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 (SS3) 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.

Format
Approximately one 1-hour lecture and one 1 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 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.

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, run assessment model in Stock Synthesis and use R4SS to produce output figures.

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 advanced 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.

Credit Hours	Hours Per Week	Lecture	Laboratory	Other
2	6	1.5	1.5	3
3	9	1.5	1.5	6
4	12	1.5	1.5	9
5	15	1.5	1.5	12

Syllabus

Week	Topic
1	Class overview and an introduction Overview of stock assessment process, PFMC website Introduction to git/github and class resources Overview of data sources,non-disclosure forms, data preparation tasks for update assessments Review update assessment TORs
2	WCGBTS/triennial/juvenile rockfish survey background and index standardization Survey compositional data WCGBTS compositional data preparation, overview of nwfscSurvey code
3	Fishery landings, PacFIN overview Fishery discards, WCGOP overview
4	Fishery retained and discarded ages and lengths PacFIN biological data processing and preparation using PacFIN.Utilities
5	Biological data and parameters estimated outside the model – Weight-Length, Maturity, Fecundity, Sex Ratios, Ageing precision and bias
6	Population modeling and assumptions, Integrated analysis, SS3 introduction, overview of SS3 input files R4SS
7	Modeling parameters in SS3 Natural mortality and growth in SS3 Initial conditions and fishing mortality in SS3 Recruitment, catchability and selectivity in SS3
8	Working with SS3 input files: formatting, processing and debugging
9	Finalize data preparation Start running models
10	Data weighting in SS3 Formulate a proposed base model

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.