**
Cross Listed Course Subject Area and Catalog Nbr (if offered with another department)	
Dual Listed Course Subject Area and Catalog number (If offered as lower/upper division or ugrd/grad)	
Choose appropriate type (s) of course(s)*	☑ Major Course ☐ Service Course ☑ GE Course ☐ None of the above
General Education Area / Subarea*	**B1**

To view the General Education SubArea definitions, click http://www.cpp.edu/~academic-programs/scheduling/Documents/Ch.3-GeneralEducationProposals.pdf.

I. Catalog Description

Catalog Description

A survey of Earth's history and changing environments: formation from the solar nebula, plate tectonics, 'continental drift,' and ocean basins; evolution of the hydrosphere, biosphere, and Earth landscape; crosscutting age relationships; fossil populations during successive geological ages; dating the past and development of the Geologic Time Scale; biostratigraphy; global climate change over time.

II. Required Coursework and Background

Prerequisite(s)

None

Corequisite(s)	
Pre or Corequisite (s)	
Concurrent	

III. Expected Outcomes

List the knowledge, skills, or abilities which students should possess upon completing the course.*	Upon successful completion of this course, students will be able to:

1. Describe the fundamental basis for theories of Earth formation and plate tectonics

2. Outline main subdivisions of the geologic time scale with respect to fossil evolution and global extinction events.

3. Utilize cross cutting age relationships revealed by photos or drawings of rock exposures to interpret the historical sequence of events.

4. Apply elements of the scientific method to interpret ancient environments and the evolution of Earth's features, biosphere, and climate over geologic time.

5. Analyze theories for mass extinctions and global environmental change and their implications for humankind.

If this is a course for the major, describe how these outcomes relate to the mission, goals and objectives of the major program.

Outcomes of this course will build student capacity in each of the following areas as defined by program objectives and student learning outcomes for the Geology Bachelor of Science degree program.

PSLO-1. Recognize and implement various facets of the scientific method.

PSLO -2. Effectively communicate results of scientific investigations in written and oral format.

PSLO -3. Recognize common Earth materials, structures, and landforms, describe their properties, and determine their age relationships.

Explain how the course meets the description of the GE SubArea(s). Please select appropriate outcomes according to the

This course addresses observational data, conceptual interpretations and scientific theories bearing on the historical evolution of our Planet Earth. Through application of the scientific method, students will relate age relationships between Earth materials to understanding of fundamental processes that are repeated over geologic time. The fossil record is examined to

GE Area/SLO mapping.	interpret biological evolution. Given its emphasis on Earth history and changing environments over geologic time, this course provides an appropriate complement to any B1 course, and furthermore offers scientific context for general discussion of values and ethics related to global environmental change.
Describe how these outcomes relate to the associated GE Learning Outcomes listed below.*	1a) Write effectively for various audiences. Students will use written words to describe Earth history processes and events. Homework assignments require a short written summary statement describing the work submitted. Quizzes and examinations contain short answer and/or essay questions that require students to describe their knowledge of specific course content in written words. (See also Course SLOs 1, 2, 3, 4 and 5 above) 1d) Construct arguments based on sound evidence and reasoning to support an opinion or conclusion. This course connects descriptive evidence or modern-day observations to historical geologic processes that controlled the evolution of our dynamic planet Earth. Students relate the fossil record and their knowledge of geologic age relationships to achieve conclusions about global extinction events. (See also Course SLOs 1, 3, 4, 5) 1e) Apply and communicate quantitative arguments using equations and graphical representations of data. The course addresses practical geoscience applications that require extraction of numerical data (dimensions, angles, quantities) from maps, cross section, or graphs and direct usage of equations. Examples may include rates of plate motion; changes in population of certain flora and fauna; calculation of ancient temperatures from oxygen and carbon isotopic data; estimations of rates of climate change. (See also Course SLOs 1 and 4) 2a) Apply scientific methods and models to draw quantitative and qualitative conclusions about the physical and natural world. A classic example of the scientific method addressed in this course is Snowball Earth hypothesis that has been used to explain at least two profound global cooling events during Precambrian time. Various types of supporting and contradictory observations are presented and evaluated, and possible extrapolations to more recent global temperature fluctuations are discussed. Similarly, several global extinction events are preserved in the fossil record. These may be explained by different competing hypotheses. Students are presented multiple sides of the controversy. (See also Course SLOs 4 and 5)
General Education Outcomes*	**Ia. Write effectively for various audiences** **Id. Construct arguments based on sound evidence and reasoning to support an opinion or conclusion.** **Ie. Apply and communicate quantitative arguments using equations and graphical representations of data.** **IIa. Apply scientific methods and models to draw quantitative and qualitative conclusions about the physical and natural world.**

To view the mapping, click https://www.cpp.edu/~academic-programs/Documents/GE%20SLO%20Mapping.pdf

IV. Instructional Materials

Provide bibliography that includes texts that may be used as the primary source for instruction, and other appropriate reference materials to be used in instruction. The reference list should be current, arranged alphabetically by author and the materials should be listed in accepted bibliographic form.

