AD HOC REPORT

Bachelor of Applied Science Environmental Conservation BASEC

Submitted to

Northwest Commission on Colleges and Universities

by

Skagit Valley College

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Table of Contents

AD HOC REPORT
BACHELOR OF APPLIED SCIENCE ENVIRONMENTAL CONSERVATION (BASEC)

Overview

As requested by NWCCU, this Ad Hoc Report is to address the progress and implementation of the Bachelor of Applied Science degree program in Environmental Conservation (BASEC) at Skagit Valley College (SVC).

In March 2014, the State Board for Community and Technical College (SBCTC) approved the BASEC. In May 2014, NWCCU granted candidacy status at the baccalaureate level for the BASEC, effective Fall 2014. Enrollment began in Fall 2014 with an initial cohort of 13 students. All students from the first cohort will graduate by the end of summer quarter 2016.

Curriculum

The Bachelor of Applied Science Degree in Environmental Conservation (BASEC) builds on the existing AAS-T degree in Environmental Conservation at Skagit Valley College and other comparable AAS-T degrees in natural resources. The degree adds upper division courses at the junior and senior level leading to a four-year baccalaureate degree. Students graduating with a BASEC degree at SVC have a minimum of 20 credits of upper division communication skills, 15 credits of natural sciences, 13 credits of humanities, and 10 credits of social sciences. Students are primarily accepted to start during fall quarter, however, the schedule is designed to meet the needs of working adults and those who can only attend part-time.

New curriculum and course learning outcomes
Curriculum for the BASEC was developed on the foundation of the AAS-T and ATA applied degree tracks within the existing Environmental Conservation program, adding upper division curriculum of 300- and 400-level courses. Program learning outcomes have been developed to ensure that graduates with a BASEC will acquire the necessary skills for advanced field and laboratory work and be able to move into management and supervisory positions within natural resource management divisions in the public and private sector. Graduates will be able to:

- Understand and apply federal, state, and tribal policies driving natural resource policies.
- Use landscape ecology principles and technology to analyze ecological scenarios for management decisions at the watershed level.
- Apply forest ecology and silvicultural techniques to develop management scenarios for working forests.
- Use salmon biology to inform and to make management decisions regarding individual salmon stocks and outline ecological restoration measures.
- Contribute to natural resource decision-making groups utilizing effective communication techniques.
- Apply conservation biology strategies and community ecology principles in the management of biodiversity at the landscape level.
- Incorporate watershed management science in management strategies for managing watersheds sustainably for ecosystem services and natural resources.

- Develop and implement management actions for aquatic habitats.
- Develop and demonstrate leadership skills within the environmental sciences and natural resources management.

A copy of the course descriptions and learning outcomes is provided as an attachment to this report in Appendix A. A suggested BASEC degree schedule is attached in Appendix B.

Modality
As planned, the BASEC is offered in a hybrid format; all courses have met the 40% in-class instruction, 20% lab and fieldtrips, and 40% online format except for ENVC 302 Data management (2 credits). After a review by faculty and students, it now has one hour lecture and one two-hour lab. This extended lab time allows the course to better meet the course learning outcomes.

Staffing, Facilities & Equipment

The BASEC is offered in classroom and lab space at the Mount Vernon campus. SVC added two new full-time positions - a Program Assistant and Lab Assistant - to support the program. Program assistant, Shawna Blue, was hired in September 2014 on a 9-month, full-time contract. Lab manager Corrin Hamburg was hired in November 2014 on a 9-month, full-time contract. Both of these contracts will be changed to 10-month, full-time beginning fall 2016.

Dr. Claus Svendsen, Department Chair, Environmental Conservation, was reassigned to administer the BASEC program, supervise faculty in the department, and advise BASEC students. The Dean of Workforce, Mr. Darren Greeno, and the Vice President for Instruction, Dr. Kenneth Lawson, provide administrative oversight of the BASEC program. Additionally, Dr. Steven Glenn (Environmental Conservation, adjunct), Dr. Roxanne Hulet (Chemistry, tenured), Dr. Ernest Tutt (Communication, tenured), and Ms. Lacy Meeks (English, adjunct) teach in the program.

