Syllabus
BIOL/WLF 433/633
Conservation Genetics
Spring 2014

Instructor:  Kris Hundertmark
Office:  323D Murie
Office hours:  After lecture or by appt.
Office phone:  474-7159
Email:  khundert@alaska.edu

Required text:
Wiley-Blackwell

Other relevant texts:
~These books are placed on reserve in the Biosciences Library~

Course description:
WLF 433 introduces students to the field of conservation genetics, which focuses on the
application of genetic analyses to management and recovery of endangered species.  This
course will provide expanded coverage to include application of genetic techniques to
general questions in wildlife and fisheries biology and management.  This course requires
students to have taken introductory biology courses as well as courses in ecology and
genetics.

Graduate-level credit:  Students taking the course for graduate credit will also attend a
3-hour laboratory weekly in which experience will be gained using public-domain
genetic analysis programs for study of conservation genetics questions.  Open discussions
of fundamental topics of conservation genetics also will be conducted.

Course goals:
•  Provide students with an understanding of a) characteristics of different types of
molecular markers, their application in a conservation context, and strengths and
weaknesses for inference, b) appropriate methods of analysis for addressing
conservation genetic questions, c) genetic implications of small population size,
and d) ramifications of taxonomy on conservation of threatened and endangered
species.

Examples of student learning outcomes:
Students will be able to:
•  understand and communicate the fundamental genetic ramifications of small
population size
• prescribe appropriate molecular markers to answer conservation questions
• apply appropriate genetic models to real conservation issues
• use public-domain software tools for genetic analysis (graduate students)

**Academic dishonesty:**
The UAF Student Code of Conduct is presented on page 73 of the 2005-06 UAF Catalog. You will be expected to abide by that code. No collaboration among students will be allowed on exams, quizzes or assignments unless expressly permitted by me. Copying or paraphrasing another student’s writing is a violation of the Student Code. Copying or paraphrasing published material without proper attribution is plagiarism and is a serious academic offense. If you are unsure what constitutes plagiarism, see the following web page or see me. [www.uaf.edu/library/instruction/handouts/Plagiarism.html](http://www.uaf.edu/library/instruction/handouts/Plagiarism.html) Evidence of academic dishonesty will be presented to the UAF Director of Judicial Services and may result in an F for the course and/or expulsion from the University.

**Disabilities:**
If you have a learning disability, please inform me before the end of the second week of class. If you have not already contacted the UAF Center for Health and Counseling (474-7043; TTY 474-7045) to document your disability, please do so at your earliest opportunity. They will work with me to provide reasonable and appropriate accommodations for persons with documented disabilities.

**Grading:**
Grades will be assigned based on your performance on the 3 exams, laboratory exercises and exam, and an in-class presentation. Late assignments will not be accepted. Recognizing the different expectations for performance of undergrads versus graduate students in the same class, a two-tiered grading system will be employed on common assignments. Regardless of the point value of any item, each will be weighted to account for the following percentages of the final grade.

**400-level students:**
- Problem sets: 25%
- Exam 1: 25%
- Exam 2: 25%
- Final exam: 25%

**600-level students:**
- Problem sets: 20%
- Exam 1: 20%
- Exam 2: 20%
- Final exam: 20%
- Laboratory exercises: 20%
Grading scheme for graduate students:
A  ≥90%
B  80-89%
C  70-79%
D  60-69%
F  <60%

Grading scheme for undergraduate students:
A  ≥85%
B  75-84%
C  65-74%
D  55-64%
F  <55%

All grades will be posted on Blackboard
+/- grading will not be used in this course

Attendance:
You are expected to attend all lecture and, if appropriate, laboratory activities. I will not accept laboratory assignments from students who did not attend the laboratory from which the assignment was derived unless a waiver from me is obtained in advance. Waivers will be granted only in unusual circumstances.

Schedule:
The accompanying list of lecture and lab topics is tentative and is meant to give you a general idea of the topics we will cover in class and lab and the order in which they will be presented. There may be times when it is necessary to stray from this schedule but I will make every effort to inform you ahead of time if that happens.

