

CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

ACADEMIC SENATE

GENERAL EDUCATION COMMITTEE

REPORT TO

THE ACADEMIC SENATE

GE-010-189

GSC 2700: The Age of Dinosaurs (GE Area B2)

General Education Committee

Date: 02/14/2019

Executive Committee
Received and Forwarded

Date: 04/10/2019

Academic Senate

Date: 04/24/2019
First Reading

TITLE OF REFERRAL: GSC 2700- AGE OF DINOSAURS

BACKGROUND:

This is a new general education course for GE Area B2, Biological Sciences.

RESOURCES CONSULTED:

Office of Academic Programs

Àngel Valdés, Jasha Polet, Johnathan Nourse

DISCUSSION:

The GE Committee evaluated the ECO of this course, its objectives, how it meets the relevant GE student learning outcomes, the methods of assessment and other relevant details and found it to meet the requirements of GE Area B2. The GE Committee also consulted members of the Biology Department for any impact or duplication. The Biology and Geological Sciences Departments worked out possible objections by Biology and the ECO was modified accordingly.

RECOMMENDATION:

The GE Committee recommends approval of GE-010-189, GSC 2700: Age of Dinosaurs

Curriculog printout provided for reference only. For most recent changes please refer to Curriculog database (<https://cpp.curriculog.com/>).

GSC - 2700 - Age of the Dinosaurs

C. Course - New/Modify General Education

General Catalog Information

Department*

Geological Sciences

Proposal Type*

New GE Course

Modify GE Course

Modification Summary

"Age of the Dinosaurs" is a new Area B2 GE class designed by Drs. Donald Prothero and Alyssa Bell. Both are skilled biologists currently teaching biology-related courses for the Geological Sciences Department. Dr. Prothero is a renowned Paleontologist, holding BA degrees in Geology and Biology, and a PhD in Geological Sciences. He teaches Invertebrate Paleontology and several GE synthesis courses for the Geology Department, and will teach a popular "Special Studies" class on Dinosaurs for the second time Spring semester, 2019. Dr. Bell holds a BA in Ecology & Systematics, an MS in Environmental Microbiology, and a PhD in Vertebrate Paleontology. She is currently teaching Principles of Evolution for the CPP Biology Department and Earth, Time and Life for the Geology Department. She also taught a Dinosaurs class for the University of Tennessee.

We plan to offer one section of this course each semester as an Area B2 option for all majors. It will integrate biological and earth science topics that include: the fundamentals of geologic dating and geology of the Mesozoic era; the evolution of non-dinosaurian life (animals and plants) of the Mesozoic; the methods of cladistics as applied to determining evolutionary relationships and informing taxonomy; a review of the major groups of dinosaurs, and their evolution; debates over dinosaur behavior, physiology, and reproduction; and the evidence for the mass extinction that ended the Mesozoic.

A course along these lines is already taught as a non-major introductory course in many different universities around the country, with three different textbooks serving this market. Because enrollment will be limited to ~ 75 students per semester, impact on GE enrollments in the Biological Sciences Department should be minimal.

Establish or Modify Articulation Agreement*

Yes

No

Subject Area*

GSC

Catalog Number* 2700

Formal Course Age of the Dinosaurs

Title*	
Abbreviated Course Title* Age of the Dinosaurs	
Unit(s)*	(3)
C/S Classification*	C-01 (Large Lecture)

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
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Contact Hour(s)

Instruction Mode(s)*	Face-to-Face	Hybrid w/Asynchronous Component
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Grading Basis*	Graded Only
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Repeat for Credit*	May be taken only once
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Repeat for Credit Limit

If course may be repeated for credit, total units applicable to degree and max units per semester.

When Offered

Cross Listed Course Subject Area and Catalog Nbr

Dual Listed Course Subject Area and Catalog Nbr
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Course Category (select all that apply)*	<input checked="" type="checkbox"/> Major Course <input type="checkbox"/> Service Course (used in other programs)
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<input checked="" type="checkbox"/> GE Course <input type="checkbox"/> None of the above	
GE Area/Subarea*	B2

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* Evolution of life during the Mesozoic era. Examination of the evolution of Mesozoic animals and plants, including the major dinosaur groups, controversies over dinosaurian behavior, physiology, and extinction; and the geology of the Mesozoic.

