

Submit originals (including syllabus) and one copy and electronic copy to the Faculty Senate Office
 See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures/> for a complete description of the rules governing curriculum & course changes.

CHANGE COURSE (MAJOR) and DROP COURSE PROPOSAL
 Attach a syllabus, except if dropping a course.

SUBMITTED BY:

Department	Fisheries	College/School	School of Fisheries and Ocean Sciences
Prepared by	Peter Westley	Phone	474-7458
Email Contact	pwestley@alaska.edu	Faculty Contact	Peter Westley

1. COURSE IDENTIFICATION: As the course now exists.

Dept	FISH	Course #	650	No. of Credits	3
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COURSE TITLE	Fish Ecology
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2. ACTION DESIRED: Check the changes to be made to the existing course.

Change Course	<input checked="" type="checkbox"/>	If Change, indicate below what is changing.	Drop Course	<input type="checkbox"/>
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NUMBER	TITLE	DESCRIPTION
PREREQUISITES*	<input checked="" type="checkbox"/>	FREQUENCY OF OFFERING
		<input checked="" type="checkbox"/>
		(move to fall odd years beginning 2017)

*Prerequisites will be required before a student is allowed to enroll in the course.

CREDITS (including credit distribution)	3	COURSE CLASSIFICATION	
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ADD A STACKED LEVEL (400/600)	<input checked="" type="checkbox"/>	Dept.	FISH	Course #	425
Include syllabi.					

How will the two course levels differ from each other? How will each be taught at the appropriate level?:

The two levels of Fish Ecology will differ in objectives, rigor of assignments, readings, and exams, and include an additional peer review of a journal article worth 9% of the final grade for 600 level students.
 For example the objectives between levels are:

FISH F425

- To strengthen student understanding of the factors that shape the ecological diversity of fish populations;
- To critically read and be able to articulate diverse opinions on fish-related ecological issues;
- To foster each student's own informed views on complex fish-related ecological issues;
- To improve written and oral communication skills with peers;
- To gain hands-on experience developing a research proposal.

FISH F650

- To develop a thorough understanding of the factors that shape the ecological diversity of populations;
- To understand how factors interact and respond to external and internal forcing;
- To critically read and synthesize diverse opinions on fish-related ecological issues;
- To foster each student's own informed views on complex fish-related ecological issues;
- To clearly express those views in writing and in discussion with peers;
- To design a full length research proposal that can serve as a template for a thesis proposal or submission to a sponsor for funding.

Students in FISH F425 will have less required reading compared to students in FISH F650 (denoted on 425 syllabus schedule as R vs. O) and consequently, exams between sections will differ. Finally, the expectations for the research proposal will be different between levels. For 425 students the main goal is to provide the opportunity to simply go through the process of asking a question, forming a hypothesis, envisioning and describing how to address the hypothesis, how to interpret results that might be obtained, etc... In contrast, I intend the proposal for 650 students to be useful in advancing their graduate careers as forming a template for thesis proposals or for submitting for actual support from a sponsor.

In addition to these conceptual differences, students in FISH 650 will work closely with me as the instructor to conduct a 'real life' peer-review of a scientific paper under consideration for publication. I will solicit papers from colleagues working as editors at journals and clarify that I will work with students to jointly provide reviews. Students will meet with me to go over the approach of how to conduct a review, then complete a draft followed by another in person meeting with me, and then submit a final review. Together, the student and I will submit the review. Combined, the peer-review is worth 17% of the total course grade and is clearly an assignment at the graduate level. I offered 650 as an independent study to graduate students in the fall of 2014 and piloted this approach of reviewing papers. It was a big success and

students reported enjoying the assignment. The goal is to increase critical thinking skills, teach the ethics of review (i.e. issues of anonymity and how to be a courteous reviewer), and for the student to better understand the peer-review system more generally.

Stacked course applications are reviewed by the (Undergraduate) Curricular Review Committee and by the Graduate Academic and Advising Committee. Creating two different syllabi—undergraduate and graduate versions—will help emphasize the different qualities of what are supposed to be two different courses. The committees will determine: 1) whether the two versions are sufficiently different (i.e. is there undergraduate and graduate level content being offered); 2) are undergraduates being overtaxed?; 3) are graduate students being undertaxed? In this context, the committees are looking out for the interests of the students taking the course. Typically, if either committee has qualms, they both do. More info online - see URL at top of this page.

ADD NEW CROSS-LISTING	Dept. & No.	Requires approval of both departments and deans involved. Add lines at end of form for additional signatures.
STOP EXISTING CROSS-LISTING	Dept. & No.	Requires notification of other department(s) and mutual agreement. Attach copy of email or memo.
OTHER (specify)		

3. COURSE FORMAT

NOTE: Course hours may not be compressed into fewer than three days per credit. Any course compressed into fewer than six weeks must be approved by the college or school's curriculum council and the appropriate Faculty Senate curriculum committee. Furthermore, any core course compressed to less than six weeks must be approved by the Core Review Committee.

COURSE FORMAT: (check all that apply) 1 2 3 4 5 6 weeks to full semester

OTHER FORMAT (specify all that apply)

Mode of delivery (specify lecture, field trips, labs, etc.) **Lecture, discussion, small group work reviewing peer writing assignments**

4. COURSE CLASSIFICATIONS: (undergraduate courses only. Use approved criteria found in Chapter 12 of the curriculum manual. If justification is needed, attach separate sheet.)

H = Humanities S = Social Sciences

Will this course be used to fulfill a requirement for the baccalaureate core? YES NO

IF YES*, check which core requirements it could be used to fulfill:

O = Oral Intensive, *Format 6 also submitted W = Writing Intensive, *Format 7 submitted X = Baccalaureate Core

4.A Is course content related to northern, arctic or circumpolar studies? If yes, a "snowflake" symbol will be added in the printed Catalog, and flagged in Banner.

YES NO X

5. COURSE REPEATABILITY:

Is this course repeatable for credit? YES NO X

Justification: Indicate why the course can be repeated (for example, the course follows a different theme each time).

How many times may the course be repeated for credit? TIMES

If the course can be repeated with variable credit, what is the maximum number of credit hours that may be earned for this course? CREDITS

6. COMPLETE CATALOG DESCRIPTION including dept., number, title, credits, credit distribution, cross-listings and/or stacking, clearly showing the changes you want made. (Underline new wording ~~strike through old wording~~ and use complete catalog format including dept., number, title, credits and cross-listed and stacked.)

Example of a complete description:

PS F450 Comparative ~~Aberiginal~~ Indigenous Rights and Policies (s)

3 Credits

Offered As Demand Warrants

~~Case-study~~ Comparative approach in ~~assessing Aberiginal~~ analyzing Indigenous rights and policies in different nation-state systems. ~~Seven Aberiginal situations~~ Multiple countries and specific policy developments examined for factors promoting or limiting self-determination. Prerequisites: Upper division standing or permission of instructor. (Cross-listed with ANS F450.) (3+0)

FISH F425 Fish Ecology

3 Credits

Offered Fall Even-Odd-numbered Years

~~Focus on the relationship of fishes to the physical, chemical, and biological features of their environment and the processes responsible for patterns of fish distribution and abundance. Concepts introduced in lectures will follow a logical progression, starting with the study of individual fish moving towards investigations of populations, metapopulations, and assemblages. Prerequisites: BIOL F115X, BIOL F271, FISH F101, or permission of instructor. Recommended: FISH F288. (3+0)~~

This course is an exploration of how fish interact with, and adapt to, their physical and biological environment, taught through the viewpoint that habitat diversity acts as a template for biological diversity within and among species. We will examine the ecology of major freshwater and marine habitats (with an emphasis on the former), as well as the potential threats to these habitats from human activity.