Final exam:
The final exam will be comprehensive. The final exam is scheduled for 1-3 PM on Wednesday, May 7th, in our regular classroom.

Blackboard:
Any other course materials, such as supplemental readings, data sets for the laboratory, problem sets, this syllabus, and answer keys, will be available on the course website on Blackboard. This is a cross-listed and stacked course but students in BIOL 433/633 and WLF 433/633 will all use the same Blackboard site.
Lecture topics and assigned readings. Additional readings from the primary literature may also be assigned.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Reading</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>Ch. 1, 2</td>
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<tr>
<td>2</td>
<td>Molecular markers, Hardy-Weinberg</td>
<td>Ch. 3-5, 12</td>
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<tr>
<td>3</td>
<td>Evolution in natural populations</td>
<td>Ch. 6-8</td>
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<tr>
<td>4</td>
<td>Population subdivision, Linkage</td>
<td>Ch. 9 and 10</td>
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<tr>
<td>5</td>
<td>Inbreeding; midterm I</td>
<td>Ch. 13</td>
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<tr>
<td>6</td>
<td>Population Viability Analysis</td>
<td>Ch. 14</td>
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<tr>
<td>7</td>
<td>Phylogenies</td>
<td>Ch. 16</td>
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<tr>
<td>8</td>
<td>Phylogeography; the coalescent</td>
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<tr>
<td>9</td>
<td>Spring Break</td>
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<tr>
<td>10</td>
<td>Management units</td>
<td>Ch. 16</td>
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<tr>
<td>11</td>
<td>Taxonomic uncertainties; midterm II</td>
<td>Ch. 16</td>
</tr>
<tr>
<td>12</td>
<td>Applications to species biology</td>
<td>Ch. 17 and 19</td>
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<tr>
<td>13</td>
<td>Landscape genetics</td>
<td>Manel et al.; Sork and Waits</td>
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<tr>
<td>14</td>
<td>Genetic management of populations</td>
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<tr>
<td>15</td>
<td>Review</td>
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Laboratories are for graduate students only and will involve analysis of genetic data with commonly used software. There also may be assigned readings for discussion.

Laboratory topics for BIOL/WLF 633:

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>22 January</td>
<td>Microsatellite data</td>
<td>GenAlEx, Convert, Formatomatic, Dropout, Microchecker</td>
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<tr>
<td>2</td>
<td>29 January</td>
<td>Assessing diversity</td>
<td>GenAlEx, Genepop, Genodive</td>
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<tr>
<td>3</td>
<td>5 February</td>
<td>Population structure</td>
<td>Arlequin, Genepop, FStat</td>
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<tr>
<td>4</td>
<td>12 February</td>
<td>Bottleneck testing</td>
<td>Bottleneck</td>
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<td>5</td>
<td>19 February</td>
<td>Assignment tests</td>
<td>Geneclass, BayesAss, Structure, GenAlEx</td>
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<td>6</td>
<td>26 February</td>
<td>Spatial assignment</td>
<td>TESS, Geneland</td>
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<tr>
<td>7</td>
<td>5 March</td>
<td>Gene flow</td>
<td>Migrate</td>
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<tr>
<td>8</td>
<td>12 March</td>
<td>Spatial autocorrelation</td>
<td>GenAlEx</td>
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<td>9</td>
<td>Spring break</td>
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<tr>
<td>10</td>
<td>26 March</td>
<td>Sequence data</td>
<td>BioEdit</td>
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<td>11</td>
<td>2 April</td>
<td>Phylogenies</td>
<td>Mega</td>
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<tr>
<td>12</td>
<td>9 April</td>
<td>Phylogeography</td>
<td>Arlequin</td>
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<td>13</td>
<td>16 April</td>
<td>Parentage</td>
<td>Cervus</td>
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<tr>
<td>14</td>
<td>23 April</td>
<td>Landscape genetics</td>
<td>Geneland, Circuitscape, Tess</td>
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<tr>
<td>15</td>
<td>30 April</td>
<td>Viable populations</td>
<td>Vortex</td>
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