II. Required Coursework and Background (i.e. Enrollment Requirements)

Prerequisite(s)
(leave blank if none)

Corequisite(s)
(leave blank if none)

Pre or Corequisite(s)
(leave blank if none)

Concurrent (leave blank if none)

III. Course Note(s) (OPTIONAL)

Note(s)

IV. Expected Outcomes

List the knowledge, skills, or abilities which students should possess upon completing the course.*

By the end of the semester, every student should be able to:

1. Identify the major clades of dinosaurs and describe their primary attributes (anatomy, behavior, stratigraphic and geographic distribution, etc.);
2. Explain basic principles of evolutionary biology, including selection, phylogenetics, speciation, and extinction, and the role of biomolecules such as DNA and proteins;
3. Understand the basic principles of geologic dating and plate tectonics and paleogeography of the Mesozoic era; and
4. Analyze and evaluate claims of inferred dinosaurian behavior, physiology, and

extinction patterns from fossil evidence

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

This course will satisfy the GE Area B2 requirement for Geology majors. It provides GSC majors a different way to gain significant biology background, in a context that is more relevant to geology.

Three Geology BS program learning outcomes (PLOs), are addressed:

PLO 1) Recognize and implement various facets of the scientific method (see also PLO 2)

PLO 2) Effectively communicate results of scientific investigations in written and oral format

PLO 7) Utilize quantitative reasoning, experiential judgment, and computer technology to assess data, draw conclusions, and solve problems.

Explain how the course meets the description of the GE SubArea(s). Please select appropriate outcomes according to the GE Area/SLO mapping.*

In accordance with p. 23 of the Curriculum Guide for GE proposals, this course provides students fundamental knowledge of living systems, specifically dinosaurs and other vertebrates and plants of the Mesozoic. Heavy emphasis is placed on topics of biological interest: understanding the systematics, ecology, and evolution of dinosaurs and other Mesozoic organisms. There will be some cross-cultural components as we describe the history and discoveries of dinosaur paleontologists from around the world.

Describe how these outcomes relate to the associated GE Learning Outcomes listed below.*

In 2015, CPP published a matrix linking Area B2 classes with the four GE learning outcomes listed below. Our proposed course addresses each outcome as follows:

GE Learning Outcome 1a:

The course will include a significant writing component, including essay exams, quizzes, homework exercises, class activities, and possibly term papers.

GE Learning Outcome 1d:

Students in this course will be exposed to major debates in dinosaur paleontology, and learn to evaluate the evidence on topics such as dinosaur evolution, physiology, behavior, and extinction.

GE Learning Outcome 1e:

Some of the topics (e.g., predator/prey ratios, ontogenetic change, surface area/volume ratios and dinosaur homeothermy, and ecomorphology) are highly quantitative and will provide practice in the utilization and interpretation of data, including equations and graphing.

GE Learning Outcome 1la:

Students will see the scientific method in action, especially as it concerns debates and arguments over controversies about dinosaur physiology and extinction.

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>

V. 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*

Required Primary Textbook: Fastovsky, D., and D. Weishampel, 2016, *Dinosaurs: A Concise Natural History* (3rd ed.), Cambridge University Press

Other References:

Alvarez, L. et al. 1980. Extraterrestrial cause for the Cretaceous-Tertiary extinction. *Science*.

Bakker, R.T. 1975 (April) Dinosaur Renaissance. *Scientific American*.

Baron, M. et al. 2017. A new hypothesis of dinosaur relationships and early dinosaur evolution. *Nature*.

Horner, J. and R. Makela. 1979. Nest of juveniles provides evidence of family structure among dinosaurs. *Nature*.

van Tuinen et al. 2000. The early history of modern birds inferred from DNA sequences of nuclear and mitochondrial ribosomal genes. *Molecular Biology and Evolution*.

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](#)

VI. Minimum Student Materials

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 Materials*

Other than writing materials and internet access for homework assignments, no special equipment is required

VII. 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*

Smart classroom with adequate projection of PowerPoint, internet connection, and the ability to play DVDs. The Geology Department has already invested in replicas of dinosaur fossils, and we have access to casts and replicas of fossils from the Natural History Museum of Los Angeles County. We have also borrowed materials from the Biology Department in the past to teach about comparative anatomy and osteology, and teach about the entire Reptilia, including dinosaurs. We will make use of the Mesozoic Garden (located on campus outside Building 3).