Prerequisites: ~~BIOL 105X, FISH 110, BIOL 371, FISH 288~~ (recommended), STAT 401 (recommended), or permission of instructor. Stacked with FISH F650. (3+0)

FISH F650 Fish Ecology

3 Credits

Offered Spring ~~Fall~~ Odd-numbered Years

~~This course will examine the relationship of fishes to the physical, chemical, and biological features of their environment in both perturbed and unperturbed aquatic ecosystems. An emphasis will be placed on fish diversity in terms of morphology, behavior, feeding, and reproductive strategies as they relate to individual and population adaptation, and community structure in both freshwater and marine environments.~~

This course is an in-depth examination of how fish interact with, and adapt to, their physical and biological environment, taught through the viewpoint that habitat diversity acts as a template for biological diversity within and among species. We will examine the ecology of major freshwater and marine habitats (with an emphasis on the former), as well as the potential threats to these habitats from human activity.

Prerequisites: Graduate student standing or permission of instructor. Stacked with FISH F425. (3+0)

7. COMPLETE CATALOG DESCRIPTION AS IT SHOULD APPEAR AFTER ALL CHANGES ARE MADE:

FISH F425

Fish Ecology

3 Credits

Offered Fall Odd -Numbered Years

This course is an exploration of how fish interact with, and adapt to, their physical and biological environment, taught through the viewpoint that habitat diversity acts as a template for biological diversity within and among species. We will examine the ecology of major freshwater and marine habitats (with an emphasis on the former), as well as the potential

threats to these habitats from human activity.

Prerequisites FISH 110, BIOL 371, FISH 288 (recommended), STAT 401 (recommended), or permission of instructor. Stacked with FISH F650. (3+0)

FISH F650
3 Credits

Fish Ecology
Offered Fall Odd -Numbered Years

This course is an in-depth examination of how fish interact with, and adapt to, their physical and biological environment, taught through the viewpoint that habitat diversity acts as a template for biological diversity within and among species. We will examine the ecology of major freshwater and marine habitats (with an emphasis on the former), as well as the potential threats to these habitats from human activity.

Prerequisites: Graduate student standing or permission of instructor. Stacked with FISH F425. (3+0)

8. **GRADING SYSTEM:** Specify only one.

LETTER: PASS/FAIL:

9. **ESTIMATED IMPACT**

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

There is no impact on budget or space as this course is essentially already being taught in the form of FISH 425 (instructed by Westley) but will add additional time and effort on my part to work with students on peer-reviews of submitted journal articles. The additional time is minimal I do note, however, that shifting to odd numbered falls beginning in 2017 will result in back to back years where my fall term will have a high teaching load (every other year I typically only teach FISH 110). Thus while this change does have personal costs to me, ultimately I am willing to do this as I think it in the best interest of our student and department.

10. **LIBRARY COLLECTIONS**

Have you contacted the library collection development officer (kljensen@alaska.edu, 474-6695) with regard to the adequacy of library/media collections, equipment, and services available for the proposed course? If so, give date of contact and resolution. If not, explain why not.

No Yes All reading materials are from the primary scientific literature in journals which UAF has access and are provided as pdf documents via blackboard

11. **IMPACTS ON PROGRAMS/DEPTS:**

What programs/departments will be affected by this proposed action? Include information on the Programs/Departments contacted (e.g., email, memo)

This change is largely only germane to students in the Fisheries Program and is intended to provide more options to our graduate students to complete requirements for the MS or PhD degree. While the course is open to students from other departments, I do not expect this course to be a major competitor among departments with any existing course and thus is unlikely to lead in the loss of enrollment in courses of other departments. Real or perceived competition with Fish Division courses, particularly FISH F676 will be reduced by moving the offering to Fall of odd years.

12. **POSITIVE AND NEGATIVE IMPACTS**

Please specify positive and negative impacts on other courses, programs and departments resulting from the proposed action.

The primary benefit is that graduate students will have the option of satisfying the 'Biology and ecology of fish and shellfish' focus area of their degree by taking FISH 650, which has not been taught for several years.

The other benefit is that the course will be offered in the Fall whereas the majority of other ecology-focused courses that can satisfy this degree requirement are offered in the spring semesters (FISH 626, 628, 633). Negative impact of this course competing with other courses within or outside the department is minimal. Impact for competition within the department is lessened by moving to odd numbered fall semesters

13. JUSTIFICATION FOR ACTION REQUESTED

The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. If you ask for a change in # of credits, explain why; are you increasing the amount of material covered in the class? If you drop a prerequisite, is it because the material is covered elsewhere? If course is changing to stacked (400/600), explain higher level of effort and performance required on part of students earning graduate credit. Use as much space as needed to fully justify the proposed change and explain what has been done to ensure that the quality of the course is not compromised as a result.

This action was stimulated following my first teaching of FISH 425 in the fall of 2014 that attracted three Fisheries graduate students and one post-baccalaureate student (aspiring to be a graduate student) that wanted to take the course for 600-level credit. Only 9 credits of 400-level courses can be applied to graduate degrees, thus students are keenly interested in gaining 600-level credits. In the fall of 2014 I provided 600-level independent study credit to these four students and piloted the plan for 650 that I am proposing here. That is, the graduate students participated in all the activities of FISH 425 and in addition worked with me to conduct a review of a paper that (at the time) was under consideration for publication. The students worked one on one with me of the course of several meetings to discuss the logic of how to approach a review, how to critically read scientific papers, to politely but constructively provide comments to reviewers, and were involved in the actual process of submission. I, of course, gained approval from handling editors before involving students and stressed upon the students the ethics of anonymous peer-review (i.e. was adamant that they were to remain anonymous as reviewers and not discuss the paper openly with others). The reviews of the four students in the 600-level of Fish Ecology were very strong with a combined median score (question 1-4) of 4.8.

This assignment is not only proving real world training in the scientific process, but is clearly only appropriate for graduate level students. Thus, participation in FISH 650 has markedly higher effort (students reported spending at least 20 total hours on the review assignment) and higher levels of responsibility than undergraduates.

The changes are justified in order to clearly distinguish between the two levels of Fish Ecology will differ in objectives, rigor of assignments, readings, and exams, and include an additional peer review of a journal article worth 9% of the final grade for 600 level students.

The change in prerequisites for FISH 425 are done to reflect other changes in Biology (BIO 271 is now offered as 371) and FISH 110 is offered instead of FISH 101 and that BIOL 105 no longer exists and a 100 level biology course is required for 371 making it redundant.

APPROVALS: (Forms with missing signatures will be returned. Additional signature blocks may be added as necessary.)