The College made additional investments in library services to support the program, planned in the original BASEC proposal. The library spent $20,070 of the allocated $20,000 to purchase 195 print books and 28 eBooks in environmental science and related disciplines. In addition, in order to provide scholarly journals, the library subscribed to the Ebsco database Environment Complete (over 900 titles) and the JSTOR database Life Sciences (over 280 titles). Annually, the college allocates $7,000 to the library to continue these databases and to purchase additional titles for the print and eBook collection.

In addition to increasing subscriptions, texts and online databases, the library increased the technical services librarian from a 0.75 FTE position to a fully funded, tenure track faculty position. The librarian started fall 2014 and has successfully completed two of the three years in the tenure process.

Student Services, including enrollment services, counseling and financial aid, have worked closely with BASEC faculty, students, and potential students to ensure satisfactory support for students interested and enrolled in the BASEC.

Funding was set aside by SVC to purchase BASEC equipment during the implementation period. New equipment purchased for the program since the fall of 2014 can be found in Appendix C.

Budget

The College implemented the BASEC with no resulting detriment to existing two-year programs. Initial enrollment was projected to be 20 FTEs with a new cohort of 20 FTEs starting every fall. The program has generated lower than expected tuition revenue for two reasons. First, low enrollment, and second, Washington state legislative actions that decreased student tuition. Therefore, the BASEC program will not be self-supporting until its fourth year, 2017-18. However, the College has committed to continue funding the costs associated with the program.

Successes and Challenges

Successes

The BASEC program at Skagit Valley College boasts unique strengths compared to similar programs at other colleges:

- Graduating students have experience in working in an accredited water quality lab, which will make them competitive job applicants. Some bachelor students graduating from 4-year institutions do not have this experience.
- All students have lab and fieldtrips associated with our courses, which gives students practical and job readiness skills.
- The BASEC thoroughly prepares students for employment, as evidenced by 50% of students in the first cohort securing a job prior to degree completion.
- 100% of students in the first cohort will complete their degree by summer 2016.

One goal of the program was to meet the Washington Department of Ecology's standards and earn accreditation by the Department. This ensures the results obtained through lab analyses are reliable. Students who graduate with proper experience in the certified laboratory environment will be equipped with the requisite skills to be successful in a scientific workplace. In addition, it will be possible for instructors to conduct field sampling for courses where the results can be shared with the community.

The BASEC lab has been designed to accommodate both a teaching lab and a water quality lab accredited by the Washington Department of Ecology. The following methodologies has been developed and a manual written:

- Alkalinity
- Conductivity
- Nitrate/nitrite
- Ortho-phosphate
- pH
- Turbidity
- Entry procedure
- Sampling procedure
- Glassware, sampling bottles and field equipment cleaning procedures

- Balance use and calibration
- Pipette calibration
- Thermometer calibration
- Safety

The lab manual detailing methodology has been approved by the Department of Ecology; the College passed the water quality blind test; and accreditation from the Department of Ecology will be decided following a site visit on August 30, 2016. As of September 1, 2016, the College has received a verbal approval for accreditation. We expect an official report to follow.

Challenges

Although the program has seen steady enrollment over time and excellent retention, it is not at the pace that was anticipated. To address this, the College has increased K-12 pathways for schools with environmental science courses. This will increase awareness of the program and recruit students to SVC. Another challenge has been establishing a pipeline of new students outside of those already attending Skagit Valley College to pursue an AAS-T or related degree. The BASEC program would like to recruit more students who have earned associates degrees from colleges other than Skagit Valley College. Therefore, the College is investigating articulation agreements with other community and technical college programs.