VIII. 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*

Below is a list of topics to be covered in this course:

1. Introduction to dinosaur paleontology and the scientific method
2. Notable paleontologists, including members of groups traditionally underrepresented in the sciences, such as women and people of color
3. Fundamentals of evolution, including selection, phylogenetics, and speciation; and the chemistry of life, including DNA and proteins
4. Fundamentals of geologic dating, plate tectonics, and Mesozoic geology

5. Non-dinosaurian life of the Mesozoic
6. The systematics of Reptilia, including the major groups of dinosaurs, and bird origins, including the role of modern genetics in understanding bird origins and diversification
7. Dinosaur paleobiology, physiology, and behavior
8. The extinction of the non-avian dinosaurs, an a look at the limitations of de-extinction, including DNA decay, cloning, and genetic engineering
9. Learning activity at the Raymond Alf Museum of Paleontology in Claremont

IX. 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*

The course will largely be taught by conventional face-to-face lectures, using PowerPoint slides, videos, and animations as necessary. There will be demonstrations and hands-on, in-class activities focused on biological principles (comparative anatomy, phylogenetics, etc.) using our dinosaur fossil replicas and materials borrowed from the comparative collections of the Biology Department and the Natural History Museum. There will also be homework exercises, such as a visit to study the plants at the CPP Mesozoic Garden. Students may also be asked to access learning materials on Blackboard, and complete related activities / questions on line.

X. Evaluation of Outcomes

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

Instructor scoring of written exams that incorporate short answer and essay questions will be the primary method of evaluation. Additional feedback to students will be provided by periodic evaluation of homework assignments, short quizzes, in class, classroom activities and related discussions, and possibly a term paper (depending on instructor).

Describe the required meaningful writing assignments to be included.*

Meaningful writing activities in the course include the midterm and final examinations (short-answer and essay questions) and the written homework assignments. These writing assignments require students to integrate their understanding of the scientific method and synthesis of data with the construction of arguments to demonstrate effective written communication in both short and long formats.

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.*

Course learning outcomes are assessed through instructor evaluation of exams, quizzes, homework assignments and classroom activities (see matrix below). In addition, these evaluative methods address three Geology BS program learning outcomes (PLOs), as described below:

PLO 1) Recognize and implement various facets of the scientific method.

Students will see the scientific method in action, especially as it pertains to debates and arguments over controversies about dinosaur physiology and extinction. See also PLO 2 below.

PLO 2) Effectively communicate results of scientific investigations in written and oral format

Writing assignments require students to integrate their understanding of the scientific method and synthesis of data with the construction of arguments to demonstrate effective written communication in both short and long formats.

PLO 7) Utilize quantitative reasoning, experiential judgment, and computer technology to assess data, draw conclusions, and solve problems.

Topics such as predator/prey ratios, ontogenetic change, surface area/volume ratios and dinosaur homeothermy, and ecomorphology are quantitative and will provide practice in the utilization and interpretation of data, including equations and graphing. Some of the related assignments will involve computer technology.

Below is a Matrix indicating how assessment methods address the course learning outcomes:

Course Learning Outcome	Methods of Assessment			
	Exams	Quizzes	Homework	Classroom Activities
#1: Identify the major clades of dinosaurs and their primary attributes (anatomy, behavior, stratigraphic and geographic distribution, etc.).	X	X		X
#2: Explain basic principles of evolutionary biology, including selection, phylogenetics, speciation, and extinction; and the role of biomolecules such as DNA and proteins.	X		X	X
#3: Understand the basic principles of geologic dating, plate tectonics, and paleogeography of the Mesozoic.	X		X	X

#4: Analyze and evaluate claims of inferred dinosaurian behavior, physiology, and extinction patterns from fossil evidence	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.*

Relationships between course content and four GE learning outcomes are described in Part IV. We will use exams, quizzes, homework assignments and classroom activities to assess these outcomes. Instructor provides students periodic feedback through classroom discussions and grading of written work and. Selected quiz or exam questions will be repeated on the final examination to assess the learning gain.

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

GE Learning Outcome (for Area B2)	Methods of Assessment			
	Exams	Quizzes	Homework	Classroom Activities
#1a: Write effectively for various audiences	X	X	X	
#1d: Construct arguments based on sound evidence and reasoning to support an opinion or conclusion	X		X	X
#1e: Apply and communicate quantitative arguments using equations and graphical representations of data.	X	X	X	
#2a: Apply scientific methods and models to draw quantitative and qualitative conclusions about the physical and natural world.	X		X	X

XI. Course/Department/College Specific Requirements (OPTIONAL)

**Department/
College Required
ECO Information
(Optional)**

FOR OFFICE OF ACADEMIC PROGRAMS USE ONLY

**AY Proposal
Submitted** 2018-2019

**AY Proposal
Implemented**

**PS Academic
Group** 75-CSCI

**PS Academic
Organization** 308-GSC

Course Type Geological Sciences

**Impact Report
(for modified
courses only)** Attached

FOR ACADEMIC SENATE OFFICE USE ONLY

Senate Referral GE-010-189
Number

**Senate Report
Number**