Signed by: <i>Frank Mueter</i>		Date	January 5, 2016
Signature, Chair, Program/Department of:		Fisheries Divison	

Signed by: <i>Ana Aguilar-Islas</i>		Date	January 5, 2016
Signature, Chair, College/School Curriculum Council for:		sfos	

Signed by: <i>Trent M Sutton</i>		Date	January 5, 2016
Signature, Dean, College/School of:		SFOS	

Offerings above the level of approved programs must be approved in advance by the Provost (e.g., non-graduate level program offering of a 600-level course):

Signature of Provost (if applicable)	Date
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ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE.

Signature, Chair	Date
Faculty Senate Review Committee: ___ Curriculum Review ___ GAAC	
___ Core Review ___ SADAC	

ADDITIONAL SIGNATURES: (As needed for cross-listing and/or stacking; add more blocks as necessary.)

Signature, Chair, Program/Department of:	Date
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Signature, Chair, College/School Curriculum Council for:	Date
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Signature, Dean, College/School of:	Date
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Note: If removing a cross-listing, you may attach copy of email or memo to indicate mutual agreement of this action by the affected department(s).

If degree programs are affected, a Format 5 program change form must also be submitted.

ATTACH COMPLETE SYLLABUS (as part of this application). This list is online at :
<http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures-/uaf-syllabus-requirements/>
The Faculty Senate curriculum committees will review the syllabus to ensure that each of the items listed below are included. If items are missing or unclear, the proposed course (or changes to it) may be denied.

SYLLABUS CHECKLIST FOR ALL UAF COURSES

During the first week of class, instructors will distribute a course syllabus. Although modifications may be made throughout the semester, this document will contain the following information (as applicable to the discipline):

1. Course information:

Title, number, credits, prerequisites, location, meeting time (make sure that contact hours are in line with credits).

2. Instructor (and if applicable, Teaching Assistant) information:

Name, office location, office hours, telephone, email address.

3. Course readings/materials:

Course textbook title, author, edition/publisher.
 Supplementary readings (indicate whether required or recommended) and
 any supplies required.

4. Course description:

Content of the course and how it fits into the broader curriculum;
 Expected proficiencies required to undertake the course, if applicable.
 Inclusion of catalog description is *strongly* recommended, and
 Description in syllabus must be consistent with catalog course description.

5. Course Goals (general), and (see #6)

6. Student Learning Outcomes (more specific)

7. Instructional methods:

Describe the teaching techniques (eg: lecture, case study, small group discussion, private instruction, studio instruction, values clarification, games, journal writing, use of Blackboard, audio/video conferencing, etc.).

8. Course calendar:

A schedule of class topics and assignments must be included. Be specific so that it is clear that the instructor has thought this through and will not be making it up on the fly (e.g. it is not adequate to say "lab". Instead, give each lab a title that describes its content). You may call the outline Tentative or Work in Progress to allow for modifications during the semester.

9. Course policies:

Specify course rules, including your policies on attendance, tardiness, class participation, make-up exams, and plagiarism/academic integrity.

10. Evaluation:

Specify how students will be evaluated, what factors will be included, their relative value, and how they will be tabulated into grades (on a curve, absolute scores, etc.) Publicize UAF regulations with regard to the grades of "C" and below as applicable to this course. (Not required in the syllabus, but is a convenient way to publicize this.) Link to PDF summary of grading policy for "C":
http://www.uaf.edu/files/uafgov/Info-to-Publicize-C_Grading-Policy-UPDATED-May-2013.pdf

11. Support Services:

Describe the student support services such as tutoring (local and/or regional) appropriate for the course.

12. Disabilities Services: Note that the phone# and location have been **updated**.

<http://www.uaf.edu/disability/> The Office of Disability Services implements the Americans with Disabilities Act (ADA), and ensures that UAF students have equal access to the campus and course materials.

State that you will work with the Office of Disabilities Services (208 WHITAKER BLDG, 474-5655) to provide reasonable accommodation to students with disabilities.

Curriculum Committee SFOS

Members: Ana Aguilar-Islas (Chair)
Anne Beaudreau
Katrin Iken
Andrew Seitz

3 December 2015

Major course change

Course Number: FISH 425/650

Course Title: Fish Ecology

Instructor: Westley (as a note, my name was misspelled in the original letter)

Changes: Combine into stacked level, prerequisites and description

General Comments and Recommendations:

Makes sense to combine these two courses and provide graduate students with another ecology-focused FISH course in the fall. However, in addition to the three ecology-focused courses identified in the form, there are three other ecology-focused courses (i.e Marine Ecosystems, Aquatic Food Web Ecology, Fish Conservation Biology) that are taught in the fall, and that this course is potentially in competition for students. It is recommended that you contact the instructors of these courses (Anne, Gordon, Ginny, Andy and Megan) to differentiate content and discuss offering times. It was suggested that because some of the above courses are offered during fall even-numbered years, you might consider offering the course during odd-years to provide students with a choice during those years.

After considerable thought and conversation with Anne Beaudreau, Andy Sietz, and Gordon Kruse I think it prudent to not only stack FISH F425/F650 but propose moving the offering of the course to *fall odd-years beginning in fall 2017*. I propose to teach FISH F425/F650 in the fall of 2016 as scheduled so as to not disrupt plans of students that were rightly expecting it to be offered and then again teach in the fall of 2017 (and then every off fall thereafter). This proposal would help reduce the real or perceived competition between FISH F676 (Aquatic Food Web Ecology) and MSL 652 (Marine Ecosystems) while providing our students additional options for courses.

It was agreed that differentiation between the two syllabi is needed. In addition to the peer-review assignment, there needs to be distinction in Course Objectives, Learning Outcomes, Required Readings, Core Activities & Assignments, and Evaluation/Grading. For example modifications for the 400 level can include the following change in words:

Objectives:

- “To develop an understanding of the factors. . .
- To improve written and oral communication of one’s views to peers.”

Outcomes:

- “To gain an understanding of the connections among topics. . .”

Readings, Activities, and Grading: This is where the peer-review reading, assignment and grading would create a difference, but as Franz suggests this is not enough differentiation, and other distinctions need to be made. Besides the ideas suggested by Franz, you could

have an additional section in the exams/quizzes for G that UG don't need to answer. The scope of the proposal can be different as well, etc.

I have made many changes to differentiate FISH F425/F650. For example the course objectives differ between the levels:

FISH F425

- To strengthen student understanding of the factors that shape the ecological diversity of fish populations;
- To critically read and be able to articulate diverse opinions on fish-related ecological issues;
- To foster each student's own informed views of complex fish-related ecological issues;
- To improve written and oral communication skills with peers;
- To gain hands-on experience developing a research proposal.

FISH F650

- To develop a thorough understanding of the factors that shape the ecological diversity of populations;
- To understand how factors interact and respond to external and internal forcing;
- To critically read and synthesize diverse opinions on fish-related ecological issues;
- To foster each student's own informed views of complex fish-related ecological issues;
- To clearly express those views in writing and in discussion with peers;
- To design a full length research proposal that could serve as a template for a thesis proposal or submission to a sponsor for funding.

Students in FISH F425 will have less required reading compared to students in FISH F650 (denoted on 425 syllabus schedule as R vs. O) and consequently, exams between sections will differ. Finally, the expectations for the research proposal will be different between levels. For 425 students the main goal is to provide the opportunity to simply go through the process of asking a question, forming a hypothesis, envisioning and describing how to address the hypothesis, how to interpret results that might be obtained, etc... In contrast, I intend the proposal for 650 students to be useful in advancing their graduate careers as forming a template for thesis proposals or for submitting for actual support from a sponsor.