Student Enrollment, Retention, Completion & Assessment

Enrollment

The first full-time cohort began in Fall 2014 with 13 students. Of the original cohort, 11 have graduated and the remaining 2 students will graduate following the completion of a capstone course in summer 2016 quarter. Six students, 50%, secured employment prior to graduation. The second cohort of students began in Fall 2015 with 9 students. All of these students will begin 400-level classes in fall 2016. The most recent cohort, Fall 2016, is projected to have 14 students.

The College capitalizes on the existing AAS-T as a pipeline to the BASEC. Several second year students in the AAS-T program have indicated a desire to apply to the BASEC and will work with faculty advisors on this goal during the year.

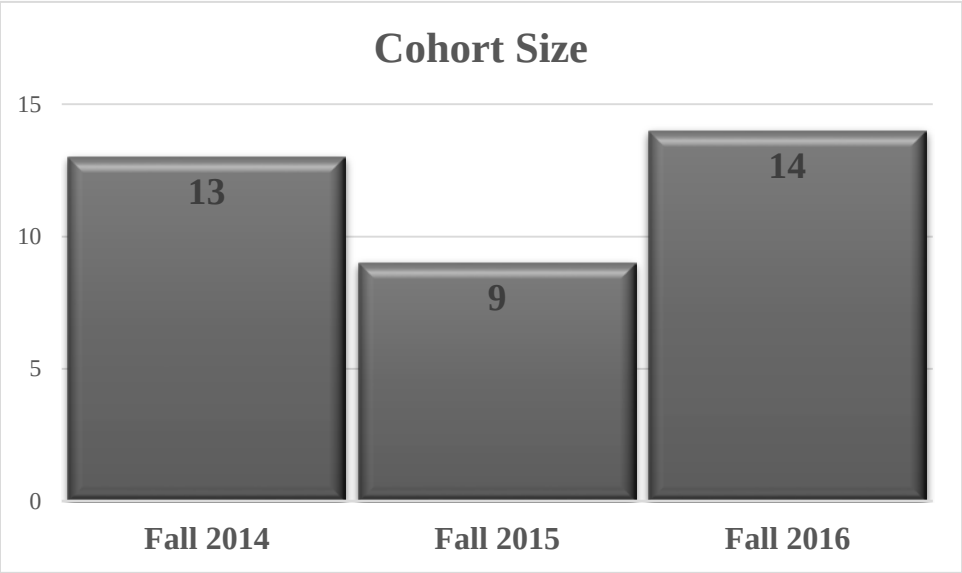
Assessment

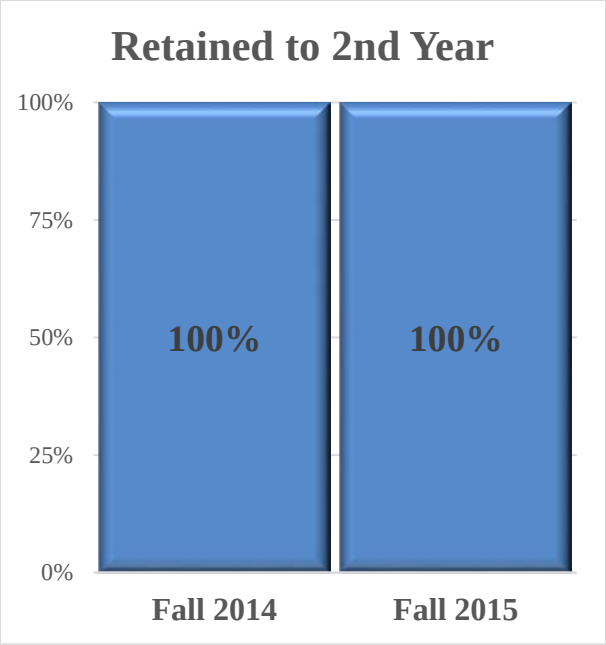
Each course includes learning outcomes that are aligned with the program-level learning outcomes. Students are assessed through tests, papers, and field research projects. Students are also assessed more informally through class discussions at the conclusion of the course. Based on this feedback, faculty are able to adapt courses for the next quarter or next cohort.

