Eastern Illinois University
New Course Proposal
GEL 3085, Vertebrate Paleoenvironments and Paleoecology

Please check one:  ☑ New course  ☐ Revised course

PART I: CATALOG DESCRIPTION

1. Course prefix and number, such as ART 1000:  GEL 3085
2. Title (may not exceed 30 characters, including spaces):  Vertebrate Paleoenvironments
   title, if any (may not exceed 100 characters, including spaces):  Vertebrate paleoenvironments and paleoecology
3. Class hours per week, lab hours per week, and credit [e.g., (3-0-3)]:  3-0-3
4. Term(s) to be offered:  ☐ Fall  ☑ Spring  ☐ Summer  ☐ On demand
5. Initial term of offering:  ☐ Fall  ☑ Spring  ☐ Summer  Year:  2011
6. Course description (not to exceed four lines):  This course will investigate principles of vertebrate paleontology, paleoenvironmental and paleoecological reconstructions and analyses. The focus will be on the fossil record of vertebrate organisms from their origins through the Pleistocene.

7. Registration restrictions:
   a. Identify any equivalent courses (e.g., cross-listed course, non-honors version of an honors course). None
   b. Prerequisite(s), including required test scores, courses, grades in courses, and technical skills. Indicate whether any prerequisite course(s) MAY be taken concurrently with the proposed/revised course. GEL 1430 Historical Geology or permission of the instructor; may not be taken concurrently
   c. Who can waive the prerequisite(s)?
      ☐ No one  ☐ Chair  ☑ Instructor  ☐ Advisor  ☐ Other (Please specify)
   d. Co-requisites (course(s) which MUST be taken concurrently with this one):
   e. Repeat status:  ☑ Course may not be repeated.
      ☐ Course may be repeated to a maximum of hours or times.
   f. Degree, college, major(s), level, or class to which registration in the course is restricted, if any: Sophomore, Junior, or Senior status
   g. Degree, college, major(s), level, or class to be excluded from the course, if any: None

8. Special course attributes [cultural diversity, general education (indicate component), honors, remedial, writing centered or writing intensive] None
9. **Grading methods** (check all that apply): ☑ Standard letter ☐ C/NC ☐ Audit ☐

ABC/NC (“Standard letter”—i.e., ABCDF--is assumed to be the default grading method unless the course description indicates otherwise.)

10. **Instructional delivery method:** ☑ lecture ☐ lab ☐ lecture/lab combined ☐ independent study/research ☐ internship ☐ performance ☐ practicum or clinical ☐ study abroad ☐ other

**PART II: ASSURANCE OF STUDENT LEARNING**

1. Objectives- Upon successful completion of this course, students will be able to:
   - Make connections between Earth history events, and evolutionary events of vertebrates.
   - Understand and discuss evolutionary theory with respect to vertebrates
   - Discuss the impacts of Extinction Events on vertebrate fauna
   - Assess paleoecological and paleoenvironmental studies of vertebrate deposits
   - Understand and discuss the origin, evolution, and diversification of vertebrates over geologic time.

2. Assignments/activities the instructor will use to assess student learning:
   - Mid-term examination  20 %
   - Presentation of primary source literature 20 %
   - Quizzes 15 %
   - Term Paper 20 %
   - Final Examination 25 %

3. Explain how instructor will determine students’ grades:

<table>
<thead>
<tr>
<th>Learning Objectives</th>
<th>20 % Mid-term Exam</th>
<th>20 % Presentations</th>
<th>15 % Quizzes</th>
<th>20 % Term Paper</th>
<th>25 % Final Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make connections between Earth history events and evolutionary events of vertebrates.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Understand and discuss evolutionary theory with respect to vertebrates.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Discuss the impacts of Extinction Events on vertebrate fauna</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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2
Learning Objectives | 20 % Mid-term Exam | 25 % Homework Assignments | 10 % Quizzes | 20 % Term Paper | 25 % Final Exam
---|---|---|---|---|---
Assess paleoecological and paleoenvironmental studies of vertebrate deposits | X | X | X | X | X
Have a basic understanding of the origin, evolution and diversification of vertebrates over geologic time. | X | X | X | X | X

4. Not technology delivered
5. Not graduate level course.
6. This course is writing-active. Students will be required to write up summaries of primary source reading, as part of homework assignments. Examinations will require some responses in essay format. The term paper will require a 10 page research paper focusing on some aspect of vertebrate paleontology.

PART III: OUTLINE OF THE COURSE

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Geologic Time and Paleontology</td>
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<tr>
<td></td>
<td>Geologic Time (relative and numerical dating)</td>
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<tr>
<td></td>
<td>Paleontology, paleoclimate and paleoecology</td>
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<td></td>
<td>Tectonics</td>
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<td></td>
<td>Classification</td>
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<td></td>
<td>The Fossil Record and Taphonomy</td>
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</tbody>
</table>

Supplemental Readings (for example):
2  Evolutionary Theory
Darwinian Evolution
Punctuated Equilibrium
Evolutionary relationships and phylogenetics

Readings from:
Weiner, J., 1994. The Beak of the Finch. (selected readings)

3  Origins of vertebrates
Basal chordates
Hemichordates
Conodonts and early chordates
End Ordovician Extinction Event

Readings from (for example):
Young, S.A., Saltzman, M.R., Foland, K.A., Linder, J.S., Kump, L.R., 2009. A major drop in seawater $^{87}\text{Sr}/^{86}\text{Sr}$ during the Middle Ordovician (Darriwilian); links to volcanism and climate? Geology, v. 37(10), p. 951-954.