As the most prominent difference between courses, students in FISH F650 will conduct a peer review of a paper in consideration for publication in a journal. I will solicit papers from colleagues working on editorial boards of fish ecology related journals and with their permission work with students to conduct the review. I completed this assignment in 650 in the fall of 2014 and consider it a success worth continuing.

Faculty Senate Form:

Address the following:

- **Section 2:** Include other differences between the 2 courses here in addition to the peer-review assignment.
- **Sections 6 and 7:** Remember to include F between FISH and course number. Prerequisites for FISH F425. Do not include BIOL 105X. The course no longer exists, and because BIOL F371 requires a BIOL 100-level course, it is redundant to

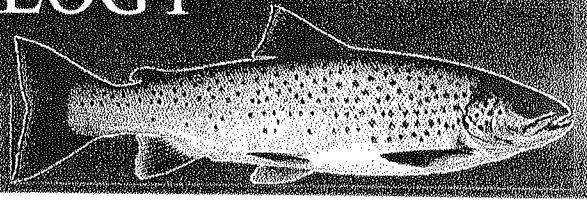
include one here.

Change year of offering if needed after discussion with other instructors

- Section 9: Mentioning workload changes is likely not needed here. If the credits for the course don't change the workload is also likely not to change.
- Section 12: Update after discussion with instructors of other ecology-focused FISH courses
- Section 13: Include additional distinction between 600 and 400 level in the justification.

FISH F650 — FISH ECOLOGY

FALL 2016



“Nothing in evolution makes sense, except in the light of ecology” – Peter & Rosemary Grant, *How and Why Species Multiply*

INSTRUCTOR

Peter Westley, Assistant Professor

233 O’Neill Building (down hall and to left)

Email: pwestley@alaska.edu

Peter’s Office Hours

Open door policy/or by appointment

COURSE DETAILS

O’Neill 201

Monday, Wednesday, Friday

9:15am – 10:15am

Class website: Blackboard (login at: <http://classes.uaf.edu>)

Course credits: 3

Prerequisites: Graduate student standing or permission of instructor

COURSE DESCRIPTION

This course is an in-depth examination of how fish interact with, and adapt to, their physical and biological environment, taught through the viewpoint that habitat diversity acts as a template for biological diversity within and among species. We will examine the ecology of major freshwater and marine habitats (with an emphasis on the former), as well as the potential threats to these habitats from human activity.

COURSE OBJECTIVES

This course has the following objectives for student learning:

- To develop a thorough understanding of the factors that shape the ecological diversity of populations;
- To understand how factors interact and respond to external and internal forcing;
- To critically read and synthesize diverse opinions on fish-related ecological issues;
- To foster each student’s own informed views of complex fish-related ecological issues;
- To clearly express those views in writing and in discussion with peers;
- To design a full length research proposal that could serve as a template for a thesis proposal or submission to a sponsor for funding.

COURSE EXPECTATIONS

Together we can be most effective and are most likely to achieve the courses’ objectives if we are clear about what we can expect from one another. As a result, the following expectations will guide our work together.

MY EXPECTATIONS OF STUDENTS

- Come to class on time, engage in the course content for the full class time, and refrain from any activities that distract us from doing our best jobs of teaching or detract from a positive learning environment for all involved;
- Come to class prepared to participate, having completed assigned reading, writing, and research in advance;
- Participate in class activities in ways that support course goals and demonstrate respect and civility toward all other students and me;
- Take an active role in obtaining information and resources for completion of tasks and assignments in the course and, ultimately, in promoting your own learning;
- Monitor your own learning and contribute feedback to support me in achieving course goals.

STUDENTS' EXPECTATIONS OF ME

- Begin and end class on time;
- Come to class prepared to do the best job of facilitating your learning;
- Provide information and resources to support your learning in the course;
- Make the best possible use of class time to support your learning in the course;
- Answer questions and emails promptly and sufficiently;
- Be available to provide additional assistance when needed;
- Provide clear and consistent criteria that can be used fairly in evaluating your learning;
- Welcome input on ways to support you in your achievement of course goals.

LEARNING OUTCOMES

By the completion of the course, you should be able to:

- Draw connections among topics in this class and other classes you have taken;
- Apply information from course topics in an informed way to novel situations;
- Clearly articulate the process of adaptation by natural selection and contrast to adaptive phenotypic plasticity;
- Provide proximate and ultimate explanations for life history strategies such as migratory behavior, parental care, and size and age at maturation

ASSUMPTIONS ABOUT LEARNING

These assumptions will guide our path in the course:

- Students learn in unique ways (for example, when asked what you did yesterday, do you see pictures or words?);
- Writing, reading, and thinking are inextricably linked;
- Students learn best from either themselves or from peers;
- The best *discussions* come from good *listening*;
- Transformative learning occurs best when preconceived notions are challenged;

REQUIRED READINGS

Posted on Blackboard in pdf form. Readings will primarily come from the primary scientific literature (i.e. published articles in peer-reviewed journals). It is *essential* that you are comfortable navigating in the Blackboard environment. Through the Blackboard system, I will provide details on assignments, important

changes to dates on the syllabus, class outlines and notes, class recordings, and supplemental reading material and content.

RECOMMENDED TEXTS (FOR THOSE WANTING TO BUILD THEIR PERSONAL LIBRARY):

Ecology of Teleost Fishes, Springer, Second Edition, by R.J. Wootton; *Behavioural Ecology of Teleost Fishes* by Godin (editor); *Behavior and Ecology of Pacific salmon & trout* by Quinn.

CORE ACTIVITIES & ASSIGNMENTS

ORIGINAL RESEARCH PROPOSALS

The primary assignment in this course is the crafting of an original research proposal to investigate a question of each student's choosing. Extensive details will be provided on the layout and expectations of the proposal, but in brief the proposal will include the following sections: synopsis, background, objectives, methods and approach, interpretation of results, and budget. There will be multiple important deadlines surrounding the proposal, given its scope and weight toward the final grade. Students will complete the following tasks as part of the complete proposal assignment:

1. Students will submit a title and brief synopsis of their proposal early in the semester (**September 29th**) and arrange a one-on-one meeting with me to discuss. This is to help ensure students are sufficiently on track.
2. **Friday October 31st**, students will submit draft proposals and have those proposals reviewed by their peers as well as me.
3. Peer reviews are due and will be discussed as a group on **Friday November 7**
4. Final proposals are **due Monday December 1st**.
5. The following week (**December 8, 10, 12**), students will give 25-30 min presentations on their proposals and respond to questions from the class.

Your combined performance on assignments related to the proposal counts towards **45% of your grade!**

EXAMS & QUIZZES

There will be two short in-class quizzes (**October 3 and November 14**), an in-class midterm exam (**October 20**), and a cumulative final take-home exam (i.e. material covers the entire course, **December 12**), which will consist of definitions, short-answer, and essay-type questions. Note: things discussed during our Friday sessions will be prime targets for exam questions! To prepare for the exam and to practice the type of questions that will be asked, we will have two short (15 min) in-class quizzes.

Exams will include additional questions of greater complexity for graduate level students compared to undergraduates taking FISH F425.

