Aquaculture and the Environment (ENV 319A/719A/719)
Fall 2021; M, W 1:45-3:00 (Bookhout Conference Room)
https://duke.zoom.us/j/96796376539?pwd=UUF3OTu3aXR6MUN1Sgy5VkVUR1RRZz09
Instructor: Zackary Johnson <zij@duke.edu>
TA: Jessica Gronniger <jessica.gronniger@duke.edu>

Area of Knowledge: NS Modes of Inquiry: W, STS

Synopsis of course content:
Describing the major environmental, social and economic drivers of increasing global aquaculture, with a focus on marine systems. Quantitative evaluation and comparison of the range of species for aquaculture, locations where operations occur, operational aspects including environmental impacts and management considerations. Investigation of alternative approaches and potential future areas for aquaculture expansion as well as social, economic and technical barriers to implementation.

https://ebookcentral.proquest.com/lib/duke/detail.action?docID=6273895


Presentations: Grad: ~10 min final presentation; UG: ~1 page summary of one of the presentations; up to 2 short presentations on journey/results from shrimp farming

Format: Multimodal and experiential! → Lectures (live, or recorded as necessary); supplementary videos; discussions (online/in-person); in-class (online/in-person) working sessions; field trips (during class period); experiential learning; guest lectures. NOTE – we will start with in-person meetings, but future meetings are situationally dependent

Grading:
15% “Field Trip” write-ups
15% In-Class Assignments – analyses, Pecha Kucha, discussion, etc.
10% Presentation / Write-up
10% Shrimp Experiment
50% 3x short-papers (30% drafts; 10% comments on others; 10% revision)

Attendance:
Participation is an important aspect of the course and therefore attendance is compulsory, if possible. Students with planned absences (e.g. religious observances, varsity athletic participation, conferences) must notify the instructor 1 week in advance. Students with excused unplanned absences (e.g. illnesses or extraordinary personal circumstances) should notify the instructor following standard Duke policies outlined here: http://trinity.duke.edu/undergraduate/academic-policies/illness

The dynamic nature of COVID means that we should be prepared for change. We will start the class in-person and all ENV319A/719A students are expected to attend in-person. If the situation changes, then we will move the entire class online.
Field Trips: All field trips are scheduled to be during the class period. When possible, students enrolled in ENV719 (Durham based students) will be given opportunities to engage (via video) or if not possible, alternative field trips will be provided (e.g. self-guided or ‘make-up’ field trip days – e.g. weekends). Students can miss 1 fieldtrip without consequence.
Objectives:
- To identify major drivers of increasing global marine aquaculture and the major countries and organisms involved
- To compare the challenges and opportunities associated with different species or types of aquaculture including how aspects of basic biology and ecology impact application in traditional aquaculture systems, integrated multi-trophic aquaculture, nutrient remediation or blue carbon stocks or others
- To assess current societal impacts on present and potential future expansion of marine aquaculture including environmental concerns/sustainability, (sea)food security, policy/management and cultural aspects

Topics (with Stickney chapter #):
- Setting the stage: major global drivers (1)
  Historical context; major countries involved; major organisms cultured
- Operational Aspects: Types of culture systems, water/energy use; feed (2, 3 & 7)
- Challenges: operational and impacts (water quality, diseases, biodiversity) (4&5); Alternative systems: multi-trophic, nutrient remediation, blue carbon, etc. (9)
- (Sea)food Security
- Case study in microalgae
- Policy/management, regulations overview and cultural aspects
- Management
- Presentations

Potential In-Person Field Trips
- Algae Farm
- Duke Aquafarm (Oyster Farm)
- Aquarium
- Sturgeon Farm
- Williston Oyster Hatchery
- Eastern NC Producers Meeting

Major Themes/Roughly by Week
- Introduction to active learning and class structure /Historical Context
- Introduction to Aquaculture – setting the stage
- Major Countries and Organisms
- Operational Aspects – types of systems/water/feed
- Environmental Impacts – Bad
- Environmental Impacts – Good
Domestic & NC Strategy/Policy
Policy/Management/Social
Geospatial considerations
Case study in algae
Case study in oysters

Preliminary Paper Topics/ Preliminary Due Dates
Sept 10: History or Country or Organisms
Oct 18: Environmental Impacts
Nov 8: Choose your own adventure! (White paper)