Texas A&M University
Departmental Request for a New Course
Undergraduate • Graduate • Professional
Submit original form and 2 copies. Attach a course syllabus to each.

1. This request is submitted by the Department of Wildlife & Fisheries Sciences

2. Course prefix, number and complete title: WFSC 648 - Molecular Evolution

3. Course description (not more than 50 words):

4. Prerequisite(s): Basic course in general genetics and Evolution

5. Is this a variable credit course? □ Yes □ No If yes, from _______ to _______.

6. Is this a repeatable course? □ Yes □ No If yes, this course may be taken ______ times. Will the course be repeated within the same semester/term? □ Yes □ No

7. Has this course been taught as a 489/689? □ Yes □ No If yes, how many times?

8. This course will be:
   a. required for students enrolled in the following degree program(s) (e.g., B.A. in history)
   b. an elective for students enrolled in the following degree program(s) (e.g., M.S., Ph.D. in geography)

9. If other departments are teaching or are responsible for related subject matter, the course must be coordinated with these departments. Attach approval letters.

10. Prefix Course # Title (exclude punctuation)
    WFSC 648 MOLECULAR EVOLUTION

    Lect. Lab SCH Subject Matter Content Code Admin. Unit Acad. Year FICE Code
    0 2 0 1 0 3 2 6 1 3 0 0 0 0 2 9 5 1 0 9 - 1 0 0 3 6 3 2

    Approval recommended by:
    Head of Department Dr. Fisher 6/18/08
    James R. Wiley 8/5/08

    Head of Department (if cross-listed course) Date

    Submitted to Coordinating Board by:
    Dean of College Date

    Director of Academic Support Services Date

    Effective Date

To have this form reviewed, please send to Linda F. Lacey, Mail Stop 1265 or fax to 847-8737.
OAR/AS-564
WFSC/GENE 648
Molecular Evolution
Fall 2008

Course Syllabus

Instructor:
Dr. Mariana Mateos
Dept. of Wildlife and Fisheries Sciences
979-847-9462
mmateos@tamu.edu
Office Hours at 320B Old Herman Heep Bldg. (HLB) by appointment.

Level = 6

Purpose: To provide students with the theoretical background and practical tools background
and hands-on experience utilized in molecular evolution studies. In addition, students will
practice important skills such as critical thinking, manuscript and proposal writing, peer-review,
and public presentation.

Course information:
Class meets:
- Lecture on Mon/Wed 4:10–5:00 PM at 311 Old Heep
- Lab on Fri 10:00AM–12:00PM at 311 Old Heep

Course Description: Examine the theory and tools used in the analysis of molecular
evolutionary patterns of DNA and protein sequences. Format combines lecture presentations by
instructor, discussion of relevant scientific literature, computer exercises, preparation of research
proposal or independent research project, and practice in peer-review process.

Course credit:
3 semester hours, based on two one-hour lectures per week and one two-hour
laboratory/discussion session per week.

Prerequisite:
Basic courses in general Genetics and in Evolution.

Textbook (Optional):

Additional Recommended Books
Oxford University Press.

Course Web Site: http://wfsctam.edu/mateoslab/MolecularEvolution
The content of the website is password protected for copyright reasons. Please do not make material (including password) available to people who are not registered in this course.
Login: nature\wfsctgene689 Password: G3n32008123

Grading

[91–100% = A; 81–90% = B; 71–80% = C; 61–70 = D; ≤ 60 = F]

Grades will be based on:
Final project proposal (5%)
First draft of Final paper (10%)
Written review of peers’ (10%)
Final Paper (35%)
Final Paper in-class Presentation (10%)
Homework/lab assignments (15%)
Class participation (includes leading paper discussions) (15%)

Attendance:

Attendance to lectures and labs is compulsory. Student should inform me as soon as possible if he/she plans to miss (or has missed due to unforeseen valid reasons) a lecture or lab/discussion due to a valid reason. Assignments will be given during lectures. Student is responsible for assignments even if he/she did not attend lecture during which the assignment was given, unless other arrangements have been made with the instructor. Each student will be responsible for leading the discussion of several papers throughout the semester, which will be assigned by me.

Discussion participation: you will be expected to hand in via email or hardcopy at least three discussion points/questions regarding each paper to be discussed, prior to the discussion session. Questions that just reflect ignorance of the topic will not be accepted. However, part of the discussion session can be used to clarify concepts.

Americans with Disabilities Act (ADA) Policy Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Cain Hall or call 845-1637.

Academic Integrity Statement:
“An Aggie does not lie, cheat, or steal or tolerate those who do.”
## Course Schedule (Subject to Change)