The final will have twice the weight as the mid-term, and combined the **exams and quizzes will count towards 27% your grade in the course.**

PARTICIPATION IN FRIDAY DISCUSSIONS

Starting on Friday September 12th, we will have weekly discussion sessions focused on the topics covered in the previous period and on the readings assigned. Given the small class size, the participation of everyone is VITAL to the success of these discussions.

You, along with a peer, will team up to facilitate (i.e. lead) at least one class discussion, which will be assigned at the beginning of the semester. As graduate students, you will be paired with undergraduates to increase your mentoring and leadership experience. Each week, students will be expected to come with a completed Weekly Discussion Guide (format to be handed out at beginning of the term). Complete forms and engagement in the class dialogues will count towards your participation score.

Your contribution to discussions, both as a facilitator and active participant, counts towards **19% of your grade**.

PEER REVIEW OF SUBMITTING JOURNAL ARTICLE

Peer-review forms the backbone of the scientific process and students in F650 will gain hands on experience with this process by conducting a review of a 'real life' article under consideration for publication in a fish or ecology related journal. Students will work closely with the instructor to understand strategies for reviewing papers and the ethics associated with the responsibility. Together they will finalize a review and submit to the journal within 1 month of receiving the assignment (as per most journal's guidelines).

EVALUATION/GRADING:

Grade scale: 92-100 A; 90-92 A-; 88-90 B+; 80-88 B; 78-80 B-; 65-78 C; 50-65 D; below 50 F. If the class average falls below 75%, this scale will be adjusted accordingly. Point and percentage values for each of the three evaluation components (shown below in **BOLD**) are as follows:

TOPIC	POINTS POSSIBLE	% TOTAL OF 1100 POINTS
RESEARCH PROPOSAL	500	45%
Proposed topic summary	25	
First draft	100	
Peer review of draft	25	
Final draft	250	
Presentation	100	
EXAMS & QUIZZES	300	27
In-class mid-term	85	
Take-home final	170	
Two in-class quizzes	45	
ARTICLE PEER REVIEW	100	9%
First draft review	25	
Final draft review	75	
DISCUSSIONS	200	19%
Facilitating discussion	100	
Participating in discussion	100	

COURSE OUTLINE (SUBJECT TO CHANGE)

DATE	TOPIC	READINGS AND ASSIGNMENTS
September 5	WELCOME TO FISH 425 CLASS OBJECTIVE (CO): To set course expectations, give overview of course activities and important dates, to introduce the broad topic of Fish Ecology	
September 8	THE HABITAT TEMPLATE I-ABIOTIC FACTORS IN THE OCEAN & ESTUARIES (CO): To understand the dominant physical (abiotic) drivers influencing fish in the ocean and transition zones between fresh and saltwaters.	Ryther 1969 Kimmer 2002
September 10	THE HABITAT TEMPLATE II-ABIOTIC FACTORS IN STREAMS, RIVERS, & LAKES (CO): To understand the dominant physical (abiotic) drivers influencing fish in freshwater lakes & rivers	LAKES - Horne & Goldman Chapter 2 (pages 14-22) RIVERS- Montgomery & Buffington 1998 (pages 13-40)
September 12	<u>FRIDAY DISCUSSION- PETER & TBD (?)</u>	
September 15	BIOGEOGRAPHY AND PATTERNS OF FISH DISTRIBUTION: (CO): to explore how fish distribution is shaped by factors acting across multiple scales	Vannote et al. 1980 Levin 1992
September 17	INDIVIDUAL AND POPULATION GROWTH (CO): To understand exponential and logistic growth, carrying capacity, negative and positive density-dependence	Rose et al. 2001 Berec et al. 2006
September 19	<u>FRIDAY DISCUSSION- LEADER TBD</u>	
September 22	NATURAL SELECTION, ADAPTATION, & ADAPTIVE PHENOTYPIC PLASTICITY (CO): To understand how natural selection can, but not necessarily, result in evolutionary responses and the role of plasticity in shaping diversity.	Reznick 2011 MacColl 2011 Bronmark and Miner 1992 Bestin et al. 2014
September 24	ECOLOGICAL DIVERSITY I: MORPHOLOGY & PHENOLOGY (CO): understand how key traits of body size, shape, and timing of life history are influenced by the environment in which a fish lives	Beaugrand et al. 2003 Quinn and Adams 1996 Schluter 1993
September 26	<u>FRIDAY DISCUSSION- LEADER TBD</u>	
September 29	ECOLOGICAL DIVERSITY II: MATING SYSTEMS, REPRODUCTIVE STRATEGIES AND ALTERNATIVE STRATEGIES (CO): To explore the diversity of different fish mating systems and to understand why some species exhibit alternative strategies	<u>PROPOSAL TOPIC DUE</u> Gross 1985 Gross 1996
October 1	ECOLOGICAL DIVERSITY III: MIGRATION AND RESIDENCY (CO): To explore the proximate and ultimate causes of	Quinn and Myers 2004 Gross et al. 1998

	fish migration	
October 3	1/3 TIME QUIZ, 2/3 TIME ON PROPOSAL WRITING	<u>QUIZ #1</u>
October 6	INTER-SPECIFIC COMPETITION & INTERACTIONS CLASS OBJECTIVE (CO): To understand the myriad ways that species interact and shape each other's ecology	Power 1992 Ruggerone et al. 2003 Worm and Myers 2003
October 8	FOOD WEB AND TROPHIC ECOLOGY GUEST LECTURE: ERIK SCHOEN, SFOS/UAF	<u>TBD</u>
October 10	<u>FRIDAY DISCUSSION- LEADER TBD</u>	
October 13	CASE STUDY: NORTHERN COD I (CO): A brief history of Newfoundland cod, from discovery to collapse. By the end you should be able to point to the key lessons learned from this tragedy	Rose 2007 pages 469-497 "Perfect deminse of northern cod" Hutchings and Meyers 1994 Hutchings et al. 1997
October 15	CASE STUDY: NORTHERN COD II (CO): To understand the cultivation depensation hypothesis for why cod have been slow to recover from overfishing	Rose 2007 pages 501-545 "A fishery without cod" Kitchell and Walters 2001
October 17	<u>FRIDAY DISCUSSION- LEADER TBD</u>	
October 20	MIDTERM EXAM	MIDTERM EXAM
October 22	CASE STUDY: BRISTOL BAY SOCKEYE SALMON LOCAL ADAPTATION, BIOCOMPLEXITY, AND PORTFOLIO DYNAMICS CO: To understand how life history diversity has facilitated the sustainable fishery in Bristol Bay	Schindler et al. 2010 (O) Berkeley et al. 2004 (R) Schindler et al. 2013 (O)
October 24	<u>FRIDAY DISCUSSION- LEADER TBD</u>	
October 27	CASE STUDY: BRISTOL BAY SOCKEYE SALMON LOCAL ADAPTATION, BIOCOMPLEXITY, AND PORTFOLIO DYNAMICS CO: To understand how life history diversity has facilitated the sustainable fishery in Bristol Bay	Schindler et al. 2010 Berkeley et al. 2004 Schindler et al. 2013
October 29	LIFE IN THE ICE LANE: ECOLOGY OF FISHES AT EXTREME COLD TEMPERATURES	Huusko et al. 2007 Cunjak 1996
October 31	<u>FRIDAY DISCUSSION- LEADER TBD</u>	<u>DRAFT PROPOSALS DUE</u>
November 3	HUMAN IMPACTS TO MARINE & ESTUARINE ENVIRONMENTS	Orr et al 2005 Bednarsek et al. 2014 Blaber et al. 2000
November 5	HUMAN IMPACTS TO FRESHWATERS I – MODIFICATION OF NATURAL FLOW REGIMES	Poff et al.1997 Waples et al. 2007
November 7	<u>FRIDAY DISCUSSION - PROPOSAL PEER REVIEW</u> (CO): TO GIVE MEANINGFUL, THOUGHTFUL,	<u>PEER-REVIEW DUE</u>