Instructional Materials*

Primary Texts may vary with instructor and over time. One example of a possible text is below:

1. Babcock, Loren E., 2009, *Visualizing Earth History*, Wiley in collaboration with National Geographic, 449p.

Secondary resources might include:

1. Carey, Stephen S., 2011, *A Beginners Guide to the Scientific Method, 4th edition*, Wadsworth, Inc.,

2. Nourse, J., Marshall, J, and Berry, D., 2003, *Practical Earth Science Exercises, revised 2nd edition*, Kendall Hunt Publishing Co., 120 p

3. Bakker, Robert T., 1986, *The Dinosaur Heresies*, William Morrow and Company, 481 p.

4. Frank, Louis A., 1990, *The Big Splash,* Birch Lane Press, 255 p.

5. Novachek, Michael, 1996, *Dinosaurs of the Flaming Cliffs,* Doubleday, 367 p.

6. Sampson, Scott, 2009, *Dinosaur Odyssey,* University of California Press, 332 p.

7. Shubin, Neil, 2009, *Your Inner Fish,* Vintage Books, 237 p.

8. Taquet, Philippe, 1998, *Dinosaur Impressions,* Cambridge University Press, 244 p.

9. Walker, Gabrielle, 2004, *Snowball Earth,* Crown Publishing Group, 288 p.

Lectures, lecture notes, homework assignments, and current papers on the diverse topics will also be made available on BlackBoard* by the instructor.

Faculty are encouraged to make all materials accessible. Indicate with an asterisk those items that have had accessibility (ATI/Section 508) reviewed. For more information, http://www.cpp.edu/~accessibility

V. Minimum Student Material

List any materials, supplies, equipment, etc., which students must provide, such as notebooks, computers, internet access, special clothing or uniforms, safety equipment, lockers, sports equipment, etc. Note that materials that require the assessment of a fee may not be included unless the fee has been approved according to University procedures.

Minimum Student Material*

notebook	Computer
graph paper	Internet service
e-mail	printer
cell phone	Standard writing materials
calculator	

VI. Minimum College Facilities

List the university facilities/equipment that will be required in order to offer this class, such as gymnastic equipment, special classroom, technological equipment, laboratories, etc.

Minimum College Facilities*

External Support

Library Services	Information Technology (IT) Services
Classroom Management System (e.g. BB)	copier
scanner	

Physical Space & Major Equipment

lecture room with seating for 60 students	smart classroom (computer/projector)
overhead screen	white board/dry erase markers
adjustable lighting	

VII. Course Outline

Describe specifically what will be included in the course content. This should not be a repetition of the course description but an expansion that provides information on specific material to be included in the class, e.g. lecture topics, skills to be taught, etc. This should not be a week-by-week guide unless all instructors are expected to follow that schedule.

Course Outline*

The following list is a representative sample of the topics that may be discussed during the class meetings:

- Course Logistics and Introduction to Earth History and the Scientific Method
- Origin of Planet Earth
- Plate Tectonics and Resulting Rocks and Minerals
- Geologic Time Scale: Relative vs. Absolute Time
- Interpreting the Rock Record and Paleoenvironments

- Origin of Life
- The Fossil Record and Evolution
- The Proterozoic and Snowball Earth Events
- The Early Paleozoic and the Cambrian Explosion
- Late Paleozoic and the Permian-Triassic Mass Extinction
- The Mesozoic: Triassic and Jurassic
- Dinosaurs and their Contemporaries
- The Mesozoic: Cretaceous and End-Cretaceous Mass Extinction
- The Cenozoic: Paleogene and Neogene and Mammalian Evolution
- The Cenozoic: Quaternary (Pleistocene, Holocene, and Anthropocene)
- Global Climate Change over Geologic Time

VIII. Instructional Methods

Describe the type(s) of method(s) that are required or recommended for the instruction of this course (lectures, demonstrations, etc.). Include any method that is essential to the course, such as the use of particular tools or software.