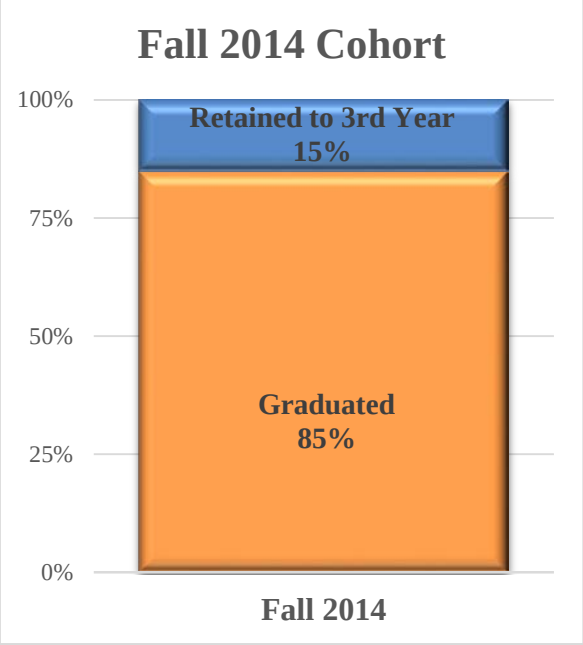
The outcomes are reviewed on an annual basis by the Environmental Conservation Advisory Committee which consists of industry experts and former students. A formal outcomes assessment is being designed and will be implemented in 2016-2017.

Retention & Completion

The BASEC program boasts 100% retention of students. From the first cohort, Fall 2014, 85% have completed their BAS degree, and the remaining 15% will complete their degree after one additional quarter. The College expects to enroll 14 students in the next cohort, Fall 2016.







Conclusion

The last two and a half years have been very exciting as the program has worked to develop new BAS curricula, purchase equipment, seek Department of Ecology accreditation of our lab, and recruit, retain and graduate students. The high employment rate of students prior to receiving their degree is evidence that this program meets labor market needs and learning outcomes meet employer needs. Enrollment in the BASEC program is anticipated to continue to grow with each cohort. This candidacy period has been one of challenges, growth and great rewards.

Within the program, the biggest impact for the students it that BASEC students have a more rigorous lab experience and are exposed to more work-like settings. The BASEC degree has impacted the College as a whole by providing the college with 300 level course work in several departments, which enriches the department and allows for cross-discipline collaboration. The College has improved library resources to meet the demands of BASEC students, providing more depth for Associate-level students. Strong college and administrative support and financial commitment have contributed much to the progress and achievements of the BASEC program.

Appendices

Appendix A: Course Descriptions and Course Learning Outcomes
Appendix B: BASEC Degree Schedule
Appendix C: New Equipment List

Course descriptions & learning outcomes

CHEM 301 Environmental Chemistry

Study of the source, fate, and reactivity of compounds in natural and polluted environments. Emphasis will be placed on climate change, air pollution, stratospheric ozone depletion, pollution and treatment of water sources, and the utilization of insecticides and herbicides.

Learning outcomes
Students will be able to:

- Analyze the chemistry of the stratospheric ozone layer and of the important ozone depletion processes.
- Analyze the chemistry of important tropospheric processes, including photochemical smog and acid precipitation.
- Understand the basic physics of the greenhouse effect. Evaluate the sources and sinks of the family of greenhouse gases, and the implication for climate change.
- Analyze the nature, reactivity, and environmental fates of toxic organic and inorganic chemicals.
- Analyze the chemistry of natural waters and of their pollution and purification.

ENVC 302 Data Management

Development of a data management strategy from field collection, processing to data storage. Emphasis will be given to the use of PDAs and cell phones for field collection to server storage. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes
Students will be able to:

- Identify appropriate data collection devices and transfer mechanisms for natural resource data collection.
- Identify an appropriate data storage solution for a natural resource project.
- Select an appropriate communication application for data management.
- Develop an appropriate strategy for collecting, send, and store natural resource data.