	CONSTRUCTIVE FEEDBACK ON PROPOSALS TO YOUR PEERS	
November 10	CASE STUDY: ELWHA DAM REMOVAL	Pess et al. 2008 Bednarek 2001
November 12	HUMAN IMPACTS TO FRESHWATERS II – LOGGING	Hatman et al. 1996 Holtby 1986
November 14	<u>1/3 QUIZ, 2/3 FRIDAY DISCUSSION- LEADER TBD</u>	<u>QUIZ #2</u>
November 17	BIOLOGICAL INVASIONS CO: To explore the ecological impacts of introductions of non-native species and rise of native invaders	Rahel 2000 Carey et al. 2012 Davis et al. 2011
November 19	CASE STUDY: INVASIVE SALMON AND TROUT (CO): To learn about invasive fish we all love	Halverson (pp 76-113) Korsu et al. 2007 Quinn et al. 2001
November 21	<u>FRIDAY DISCUSSION- LEADER TBD</u>	
November 24	INTERACTIONS BETWEEN WILD AND AQUACULTURE-PRODUCED FISH (CO): To explore the ecological costs of hatcheries and aquaculture on wild populations	Araki 2007 Fleming et al. 2000 Brenner et al. 2012
November 26	FISH IN A RAPIDLY CHANGING WORLD (CO): To understand how changing patterns of climate is shaping the ecology of fish in marine and freshwaters	Crozier et al. 2011 Schindler et al. 2005 Eliason et al. 2011 Pinsky et al. 2013 Wenger et al. 2011
November 28	<u>NO CLASS, THANKSGIVING HOLIDAY</u>	
December 1	CONSERVATION & THE FUTURE OF FISH (CO): to scan the horizon for what is in store for fish in the 21 st century	<u>FINAL PROPOSALS DUE</u> Worm and Branch 2012 Montgomery 2003 (concluding chapter in <i>King of Fish</i>)
December 3	STUDENT PROPOSAL PRESENTATIONS	
December 5	STUDENT PROPOSAL PRESENTATIONS	
December 8	STUDENT PROPOSAL PRESENTATIONS	
December 10	STUDENT PROPOSAL PRESENTATIONS	
December 12	STUDENT PROPOSAL PRESENTATIONS	HANDOUT FINAL EXAM
December 17	<u>TAKE-HOME FINAL EXAM DUE BY 10:00AM</u>	FINAL EXAM DUE

POLICIES

LATE WORK & ATTENDANCE

Given this is a graduate-level university course I feel justified treating students like the adults that they are. Consequently, I expect that students will take a proactive attitude toward the work in Fish F650 and let me know in advance if they are going to miss class or have a reasonable request for extending deadlines on assignments. Ultimately, I expect that students will attend all class sessions as participation in discussions counts for a large part of the course grade. If students fail to communicate with me in advance to missing class or assignments they will be given zero credit for their work.

ACADEMIC DISHONESTY

I, and the University of Alaska Fairbanks as a whole, consider academic dishonesty and plagiarism as a violation of trust and an offense that has major ramifications (e.g. potential expulsion from UAF). I expect that your thoughts will be shaped through conversation with your peers, through what you read, and what you watch. But the work you turn in needs to be in your own voice, express personal conclusions, and where appropriate acknowledge the contribution of others (through citation).

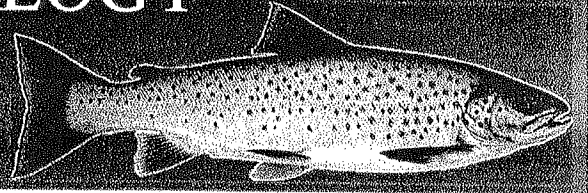
SUPPORT SERVICES AND DISABILITIES

This class involves writing assignments with feedback from the instructor and your peers. Additionally, you may find it useful to visit the UAF writing center. For more information, go to www.uaf.edu/english/writingcenter/about.htm. Make sure that your tutor understands the premise and audience for your writing assignments. For students new to Fairbanks and college life, consider using the services provided by Rural Student Services <http://www.uaf.edu/ruralss/>.

If you need special accommodations because of a disability, please contact me as soon as possible and we will work together with the Office of Disabilities Services (203 WHIT, 474-7043) to make the necessary arrangements in order to maximize your learning. To the extent possible I will work to provide reasonable accommodation to students with disabilities.

FISH F425 — FISH ECOLOGY

FALL 2016



“Nothing in evolution makes sense, except in the light of ecology” – Peter & Rosemary Grant, *How and Why Species Multiply*

INSTRUCTOR

Peter Westley, Assistant Professor

233 O’Neill Building (down hall and to left)

Email: pwestley@alaska.edu

Peter’s Office Hours

Open door policy/or by appointment

COURSE DETAILS

O’Neill 201

Monday, Wednesday, Friday

9:15am – 10:15am

Class website: Blackboard (login at: <http://classes.uaf.edu>)

Course credits: 3

Prerequisites: FISH 110, BIOL 371,

FISH 288 (recommended), STAT 401

(recommended), permission of instructor

COURSE DESCRIPTION

This course is an exploration of how fish interact with, and adapt to, their physical and biological environment, taught through the viewpoint that habitat diversity acts as a template for biological diversity within and among species. We will examine the ecology of major freshwater and marine habitats (with an emphasis on the former), as well as the potential threats to these habitats from human activity.

COURSE OBJECTIVES

This course has the following objectives for student learning:

- To strengthen student understanding of the factors that shape the ecological diversity of fish populations;
- To critically read and be able to articulate diverse opinions on fish-related ecological issues;
- To foster each student’s own informed views of complex fish-related ecological issues;
- To improve written and oral communication skills with peers;
- To gain hands-on experience developing a research proposal.

COURSE EXPECTATIONS

Together we can be most effective and are most likely to achieve the courses’ objectives if we are clear about what we can expect from one another. As a result, the following expectations will guide our work together.

MY EXPECTATIONS OF STUDENTS

- Come to class on time, engage in the course content for the full class time, and refrain from any activities that distract us from doing our best jobs of teaching or detract from a positive learning environment for all involved;

- Come to class prepared to participate, having completed assigned reading, writing, and research in advance;
- Participate in class activities in ways that support course goals and demonstrate respect and civility toward all other students and me;
- Take an active role in obtaining information and resources for completion of tasks and assignments in the course and, ultimately, in promoting your own learning;
- Monitor your own learning and contribute feedback to support me in achieving course goals.