Instructional Methods*

lecture	field studies
problem-solving	case studies
discussion	individual instruction
small group activities	peer instruction
observation	creating and presenting a talk/speech
inquiry-based learning	project-based learning
assigned readings (textbook, journals, etc.)	demonstrations
outlining (readings, papers, activities, etc.)	invited speakers
review, evaluation, critique	project (by individual, group, and/or class)
study groups	

IX. Evaluation of Outcomes

Describe the methods to be used to evaluate students' learning, i.e. written exams, term papers, projects, participation, quizzes, attendance, etc.*

Students' learning of course content is evaluated **via classroom/group activities, homework assignments, short quizzes, midterm examination, and final examination.** Suggested weighting in grade calculations is 15% activities, 20% homework, 15% quizzes, 20% midterm, and 30% final exam. Classroom activities will graded on basis of level of participation and attendance; the other evaluation methods will be scored using standard numerical methods and/or rubrics. Instructor may substitute a second midterm in lieu of short quizzes.

Classroom Activities involve whole class or small group discussions of Earth history content that might include description of rocks and crosscutting field relationships in Cal Poly Pomona's Mesozoic Garden; development of techniques for geotechnical illustration, visualization of historical geologic processes, assessment of movies or presentations, and analysis of current events or issues in geosciences. Learning gain will occur through interactions between students, peers and instructor.

H**omework Assignments** include problems devised by instructor that ask students to expound upon examples and content presented during lecture. These assignments may include interpretation of maps and graphs, resolution of real-world geoscience problems through calculations, web research and associated explanation, evaluation of external public lectures or presentations, and description of on campus field sites such as BioTrek or the Mesozoic Garden.

Short Quizzes, to be given periodically during lecture meetings, will address content areas recently covered in lecture and assess short-term recall of important Earth history concepts. Instructor evaluations of quizzes provide study material to the student that is pertinent to examinations.

Examinations (midterm and final) are structured written assignments with a time limit that require students to demonstrate the knowledge gained in class to describe, explain, or interpret historical events or geologic processes. Types of questions may include multiple choice, match-up, short answer, label drawings or diagrams, short essays, calculations, an illustrate geologic processes or features with drawings. At least one midterm question will be written in nature and repeated on the final to assess student improvement and knowledge gained.

Describe the meaningful writing assignments to be included.*

Students will have multiple opportunities to demonstrate effective writing, with feedback provided through instructor comments. Homework assignments require a short written summary statement describing the work submitted. Quizzes and examinations contain short answer and/or essay questions that require students to describe their knowledge of specific course content in written words. Written responses will be evaluated by the instructor, with comments/corrections returned to students. Some questions may be repeated on the final examination. This process enables students to use the feedback to improve their technical writing and aids instructor assessment of student improvement and knowledge gained.

Discuss how these methods may be used to address the course and program outcomes, as appropriate. Include or attach a matrix to align the evaluation methods to the outcomes.*

Below is a Matrix indicating how assessment methods align to course learning outcomes.

	Methods of Assessment			
Student Learning Outcome (see detailed list in Part III above)	**Written Exams**	**Quizzes**	**Homework Assignments**	**Classroom Activities**
#1: Describe the fundamental basis for theories of Earth formation and plate tectonics	X		X	X
#2: Outline the geologic time scale with respect to fossil evolution and global extinction events.	X	X	X	
#3: Utilize crosscutting	X		X	X

age relationships to interpret historical sequence of events eeventsevents.				
#4: Apply scientific method to interpret ancient environments and evolution of Earth features, etc. biosphere, and climate over geologic time.			X	X
#5: Analyze theories for mass extinctions and global environmental change	X	X		X

If this is a general education course, discuss how these methods may be used to address the associated GE Learning Outcomes listed below. Include or attach a matrix to align the evaluation methods to the outcomes.*

Below is a matrix indicating how assessment methods evaluate the GE learning outcomes:

	Methods of Assessment			
GE Learning Outcome (see Part III above)	**Written Exams**	**Quizzes**	**Homework Assignments**	**Classroom Activities**
	X	X	X	

#1a: Write effectively				
#1d: Construct arguments	X		X	X
#1e: Quantitative reasoning	X	X	X	X
#2a: Scientific method			X	X

X. This OPTIONAL Section is for describing Course/Department/College specific requirements.

Department/ College Required ECO Information (Optional)	