CMST 303 Communication in Natural Resources

Provide an overview of communication processes involved in small group interactions and collaborative decision making related to natural resource management. Focuses on applications of group dynamics, decision-making, problem solving, and conflict resolution. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes

Students will be able to:

- Effectively meet planning and facilitation of participatory group discussions.
- Strategically plan: develop projects and goals; analyze processes and outcomes.
- Identify and develop communication strategies for various target audiences.
- Use appropriate forms of mass media.
- Use feedback analysis to improve individual and group performance, and program success.

ENVC 304 River Ecology & Watershed Management

Watershed perspective to learn about rivers and streams with special emphasis on the Pacific Northwest coastal ecoregion. Topics include hydrology, hyporheic flow, geomorphology, stream classification, riparian ecology,, and biogeochemical cycles. Development of watershed and ecosystem management at the appropriate spatial and temporal scales including adaptive management processes incorporating cultural values and philosophies allowing successful watershed management. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes
Students will be able to:

- Utilize stream classification systems to inventory stream conditions.
- Understand and quantify stream hydrology.
- Quantify and evaluate the biotic integrity of streams using primary production and macroinvertebrate communities.
- Quantify and evaluate fish communities in various stream habitats.
- Quantify and evaluate riparian conditions for wildlife.
- Evaluate current landscape processes responsible for hydrology and quantify management recommendations for ecological restoration.
- Understand and utilize stream systems as sentinels; especially when providing management recommendations.
- Develop an understanding of various cultural values associated with rivers and their riparian zones in the past and present.
- Assess anthropogenic changes to riverine ecosystems.

ENVC 310 Soil Ecology

Fundamental principles of soil ecology in relation to physical, nutrient cycling dynamics, biogeochemical cycling, belowground biomass, biodiversity of soil organisms, and soil food webs and ecological processes. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes
Students will be able to:

- Quantify the physical aspects of soils.
- Measure and describe soil profiles and their utility for soil conservation.
- Measure soil primary production of higher plants.
- Investigate how microbes influence soil processes and structure.

- Develop community ecology flow charts to illustrate how soil fauna influences soil processes and structure.
- Measure nutrient cycling in soils by measuring nutrient flows between trophic layers.
- Measure soil biodiversity parameters .
- Manage soil biodiversity.
- Understand and measure soil chemistry.
- Assess anthropogenic landuse influences on soils ability to perform ecological processes.

ENVC 315 Limnology & Reservoir Ecology

Structure and function of lakes, ponds, and reservoirs. Includes physical, chemical, and biological controls of productivity and species composition of aquatic flora and fauna, and effects of pollution on water quality. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes
Students will be able to:

- Identify the landscape context and dynamic patterns of a lake or reservoir.
- Quantify the water budget of a lake or reservoir.
- Understand how light and temperature influences the ecological processes in a lake or reservoir.
- Understand the water movements of a lake or reservoir and shoreline impacts.
- Quantify and evaluate a lake's biotic structure and productivity.
- Measure and evaluate a lake's oxygen budget spatially and seasonally.
- Quantify and evaluate water quality parameters for lakes and reservoirs.
- Measure and evaluate lake plankton.
- Quantify and develop a fish management plan for a lake or reservoir.
- Quantify, evaluate and manage land-water interfaces.
- Evaluate specific anthropogenic influences to limnetic ecosystems in response to various watershed land uses.

QSCI 318 Quantitative Analysis of the Environment

Applications to environmental and natural resource problems stressing the formulation and interpretation of statistical tests. Course includes random variables, expectations, variance, binomial, hypergeometric, Poisson, normal, chi-square, ‘t’ and ‘F’ distributions. ANOVA, and regression analysis included. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes
Students will be able to:

- Understand biological data and populations and samples.
- Determine measures of central tendency, variability, and dispersion.
- Determine and interpret probabilities.
- Understand the properties of a normal distribution.

- Outline sample hypotheses.
- Outline multisample hypotheses and analysis of variance (ANOVA).
- Perform data transformations.
- Calculate linear regressions.
- Conduct testing for goodness of fit.

