Agenda Item #17-78
Effective Summer 2017

Eastern Illinois University
New Course Proposal
BIO 3155G, Introduction to Evolutionary Medicine

Banner/Catalog Information (Coversheet)

1. **__X__New Course or _____Revision of Existing Course**
2. **Course prefix and number:** _BIO 3155G_____
3. **Short title:** __Evolutionary Medicine Intro_____
4. **Long title:** Introduction to Evolutionary Medicine_____
5. **Hours per week:** _3__ Class _0__ Lab _3__ Credit
6. **Terms:** ___ Fall ___ Spring _X__ Summer ___ On demand
7. **Initial term**: ___ Fall ___ Spring __X_ Summer Year: _2017_
8. **Catalog course description:** A survey of current topics in evolutionary medicine, such as cancer treatment, antibiotic resistance, asthma and diseases of civilization will be explored and analyzed using the mechanisms of evolution natural selection, generation of biological traits and evolutionary history "mismatch" to current lifestyles affecting human biology today.
9. **Course attributes:**

   General education component: Scientific Awareness_____

   ___ Cultural diversity ___ Honors ___ Writing centered ___ Writing intensive ___Writing active

10. **Instructional delivery**
    Type of Course:

    _X_ Lecture ___ Lab ___ Lecture/lab combined ___ Independent study/research

    ___ Internship ___ Performance ___ Practicum/clinical ___ Other, specify: _____

    Mode(s) of Delivery:

    ___ Face to Face _X_ Online ___ Study Abroad

    ___ Hybrid, specify approximate amount of on-line and face-to-face instruction_____

11. Course(s) to be deleted from the catalog once this course is approved.
    _____**NONE**_____

12. **Equivalent course(s): __NONE**_____

    a. Are students allowed to take equivalent course(s) for credit? ___ Yes __X No

13. **Prerequisite(s): ____NONE**_____

    a. Can prerequisite be taken concurrently? ___ Yes ___ No

    b. Minimum grade required for the prerequisite course(s)? ___

c. Use Banner coding to enforce prerequisite course(s)? ___ Yes ___ No

d. Who may waive prerequisite(s)?

___ No one ___ Chair ___ Instructor ___ Advisor ___ Other (specify)

14. Co-requisite(s): __**NONE**_____

15. Enrollment restrictions

a. Degrees, colleges, majors, levels, classes which may take the course: _Off-campus students that are non-Biological Sciences majors and minors._____

b. Degrees, colleges, majors, levels, classes which may not take the course: _Biological Sciences majors and minors ; on-campus students_____

16. Repeat status: __X_ May not be repeated ___ May be repeated once with credit

17. Enter the limit, if any, on hours which may be applied to a major or minor: ___

18. Grading methods: __X_ Standard ___ CR/NC __ Audit ___ ABC/NC

19. Special grading provisions:

___ Grade for course will not count in a student's grade point average.

___ Grade for course will not count in hours toward graduation.

___ Grade for course will be removed from GPA if student already has credit for or is registered in: _____

___ Credit hours for course will be removed from student's hours toward graduation if student already has credit for or is registered in: _____

20. Additional costs to students:
Supplemental Materials or Software_____

Course Fee _X__No ___Yes, Explain if yes_____

21. Community college transfer:

___ A community college course may be judged equivalent.

__X_ A community college may not be judged equivalent.

Note: Upper division credit (3000+) will not be granted for a community college course, even if the content is judged to be equivalent.

Rationale, Justifications, and Assurances (Part I)

1. ___Course is required for the major(s) of _____
   ___Course is required for the minor(s) of _____
   ___Course is required for the certificate program(s) of _____
   __X_ Course is used as an elective
2. **Rationale for proposal**: This course addresses an important emergent topic (Evolutionary Medicine) in evolutionary biology not currently available to students except in a small number of institutions. This non-majors course will add to the Department of Biological Sciences' outreach to non-biologists concerning the impact of evolutionary processes on the organic world and human health.
3. **Justifications for (answer N/A if not applicable)**

   Similarity to other courses:

   Some mechanics of evolutionary processes (e.g., natural selection, genetic drift, etc.) are fundamental and will overlap with BIO 3003G "Introduction to evolution." The application of these mechanisms and processes to human biology and health differs from the more general and widespread introduction to evolution in BIO 3003G.