STUDENTS' EXPECTATIONS OF ME

- Begin and end class on time;
- Come to class prepared to do the best job of facilitating your learning;
- Provide information and resources to support your learning in the course;
- Make the best possible use of class time to support your learning in the course;
- Answer questions and emails promptly and sufficiently;
- Be available to provide additional assistance when needed;
- Provide clear and consistent criteria that can be used fairly in evaluating your learning;
- Welcome input on ways to support you in your achievement of course goals.

LEARNING OUTCOMES

By the completion of the course, you should be able to:

- Explain the process of adaptation by natural selection and contrast to adaptive phenotypic plasticity;
- Provide proximate and ultimate explanations for why some populations and individuals migrate, guard their young, or exhibit alternative reproductive strategies while others do not;
- To thoroughly understand the connections among topics and to apply the concepts learned in class to novel situations;

ASSUMPTIONS ABOUT LEARNING

These assumptions will guide our path in the course:

- Students learn in unique ways (for example, when asked what you did yesterday, do you see pictures or words?);
- Writing, reading, and thinking are inextricably linked;
- Students learn best from either themselves or from peers;
- The best *discussions* come from good *listening*;
- Transformative learning occurs best when preconceived notions are challenged;

REQUIRED AND OPTIONAL READINGS

Posted on Blackboard in pdf form. Readings will primarily come from the primary scientific literature (i.e. published articles in peer-reviewed journals). It is *essential* that you are comfortable navigating in the

Blackboard environment. Through the Blackboard system, I will provide details on assignments, important changes to dates on the syllabus, class outlines and notes, class recordings, and supplemental reading material and content. Required and optional readings and are denoted as (R) and (O) on the course outline and on Blackboard as appropriate

RECOMMENDED TEXTS (FOR THOSE WANTING TO BUILD THEIR PERSONAL LIBRARY):

Ecology of Teleost Fishes, Springer, Second Edition, by R.J. Wootton; *Behavioural Ecology of Teleost Fishes* by Godin (editor); *Behavior and Ecology of Pacific salmon & trout* by Quinn.

CORE ACTIVITIES & ASSIGNMENTS

ORIGINAL RESEARCH PROPOSALS

The primary assignment in this course is the crafting of an original research proposal to investigate a question of each student's choosing. Extensive details will be provided on the layout and expectations of the proposal, but in brief the proposal will include the following sections: synopsis, background, objectives, methods and approach, interpretation of results, and budget. There will be multiple important deadlines surrounding the proposal, given its scope and weight toward the final grade. Students will complete the following tasks as part of the complete proposal assignment:

1. Students will submit a title and brief synopsis of their proposal early in the semester (**September 29th**) and arrange a one-on-one meeting with me to discuss. This is to help ensure students are sufficiently on track.
2. **Friday October 31st**, students will submit draft proposals and have those proposals reviewed by their peers as well as me.
3. Peer reviews are due and will be discussed as a group on **Friday November 7**
4. Final proposals are **due Monday December 1st**.
5. The following week (**December 8, 10, 12**), students will give 25-30 min presentations on their proposals and respond to questions from the class.

Your combined performance on assignments related to the proposal counts towards **50% of your grade!**

EXAMS & QUIZZES

There will two short in-class quizzes (**October 3 and November 14**), an in-class midterm exam (**October 20**), and a cumulative final take-home exam (i.e. material covers the entire course, **December 12**), which will consist of definitions, short-answer, and essay-type questions. Note: things discussed during our Friday sessions will be prime targets for exam questions! To prepare for the exam and to practice the type of questions that will be asked, we will have two short (15 min) in-class quizzes.

The final will have twice the weight as the mid-term, and combined the exams and quizzes will count towards 30% your grade in the course.

PARTICIPATION IN FRIDAY DISCUSSIONS

Starting on Friday September 12th, we will have weekly discussion sessions focused on the topics covered in the previous period and on the readings assigned. Given the small class size, the participation of everyone is VITAL to the success of these discussions.

You, along with a peer, will team up to facilitate (i.e. lead) at least one class discussion, which will be assigned at the beginning of the semester. Undergraduates will be paired with graduate students taking the stacked version of FISH F425 (FISH F650). Each week, students will be expected to come with a completed Weekly Discussion Guide (format to be handed out at beginning of the term). Complete forms and engagement in the class dialogues will count towards your participation score.

Your contribution to discussions, both as a facilitator and active participant, counts towards **20% of your grade.**

EVALUATION/GRADING:

Grade scale: 93-100 A; 90-92 A-; 87-89 B+; 80-86 B; 77-79 B-; 65-78 C; 50-64 D; below 50 F. If the class average falls below 75%, this scale will be adjusted accordingly. Point and percentage values for each of the three evaluation components (shown below in **BOLD**) are as follows:

TOPIC	POINTS POSSIBLE	% TOTAL OF 1000 POINTS
RESEARCH PROPOSAL	500	50
Proposed topic summary	25	
First draft	100	
Peer review of draft	25	
Final draft	250	
Presentation	100	
EXAMS & QUIZZES	300	30
In-class mid-term	85	
Take-home final	170	
Two in-class quizzes	45	
DISCUSSIONS	200	20
Facilitating discussion	100	
Weekly discussion guides	50	
Active participation in discussion	50	

COURSE OUTLINE (SUBJECT TO CHANGE); READINGS DENOTED AS (R) ARE REQUIRED AND (O) ARE OPTIONAL

DATE	TOPIC	READINGS AND ASSIGNMENTS
September 5	WELCOME TO FISH F425 CLASS OBJECTIVE (CO): To set course expectations, give overview of course activities and important dates, to introduce the broad topic of Fish Ecology	
September 8	THE HABITAT TEMPLATE I-ABIOTIC FACTORS IN THE OCEAN & ESTUARIES (CO): To understand the dominant physical (abiotic) drivers influencing fish in the ocean and transition zones between fresh and saltwaters.	Ryther 1969 (R) Kimmer 2002
September 10	THE HABITAT TEMPLATE II-ABIOTIC FACTORS IN STREAMS, RIVERS, & LAKES (CO): To understand the dominant physical (abiotic) drivers influencing fish in freshwater lakes & rivers	LAKES - Horne & Goldman Chapter 2 (pages 14-22) (R) RIVERS- Montgomery & Buffington 1998 (pages 13-40) (R)
September 12	<u>FRIDAY DISCUSSION- PETER & TBD (?)</u>	
September 15	BIOGEOGRAPHY AND PATTERNS OF FISH DISTRIBUTION: (CO): to explore how fish distribution is shaped by factors acting across multiple scales	Vannote et al. 1980 (O) Levin 1992 (R)
September 17	INDIVIDUAL AND POPULATION GROWTH (CO): To understand exponential and logistic growth, carrying capacity, negative and positive density-dependence	Rose et al. 2001 Berec et al. 2006 (R)
September 19	<u>FRIDAY DISCUSSION- LEADER TBD</u>	
September 22	NATURAL SELECTION, ADAPTATION, & ADAPTIVE PHENOTYPIC PLASTICITY (CO): To understand how natural selection can, but not necessarily, result in evolutionary responses and the role of plasticity in shaping diversity.	Reznick 2011 (R) MacColl 2011 (R) Bronmark and Miner 1992 (O) Bestin et al. 2014 (O)
September 24	ECOLOGICAL DIVERSITY I: MORPHOLOGY & PHENOLOGY (CO): understand how key traits of body size, shape, and timing of life history are influenced by the environment in which a fish lives	Beaugrand et al. 2003 (O) Quinn and Adams 1996 (R) Schluter 1993 (O)
September 26	<u>FRIDAY DISCUSSION- LEADER TBD</u>	
September 29	ECOLOGICAL DIVERSITY II: MATING SYSTEMS, REPRODUCTIVE STRATEGIES AND ALTERNATIVE STRATEGIES (CO): To explore the diversity of different fish mating systems and to understand why some species exhibit alternative strategies	<u>PROPOSAL TOPIC DUE</u> Gross 1985 (O) Gross 1996 (R)
October 1	ECOLOGICAL DIVERSITY III: MIGRATION AND RESIDENCY (CO): To explore the proximate and ultimate causes of	Quinn and Myers 2004 (O) Gross et al. 1998 (R)