4&5  Early Paleozoic Fishes and Environments
Jawless Fishes
Placoderms
Early Sharks and Bony Fishes

Supplemental Readings (for example):


6&7  **Invasion of land**

- adapting to land
- Devonian tetrapods
- Devonian-Permian paleoenvironments
- Carboniferous tetrapods
- anapsids, diapsids, synapsids, therapsids
- Permian-Triassic Extinction Event
- Case Studies: Pennsylvanian pelycosaurs, Permian of South Africa, Permian-Triassic Extinction Event

Readings from (for example):


8&9  **Dinosaurs, Mesozoic Marine Revolution, and Birds**

- archosauromorphs
- Triassic paleoenvironments
- marine reptiles
- dinosaurs
- Flight
- Pterosaurs
Birds
Cretaceous-Paleocene Extinction Event

Readings from (for example):


10 & 11 Into the Cenozoic World
Paleocene-Eocene Teleost Fishes
Paleogene Mammalian Fauna
Biogeography, paleoclimate and tectonics of the Paleocene and Eocene
Paleocene Eocene Thermal Maximum

Readings from (for example):


12 **Placental Mammals**

Reproductive strategy
Cenozoic Mammalian diversification and radiation
Paleogene Mammalian Fauna

Readings from (for example):

13&14 **Neogene Mammalian Fauna**

Biogeography and centers of evolution
Evolution of horses
Evolution of elephants (mammoths, mastodons, etc)
Pleistocene Mammals and Extinctions
La Brea Tar Pits

Readings from (for example):


PART IV: PURPOSE AND NEED

1. Explain the department’s rationale for developing and proposing this course.

   This course will provide students with an interest in Paleontology the opportunity to take an elective course that complements Invertebrate Paleontology (GEL 4490), a required course for Geology majors. The focus of this course is to help students associate changing paleoenvironmental and paleoecological conditions with changing vertebrate fauna through geologic time. The course aims to help students integrate concepts of paleontology, stratigraphy, and historical geology through the perspective of vertebrate organisms.

2. Historical Geology (GEL 1430) is the prerequisite for this course and will prepare students for this course by giving them a basic understanding of the geological history.
of the Earth. In special situations (i.e. Biology majors), the instructor may allow enrollment without GEL 1430.

2. BIO 3950 Vertebrate Natural History is not an equivalent course. Vertebrate Paleoenvironments aims to investigate the fossil record of vertebrates using specific examples from different stratigraphic units. Dr. Steve Mullin in Biology, who teaches BIO 3950, has seen the course proposal and offered suggestions which have been taken into account. He is supportive of GEL 3090.

BIO 4984 Organic Evolution is also not an equivalent course. While there may be some overlap in material at the beginning of the proposed Vertebrate Paleoenvironments course, the bulk of the course will be focused on the fossil record. Dr. Gary Fritz agrees that there is not substantial overlap with Organic Evolution.

4. This course will be offered as an elective within the B.S. Geology major program.

PART V: IMPLEMENTATION
1. Faculty member(s) to whom the course may be assigned:
   Dr. Katherine Johnson or qualified faculty members in the Geology or Geography Program.

2. Additional costs to students:
   Field Trip

3. Text:
   Supplemental Readings will be put on reserve at the library

PART VI: COMMUNITY COLLEGE TRANSFER
   A community college course will not be judged equivalent to this course.

PART VII: APPROVALS

Date approved by the Department of Geology/Geography: March 29, 2010

Date approved by the College of Sciences Curriculum Committee: April 9, 2010

Date approved by CAA: April 22, 2010
*In writing-active courses, frequent, brief writing activities and assignments are required. Such activities -- some of which are to be graded – might include five-minute in-class writing assignments, journal keeping, lab reports, essay examinations, short papers, longer papers, or a variety of other writing-to-learn activities of the instructor's invention. Writing assignments and activities in writing-active courses are designed primarily to assist students in mastering course content, secondarily to strengthen students' writing skills. In writing-intensive courses, several writing assignments and writing activities are required. These assignments and activities, which are to be spread over the course of the semester, serve the dual purpose of strengthening writing skills and deepening understanding of course content. At least one writing assignment is to be revised by the student after it has been read and commented on by the instructor. In writing-intensive courses, students' writing should constitute no less than 35% of the final course grade. In writing-centered courses (English 1001G, English 1002G, and their honors equivalents), students learn the principles and the process of writing in all of its stages, from inception to completion. The quality of students' writing is the principal determinant of the course grade. The minimum writing requirement is 20 pages (5,000 words).