<table>
<thead>
<tr>
<th>Week</th>
<th>Day</th>
<th>Date</th>
<th>Tentative Topic/Activity</th>
<th>Final project requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mon</td>
<td>8/25</td>
<td>Introduction to course</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wed</td>
<td>8/27</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fri</td>
<td>8/29</td>
<td>Basic Bioinformatics exercise</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Mon</td>
<td>9/1</td>
<td>Dynamics of genes in populations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wed</td>
<td>9/3</td>
<td>Discussion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fri</td>
<td>9/5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Mon</td>
<td>9/8</td>
<td>Evolutionary change in nucleotide sequences</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wed</td>
<td>9/10</td>
<td>No Class; Academic Convocation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fri</td>
<td>9/12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Mon</td>
<td>9/15</td>
<td>Molecular Phylogenetics</td>
<td>One-page proposal due</td>
</tr>
<tr>
<td></td>
<td>Wed</td>
<td>9/17</td>
<td>Discussion: Species trees from gene trees</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fri</td>
<td>9/19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Mon</td>
<td>9/22</td>
<td>Rates and Patterns of nucleotide substitution: Molecular Clocks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wed</td>
<td>9/24</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fri</td>
<td>9/26</td>
<td>Lab: relaxed clocks</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Mon</td>
<td>9/29</td>
<td>Measures of clade support</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wed</td>
<td>10/1</td>
<td>Discussion: Topology-Bayes vs Clade Bayes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fri</td>
<td>10/3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Mon</td>
<td>10/6</td>
<td>Rates and Patterns of nucleotide substitution: Detecting positive selection (Phylogenetic approach)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wed</td>
<td>10/8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fri</td>
<td>10/10</td>
<td>Lab: detecting positive selection</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Mon</td>
<td>10/13</td>
<td>DNA Polymorphism in populations: Detecting natural selection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wed</td>
<td>10/15</td>
<td>Introduction to the Coalescent</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fri</td>
<td>10/17</td>
<td>Discussion: Detecting natural selection</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Mon</td>
<td>10/20</td>
<td>DNA Polymorphism in populations: the Coalescent</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wed</td>
<td>10/22</td>
<td>Discussion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fri</td>
<td>10/24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Mon</td>
<td>10/27</td>
<td>DNA Polymorphism in populations: Population structure and migration</td>
<td>First draft due</td>
</tr>
<tr>
<td></td>
<td>Wed</td>
<td>10/29</td>
<td>Recombination</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fri</td>
<td>10/31</td>
<td>Lab: LAMARC</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Mon</td>
<td>11/3</td>
<td>Evolution by Gene Duplication, Exon Shuffling and Concerted Evolution</td>
<td>Peer-reviews due</td>
</tr>
<tr>
<td></td>
<td>Wed</td>
<td>11/5</td>
<td>Discussion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fri</td>
<td>11/7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Mon</td>
<td>11/10</td>
<td>Evolution by transposition and horizontal transfer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wed</td>
<td>11/12</td>
<td>Discussion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fri</td>
<td>11/14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Mon</td>
<td>11/17</td>
<td>Genome organization and Evolution</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wed</td>
<td>11/19</td>
<td>Discussion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fri</td>
<td>11/21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Mon</td>
<td>11/24</td>
<td>Roles of Mutation and Selection in Molecular Evolution</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wed</td>
<td>11/26</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fri</td>
<td>11/28</td>
<td>No Class; Thanksgiving Holiday</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mon</td>
<td>12/1</td>
<td>Redefined Friday. Start 9:30 AM. Tentative date for course evaluations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wed</td>
<td>12/3</td>
<td>Final presentations</td>
<td>Final paper due</td>
</tr>
</tbody>
</table>
May 1, 2008

Memorandum

To: Dr. James R. Wild
   Faculty of Genetics
   MS # 2128

Through: Dr. Tom Lacher, Head
         Department of Wildlife & Fisheries Sciences

From: Dr. Mariana Mateos, Assistant Professor
      Department of Wildlife and Fisheries Sciences

Re: WFSC 648 Molecular Evolution

The Department of Wildlife and Fisheries is proposing a new course, WFSC 648 “Molecular Evolution.” The course is intended for graduate students from any department, particularly those students within the Ecology and Evolutionary Biology group. We believe this course does not overlap but is complementary to Quantitative Phylogenetics, Population Genetics, and Conservation Genetics (courses in your program; one of which I teach). I am hoping that we can cross-list this new course with your program.

Attached is the syllabus with a course description for your evaluation. Please review these materials and indicate, by your signature below, that this course does not replace curricula in your program. We would appreciate your response by Friday, April 18, 2008. If you have any questions, please feel free to contact me by email at mmateos@tamu.edu or phone number 847-9462.

[Signature]

Date

Jameo R. Wild
6 May 2008
March 5, 2008

Memorandum

To: Dr. Vincent Cassone, Head
   Department of Biology
   MS # 3258

Through: Dr. Tom Lacher, Head
   Department of Wildlife & Fisheries Sciences

From: Dr. Mariana Mateos, Assistant Professor
   Department of Wildlife and Fisheries Sciences

Re: WFSC 648 Molecular Evolution

The Department of Wildlife and Fisheries is proposing a new course, WFSC 648 “Molecular Evolution.” The course is intended for graduate students from any department, particularly those students within the Ecology and Evolutionary Biology group. We believe this course does not overlap but is complementary to Evolution courses in your department.

Attached is the syllabus with a course description for your evaluation. Please review these materials and indicate, by your signature below, that this course does not replace curricula in your department. We would appreciate your response by Friday, April 18, 2008. If you have any questions, please feel free to contact me by email at mmateos@tamu.edu or phone number 847-9462.

Signature

Date

2258 TAMUS
College Station, TX 77843-2258
Tel. 979.847.9642
Fax. 979.845.4036
Email: mmateos@tamu.edu
http://wfscc.tamu.edu/mateoslab/