   Prerequisites: N/A

   Co-requisites: N/A

   Enrollment restrictions:

   As a course offered to fulfill a general education requirement, the course will not count toward the Biological Sciences Major/Minor. As an online course, only off-campus students may enroll.

   Writing active, intensive, centered: N/A
4. **General education assurances (answer N/A if not applicable)**

   General education component:

   Scientific Awareness: Students in this course will interpret and analyze topics in human health using an evolutionary biologist's toolkit and perspective. Students will build scientific literacy and mindful communication through analyses of studies, discussions and making inferences and predictions about research conclusions on human health.

   Curriculum:

   Please see Part II.3 and II.8 for learning objectives and their incorporation into the proposed "Introduction to Evolutionary Medicine" course.

Instruction:

The course will be delivered asynchronously online; this course may be taught by qualified faculty who are OCDI certified. Students will engage in discussion asynchronously, by both posting original ideas and responding to posts by peers. This course will enlarge the offerings for off-campus students at EIU.

Assessment:

Please see Part II.3, II.6-II.8 for assessment modes and their incorporation into the proposed "Introduction to Evolutionary Medicine" course.

5. Online/Hybrid delivery justification & assurances (answer N/A if not applicable)

Online or hybrid delivery justification:

Online delivery of the "Introduction to Evolutionary Medicine" will allow off-campus students to engage in the proposed class without having to attend classes on EIU's main campus. This is an additional opportunity to increase the scientific awareness of off-campus students.

Instruction:

Qualified faculty who are OCDI certified (or have equivalent training) will teach this course. The course will be delivered asynchronously, (with content (PowerPoint lectures, video, discussion forums, quizzes, tests) available at times convenient for students off campus.

Integrity:

Tests will be taken with the Respondus Lockdown Browser to help prevent academic dishonesty; submitted homework and term papers will be submitted via "Turnitin" antiplagiarism software.

Interaction:

Students will participate in discussion with peers in response to instructor stem questions relating to course content in D2L discussion forums. Students can interact with the instructor via email, or by phone.

Model Syllabus (Part II)

1. Course number and Title: BIO 3155G / Introduction to Evolutionary Medicine
2. Catalog Description: Current topics in evolutionary medicine, such as cancer treatment, antibiotic resistance, asthma, cardiovascular and other so-called “diseases of civilization” will be analyzed using the mechanisms of evolution such as natural selection, which affect the health outcomes of biological traits; the theme of "mismatch" between human evolutionary history and current lifestyles affecting human health will be explored.
3. Learning Objectives:
   A. Engage in discussion relating to topics in evolutionary medicine. (CT 1-6, WR 2, 5 & 6, RC 1, 2, 4).
   B. Recognize, analyze and evaluate the types of human health issues where an evolutionary

perspective is necessary, in written context. (CT 1-6, WR 1-6, RC 1, 2 & 4).

C. Develop a complex, multi-level assessment of topics in evolutionary medicine (heritability, molecular clock information, variability in human populations to disease susceptibility and resistance). (CT 1-6, WR 4-6, QR 1-3, 5, RC 1, 2).

D. Research a topic in evolutionary medicine and present the information in a written format (e.g., term paper). (CT 1-6, WR 1-7, RC 1, 2, 4).

4. Course materials: Reading appropriate to a 3,000-level non-majors course will be provided from currently published lay articles, videos and textbook chapters (e.g., Evolutionary Medicine 2016 by Stearns & Medzhitov, etc.)