	fish migration	
October 3	1/3 TIME QUIZ, 2/3 TIME ON PROPOSAL WRITING	<u>QUIZ #1</u>
October 6	INTER-SPECIFIC COMPETITION & INTERACTIONS CLASS OBJECTIVE (CO): To understand the myriad ways that species interact and shape each other's ecology	Power 1992 (R) Ruggerone et al. 2003 (O) Worm and Myers 2003 (O)
October 8	FOOD WEB AND TROPHIC ECOLOGY GUEST LECTURE: ERIK SCHOEN, SFOS/UAF	<u>TBD</u>
October 10	<u>FRIDAY DISCUSSION- LEADER TBD</u>	
October 13	CASE STUDY: NORTHERN COD I (CO): A brief history of Newfoundland cod, from discovery to collapse. By the end you should be able to point to the key lessons learned from this tragedy	Rose 2007 pages 469-497 "Perfect deminse of northern cod" (R) Hutchings and Meyers 1994 (O) Hutchings et al. 1997 (R)
October 15	CASE STUDY: NORTHERN COD II (CO): To understand the cultivation depensation hypothesis for why cod have been slow to recover from overfishing	Rose 2007 pages 501-545 "A fishery without cod"(R) Kitchell and Walters 2001 (R)
October 17	<u>FRIDAY DISCUSSION- LEADER TBD</u>	
October 20	MIDTERM EXAM	MIDTERM EXAM
October 22	CASE STUDY: BRISTOL BAY SOCKEYE SALMON LOCAL ADAPTATION, BIOCOMPLEXITY, AND PORTFOLIO DYNAMICS CO: To understand how life history diversity has facilitated the sustainable fishery in Bristol Bay	Schindler et al. 2010 (O) Berkeley et al. 2004 (R) Schindler et al. 2013 (O)
October 24	<u>FRIDAY DISCUSSION- LEADER TBD</u>	
October 27	LIFE IN THE ICE LANE: ECOLOGY OF FISHES AT EXTREME COLD TEMPERATURES	Huusko et al. 2007(R) Cunjak 1996 (O)
October 29	HUMAN IMPACTS TO MARINE & ESTUARINE ENVIRONMENTS	Orr et al 2005 (R) Bednarsek et al. 2014(O) Blaber et al. 2000(O)
October 31	<u>FRIDAY DISCUSSION- LEADER TBD</u>	<u>DRAFT PROPOSALS DUE</u>
November 3	HUMAN IMPACTS TO FRESHWATERS I – MODIFICATION OF NATURAL FLOW REGIMES	Poff et al.1997 (R) Waples et al. 2007 (O)
November 5	CASE STUDY: EL WHA DAM REMOVAL	Pess et al. 2008 (R) Bednarek 2001(O)
November 7	<u>FRIDAY DISCUSSION - PROPOSAL PEER REVIEW</u> (CO): TO GIVE MEANINGFUL, THOUGHTFUL, CONSTRUCTIVE FEEDBACK ON PROPOSALS TO YOUR PEERS	<u>PEER-REVIEW DUE</u>

November 10	HUMAN IMPACTS TO FRESHWATERS II – LOGGING	Hatman et al. 1996 (O) Holtby 1986 (R)
November 12	BIOLOGICAL INVASIONS CO: To explore the ecological impacts of introductions of non-native species and rise of native invaders	Rahel 2000 (O) Carey et al. 2012 (R) Davis et al. 2011(O)
November 14	<u>1/3 QUIZ, 2/3 FRIDAY DISCUSSION- LEADER TBD</u>	<u>QUIZ #2</u>
November 17	CASE STUDY: INVASIVE SALMON AND TROUT (CO): To learn about invasive fish we all love	Halverson (pp 76-113) (R) Korsu et al. 2007 (R) Quinn et al. 2001(O)
November 19	INTERACTIONS BETWEEN WILD AND AQUACULTURE-PRODUCED FISH (CO): To explore the ecological costs of hatcheries and aquaculture on wild populations	Araki 2007 (R) Fleming et al. 2000 (O) Brenner et al. 2012 (O)
November 21	<u>FRIDAY DISCUSSION- LEADER TBD</u>	
November 24	GLOBAL CLIMATE CHANGE I- SHIFTS IN PHENOLOGY (CO): To understand how changing patterns of climate may be inducing changes in timing of key biological events	Crozier et al. 2011(O) Schindler et al. 2005 (O) Eliason et al. 2011 (R)
November 26	GLOBAL CLIMATE CHANGE II-SHIFTS IN DISTRIBUTION (CO): To understand how changing patterns of climate may be altering the in distribution of suitable fish habitat	Pinksky et al. 2013 (R) Wenger et al. 2011(O)
November 28	<u>NO CLASS, THANKSGIVING HOLIDAY</u>	
December 1	COMMUNICATING SCIENCE- ART OF EFFECTIVE PRESENTATIONS (CO): To prepare effectively for class presentation in 425 and beyond	<u>FINAL PROPOSALS DUE</u> Janzen 1980 (R) Pickett et al. 1991 (R)
December 3	CONSERVATION & THE FUTURE OF FISH (CO): to scan the horizon for what is in store for fish in the 21 st century	Worm and Branch 2012 (O) Montgomery 2003 (concluding chapter in <i>King of Fish</i>) (R)
December 5	<u>FRIDAY DISCUSSION- LEADER TBD</u>	
December 8	STUDENT PROPOSAL PRESENTATIONS	
December 10	STUDENT PROPOSAL PRESENTATIONS	
December 12	STUDENT PROPOSAL PRESENTATIONS	HANDOUT FINAL EXAM
December 17	<u>TAKE-HOME FINAL EXAM DUE BY 10:00AM</u>	FINAL EXAM DUE

POLICIES

LATE WORK & ATTENDANCE

Given this is a 400-level university course I feel justified treating students like the adults that they are. Consequently, I expect that students will take a proactive attitude toward the work in Fish F425 and let me know in advance if they are going to miss class or have a reasonable request for extending deadlines on assignments. Ultimately, I expect that students will attend all class sessions as participation in discussions counts for a large part of the course grade. If students fail to communicate with me in advance to missing class or assignments they will be given zero credit for their work.

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This class involves writing assignments with feedback from the instructor and your peers. In addition, you may find it useful to visit the UAF writing center. For more information, go to www.uaf.edu/english/writingcenter/about.htm. Make sure that your tutor understands the premise and audience for your writing assignments. For students new to Fairbanks and college life, consider using the services provided by Rural Student Services <http://www.uaf.edu/ruralss/>.

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