FISH 576: Applied Stock Assessment I (2-5 credits); Winter Quarter

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Recommended Skills and Knowledge:
R or similar (C++) programming experience.
Basic knowledge of population dynamics.

Overview
Applied Stock Assessment I is the first part of a two-quarter applied stock assessment series offered in collaboration with stock assessment scientists in the Fishery Resource Analysis and Monitoring Division at the Northwest Fisheries Science Center. This course provides a review of population dynamic modeling basics and stock assessment data types, and then focuses on the details of processing fishery and survey data for use in stock assessment and running Stock Synthesis stock assessment models. The work products from this course will be submitted to the Pacific Fishery Management Council (PFMC) for use in management, thus PFMC’s documentation requirements are reviewed early in the term. During this first term, students will work as a team to:

1) Review assessment documents, STAR reports, and identify new literature
2) Work up data for the update assessments
3) Update data as each data source is finalized
4) Begin work on producing an update stock assessment that involves updating and adding recent data from all data sources used in the previously reviewed stock assessment adopted for management.
5) Begin work on catch-only stock assessment projections.

Format
One 1.5-hour lecture and one 1.5 hour laboratory each week in which the instructors first introduce the theory behind the topic being discussed and the practical approach including decision points and code. Depending on the topic, students start the process of applying the methods to the stock assessment update and/or catch only projections and possibly additional examples during the laboratory session.

Learning Goals
Upon successful completion of the course, students will be able to:

1. Evaluate and process length and age composition data and fishery-independent indices.
2. Evaluate and process survey index data.
3. Run existing Stock Synthesis models and replace or extend data in input files for catch, indices, composition, discard, and environmental data.
4. Understand basic modeling assumptions and when they might be violated.

Texts
There are no prescribed texts. Students will be assigned readings at the beginning of the class.
Material is also covered in PowerPoint slides and example R scripts that will be posted on the class web-site.

**Evaluation (CR/NC or Graded)**

This is a CR/NC class. Students should sign up for a number of credits reflecting their expected involvement in the class and contributions to the projections and update stock assessment. Credit will depend upon participation in class and in the projections and update assessment. For variable credits, see requirements below:

2 credits: Attend and participate in class, read material, turn in homework assignments.

3 credits: Attend and participate in class, read material, turn in homework assignments. Participate in working up at least one data type/source for update stock assessment and run a catch-only projection in Stock Synthesis and use R4SS to produce output figures.

4 credits: Attend and participate in class, read material, turn in homework assignments. Participate in working up at least one data type/source for update stock assessment. Serve as a lead on a catch-only projection including running models and producing a document and presentation for review.

5 credits: Attend and participate in class, read material, turn in homework assignments. Participate in working up at least one data type/source for update stock assessment. Serve as a lead on the update assessment, overseeing and reviewing each of the data analyses undertaken to produce processed data to include in the update.

Enrolling in the two and three credit versions of this course requires background in the R language for statistical computing, gained through course FISH 552, Introduction to R Programming for Natural Scientists or approval from the instructor.

Enrolling in the four and five credit versions of this course requires background in the R language for statistical computing, gained through courses FISH 552, Introduction to R Programming for Natural Scientists, and FISH 553, Advanced R Programming for Natural Scientists. Additional required course work includes FISH 555, Age-Structured Models in Fisheries Stock Assessment, and/or FISH 558, Decision Analysis in Natural Resource management, or approval from the instructor.

The expected hours of coursework per week for the credit hours options, as well as the breakdown of hours spent on course tasks are provided in the table below.

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<th>Credit Hours</th>
<th>Hours Per Week</th>
<th>Lecture</th>
<th>Laboratory</th>
<th>Other</th>
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## Syllabus

<table>
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<th>Topic</th>
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| 1    | Class overview and an introduction  
Introduction to population modelling and assumptions  
Review Update TORs  
Visit PFMC website  
PacFIN non-disclosure forms  
Overview of data sources |
| 2    | Assign data preparation tasks  
NWFSC/Triennial/AK slope survey background and GLMM  
NWFSC survey compositional data  
NWFSC Biological data |
| 3    | Biological Data – Weight-Length, Maturity, Fecundity, Natural Mortality, Length at age, Sex Ratios, Aging precision and bias  
Fit length/weight and Von Bertalanffy growth relationships using survey data  
Fishery Landings |
| 4    | Fishery discards  
Fishery and discard ages and lengths |
| 5    | Environmental indices  
Integrated Analysis, r4ss, ADMB |
| 6    | SS Introduction, modeling parameters |
| 7    | SS input files, processing and formatting, debugging |
| 8    | Catch only assessment projections in SS |
| 9    | Catch only assessment projections documentation; Data preparation documentation |
| 10   | Finalize data documentation for update stock assessments  
Finalize Catch only assessment projections documents for PFMC |

### Religious Accommodations

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW’s policy, including more information about how to request an accommodation, is available at [Religious Accommodations Policy](https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/).

Accommodations must be requested within the first two weeks of this course using the [Religious Accommodations Request form](https://registrar.washington.edu/students/religious-accommodations-request/).

### Email and Computer Use

All students are expected to have an email address and you will receive email relevant to this course on a regular basis.

### Academic Integrity
Trust between student and instructor is of paramount importance in academic settings. Plagiarism, cheating, and other misconduct are serious violations of the University of Washington Student Conduct Code (WAC 478-120) and your personal contract as a student. I expect that you will know and follow the university’s policies on cheating and plagiarism. Please review the College of the Environment website on academic integrity so that you are clear on what constitutes academic misconduct. Any suspected cases of academic misconduct will be handled per University of Washington regulations. For more information, see the College of the Environment Academic Misconduct Policy and the University of Washington Community Standards and Student Conduct website. Be advised that as an instructor at the UW, I have the responsibility to notify University Conduct committees about any suspected student misconduct.

**Disability Accommodations**

It is crucial that all students in this class have access to the full range of learning experiences. At the University of Washington, it is the policy and practice to create inclusive and accessible learning environments consistent with federal and state law. Full participation in this course requires: 1) the ability to attend all lectures per week; 2) participate in small group discussions on topics relevant to the course, 3) participate in all laboratory/discussion sections and 3) prepare stock assessment documents and make short presentations that synthesize results and discussion orally. If you anticipate or experience barriers to your learning or full participation in this course based on a physical, learning, or mental health disability, please immediately contact the instructor to discuss possible accommodation(s). A more complete description of the disability policy of the College of the Environment can be found here. If you have, or think you have, a temporary or permanent disability that impacts your participation in any course, please also contact Disability Resources for Students (DRS) at: 206-543-8924 (V), 206-543-8925 (TDD), uwdss@uw.edu.