5. <u>Weekly Outline for 15-week semester (A) and 8-week summer course (B).</u>

A. Content outline for 15-week semester per CAA course proposal guidelines.

Week	Module	Content
1	**1**	**Introduction:** course mechanics, discussion expectations, brief paper requirements; introduction to the evolutionary biologist's toolkit (terms & definitions).
2-3	**2**	**Evolutionary thinking "tools" applied to human health:** Natural selection using exemplars (e.g., malaria & maintenance of the sickle cell allele, human microbial flora and antibiotic resistance).
4-6	**2 cont**.	**Evolutionary thinking "tools" applied to human health:** Additional mechanisms for evolutionary change: neutral mutations (e.g. tamiflu and H1N1) and genetic drift; understanding and applying the molecular clock.
7-8	**3**	**Adaptations with health consequences and trade-offs**: Evolution of aging, stem cells, the development of the invasive placenta and origins of cancer.
9-10	**4**	**Adaptations to disease and pathogens**: evolution of human defenses and pathogen evolution, cancer from an evolutionary perspective, understanding the role of natural selection on cancerous cells.
11-12	**5**	**Reproduction from an evolutionary perspective**: reproductive rate, parent-offspring conflict, kin selection, genomic imprinting and menstruation.
13-14	**6**	**Mismatches:** Biological traits cannot keep pace with the changes of "modernity" in culture/environment.
15	**6 cont.**	**Mismatches:** Biological traits cannot keep pace with the changes of "modernity" in culture/environment.
16		**Final Exam**

B. Content Outline: 8-week summer course

Week	Module	Content
1 **1 cont.**	**1** **2**	**Introduction:** course mechanics, discussion expectations, brief paper requirements; introduction to the evolutionary biologist's toolkit (terms & definitions). **Evolutionary thinking "tools" applied to human health:** Natural selection using exemplars (e.g., malaria & maintenance of the sickle cell allele, human microbial flora and antibiotic resistance).
2	**2 cont.**	**Evolutionary thinking "tools" applied to human health:** Additional mechanisms for evolutionary change: neutral mutations (e.g. tamiflu and H1N1) and genetic drift; understanding and applying the molecular clock.
3	**3**	**Adaptations with health consequences and trade-offs**: Evolution of aging, stem cells, the development of the invasive placenta and origins of cancer.
4	**3 cont.-4**	**Module 3 cont. & Adaptations to disease and pathogens**: evolution of human defenses and pathogen evolution, cancer from an evolutionary perspective, understanding the role of natural selection on cancerous cells.
5	**5**	**Reproduction from an evolutionary perspective**: reproductive rate, parent-offspring conflict, kin selection, genomic imprinting and menstruation.
6-8	**6**	**Mismatches:** Biological traits cannot keep pace with the changes of "modernity" in culture/environment.
	6 cont.	**Mismatches:** Biological traits cannot keep pace with the changes of "modernity" in culture/environment.
End of week 8		**Final Exam**

6. Assignments and evaluation, including weights for final course grade
Quizzes 3 @ 50 pts = 150 pts (25%)
Discussion Questions, Homework = 100 pts (16.67%)
Midterm Exam = 100 pts (16.67%)
Term paper = 100 pts (16.66%)
Final Exam = 150 pts (25%)
Total = 600 pts

7. Grading scale: A =90 to 100%, B = 80 to 89%, C = 70-79%, d = 60-69% F = < 60%

8. Correlation of learning objectives to assignments and evaluation:

Learning Objectives	Quizzes, Discussions, Homework (41.67%)	Term paper (16.66%)	Midterm & Final Exam (41.67%)
Engage in discussion with peers relating to topics in evolutionary medicine. (CT 1-6, WR 2, 5 & 6, RC 1, 2, 4).	X		
Recognize, analyze and evaluate the types of human health issues where an evolutionary perspective is necessary, in written context (CT 1-6, WR 1-6, RC 1, 2 & 4)	X	X	X
Develop a complex, multi-level assessment of topics in evolutionary medicine (e.g., heritability, molecular clock information, variability in human populations to disease susceptibility and resistance). (CT 1-6, WR 4-6, QR 1-3, 5, RC 1, 2)		X	X
Research a topic in evolutionary medicine and present the information in a written format (e.g., term paper). (CT 1-6, WR 1-7, RC 1, 2, 4).		X	

Date approved by the department or school: February 21, 2017
Date approved by the college curriculum committee: February 24, 2017
Date approved by the Honors Council *(if this is an honors course):*
Date approved by CAA: March 9, 2017 CGS: Not applicable