

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

**1. COURSE IDENTIFICATION: As the course now exists.**

Dept	<b>FISH</b>	Course #	<b>650</b>	No. of Credits	<b>3</b>
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<b>COURSE TITLE</b>	<b>Fish Ecology</b>
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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	X
<b>PREREQUISITES*</b>	<input checked="" type="checkbox"/>		<b>FREQUENCY OF OFFERING</b>	<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.

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

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... Consequently the combined weight of the proposal for 425 students is 40% of the grade. 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 and is worth 45% of the final grade.

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.

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

**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.

<b>COURSE FORMAT:</b> (check <u>all</u> that apply)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input checked="" type="checkbox"/> 6 weeks to full semester
<b>OTHER FORMAT (specify all that apply)</b>						
<b>Mode of delivery (specify lecture, field trips, labs, etc.)</b>	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	<input type="checkbox"/>	S = Social Sciences	<input type="checkbox"/>		
Will this course be used to fulfill a requirement for the baccalaureate core?		YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
IF YES*, check which core requirements it could be used to fulfill:					
O = Oral Intensive, *Format 6 also submitted	<input type="checkbox"/>	W = Writing Intensive, *Format 7 submitted	<input type="checkbox"/>	X = Baccalaureate Core	<input type="checkbox"/>

**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	<input type="checkbox"/>	NO	<input checked="" type="checkbox"/>
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**5. COURSE REPEATABILITY:**

Is this course repeatable for credit?	YES	<input type="checkbox"/>	NO	<input checked="" type="checkbox"/>
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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?	<input type="checkbox"/>	TIMES
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If the course can be repeated with variable credit, what is the maximum number of credit hours that may be earned for this course?	<input type="checkbox"/>	CREDITS
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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~~ to analyzing Indigenous rights and policies in different nationstate systems. ~~Seven Aberiginal situations~~ Multiple countries and specific policy development 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, 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

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

DocuSigned by: <i>Franz Muetter</i>		Date	January 5, 2016
Signature, Chair, Program/Department of:		Fisheries Divison	

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

DocuSigned 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 Faculty Senate Review Committee:	Date
<input type="checkbox"/> Curriculum Review <input type="checkbox"/> GAAC <input type="checkbox"/> Core Review <input type="checkbox"/> 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](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.

# 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](mailto: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, or  
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 29<sup>th</sup>**) 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 1<sup>st</sup>**.
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 **40% 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 12<sup>th</sup>, 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 **30% 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:

<b>TOPIC</b>	<b>POINTS POSSIBLE</b>	<b>% TOTAL OF 1000 POINTS</b>
<b>RESEARCH PROPOSAL</b>	<b>400</b>	<b>40</b>
Proposed topic summary	20	
First draft	75	
Peer review of draft	25	
Final draft	200	
Presentation	80	
<b>EXAMS &amp; QUIZZES</b>	<b>300</b>	<b>30</b>
In-class mid-term	85	
Take-home final	170	
Two in-class quizzes	45	
<b>DISCUSSIONS</b>	<b>300</b>	<b>30</b>
Facilitating discussion	100	
Weekly discussion guides	150	
Active participation in discussion	50	

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

<b><u>DATE</u></b>	<b><u>TOPIC</u></b>	<b><u>READINGS AND ASSIGNMENTS</u></b>
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	<b><u>FRIDAY DISCUSSION- PETER &amp; TBD (?)</u></b>	
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	<b><u>FRIDAY DISCUSSION- LEADER TBD</u></b>	
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	<b><u>FRIDAY DISCUSSION- LEADER TBD</u></b>	
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	<b><u>PROPOSAL TOPIC DUE</u></b> 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	<b>1/3 TIME QUIZ, 2/3 TIME ON PROPOSAL WRITING</b>	<b><u>QUIZ #1</u></b>
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	<b><u>TBD</u></b>
October 10	<b><u>FRIDAY DISCUSSION- LEADER TBD</u></b>	
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)
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October 27	LIFE IN THE ICE LANE: ECOLOGY OF FISHES AT EXTREME COLD TEMPERATURES	Huusko et al. 2007(R) Cunjak 1996 (O)
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October 31	<b><u>FRIDAY DISCUSSION- LEADER TBD</u></b>	<b><u>DRAFT PROPOSALS DUE</u></b>
November 3	HUMAN IMPACTS TO FRESHWATERS I – MODIFICATION OF NATURAL FLOW REGIMES	Poff et al.1997 (R) Waples et al. 2007 (O)
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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	<b><u>FRIDAY DISCUSSION- LEADER TBD</u></b>	
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	<b><u>NO CLASS, THANKSGIVING HOLIDAY</u></b>	
December 1	COMMUNICATING SCIENCE- ART OF EFFECTIVE PRESENTATIONS (CO): To prepare effectively for class presentation in 425 and beyond	<b><u>FINAL PROPOSALS DUE</u></b> 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 <sup>st</sup> century	Worm and Branch 2012 (O) Montgomery 2003 (concluding chapter in <i>King of Fish</i> ) (R)
December 5	<b><u>FRIDAY DISCUSSION- LEADER TBD</u></b>	
December 8	<b>STUDENT PROPOSAL PRESENTATIONS</b>	
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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 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](mailto: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 29<sup>th</sup>**) 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 1<sup>st</sup>**.
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 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 12<sup>th</sup>, 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:

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

**COURSE OUTLINE (SUBJECT TO CHANGE)**

<b><u>DATE</u></b>	<b><u>TOPIC</u></b>	<b><u>READINGS AND ASSIGNMENTS</u></b>
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	<b><u>FRIDAY DISCUSSION- PETER &amp; TBD (?)</u></b>	
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	<b><u>FRIDAY DISCUSSION- LEADER TBD</u></b>	
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	<b><u>FRIDAY DISCUSSION- LEADER TBD</u></b>	
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	<b><u>PROPOSAL TOPIC DUE</u></b> 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	<b>1/3 TIME QUIZ, 2/3 TIME ON PROPOSAL WRITING</b>	<b><u>QUIZ #1</u></b>
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	<b><u>TBD</u></b>
October 10	<b><u>FRIDAY DISCUSSION- LEADER TBD</u></b>	
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
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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	<b><u>NO CLASS, THANKSGIVING HOLIDAY</u></b>	
December 1	CONSERVATION & THE FUTURE OF FISH (CO): to scan the horizon for what is in store for fish in the 21 <sup>st</sup> century	<b><u>FINAL PROPOSALS DUE</u></b>  Worm and Branch 2012 Montgomery 2003 (concluding chapter in <i>King of Fish</i> )
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