ENVC 320 Landscape Ecology

The science and art of studying and influencing the relationships between spatial pattern and ecological processes across different spatio temporal scales and levels of biological organization. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes
Students will be able to:

- Understand the importance of landscape scales.
- Quantify landscape patterns.
- Learn that landscape ecology is a multi-disciplinary subject including economics and sociology, the earth sciences and geography.
- Construct computer models in landscape ecology.
- Critically work with ecosystem processes in a landscape.
- Understand and quantify how organisms utilize landscape patterns.
- Evaluate underlying processes responsible for landscape patterns.
- Define landscape ecology.
- Quantify human fragmentation of landscapes at different spatial and temporal scales.
- Quantify metapopulations in fragmented landscapes.

ENGL 324 Advanced Writing in Science

Focuses on the skills necessary to write in the natural sciences. Students will discuss problems common to all technical writing and will develop effective ways to describe equipment, processes and procedures; to classify, analyze, and present information; explain principles, laws, and concepts. Intensive peer review is a strong component. The course includes a significant research component. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes
Students will be able to:

- Recognize and use the conventions governing the dissemination of scientific knowledge;
- Learn to define the context for different kinds of scientific writing—lab and research reports, reviews of literature, scientific arguments, etc.—and develop the appropriate written response;
- Write concisely, concretely, and accurately to present complex scientific ideas clearly for scientific and lay audiences;
- Demonstrate the ability to find, evaluate, synthesize, and integrate necessary information

for the completion of a project;
- Effectively and ethically incorporate appropriate scientific exhibits (graphs, charts, etc.) as part of textual communication;
- Analyze own writing strengths and areas for improvement and develop strategies for ensuring effective completion of written assignments;
- Increase ability to workshop: respond effectively to peers' work in progress, to revised own texts in response to feedback, and participate in collaborative learning activities.

ENVC 327 Advanced Wetland Ecology

Wetland hydrology, biogeochemistry, and biological adaptations to wetland conditions. Including global wetland issues, wetlands and climate change, international management of wetlands, and human interface with wetland in different socio-economic settings. Course includes advanced wetland delineation. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes
Students will be able to:

- Understand the science, regulatory environment, and history of wetland management.
- Classify a wetland within North America.
- Quantify and evaluate the hydrology of wetlands.
- Measure and quantify critical biogeochemistry parameters of wetlands.
- Evaluate the successional development of a wetland.
- Understand and quantify ecosystem processes of coastal wetlands at various trophic levels.
- Understand and quantify ecosystem processes of inland wetlands at multiple trophic scales.
- Understand and communicate values and valudation measures of wetland ecosystems.
- Develop a wetland restoration plan.
- Assess competing landuse values influencing the conservation and restoration efforts of wetlands.
- Measure and Quantify amphibian use of wetlands at different developmental stages.

Measure and quantify wildlife habitat by Cowardin classes.

ENVC 405 Behavioral Ecology

Investigates the evolutionary and ecological behavioral adaptations of animals. Various taxonomic groups will be examined with an emphasis on vertebrate species as well as species of ecological and economic importance. Ecological behavior will be viewed in light of ecosystem management activities. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes
Students will be able to:

- Investigate causes and consequences of variation.
- Understand comparative analysis of natural selection and adaptation.
- Analyze development of behavior.
- Investigate adaptations of feeding behavior and survival.

- Compare behavioral strategies in habitat selection.
- Analyze behavioral strategies in reproductive behavior and the development of mating systems.
- Investigate the development of social behavior and the consequences for conservation and management.

ENVC 407 Forest Ecology

Forest ecology includes the development of forestry, biogeochemistry, nutrient cycling, transfer and storage of energy, and the physical environment. Forest management as a renewable resource, including fire ecology, forest succession, and functioning of forest ecosystems. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes
Students will be able to:

- Understand how forestry practices and forest ecology must be matched.
- Quantify and evaluate nutrient cycling and energy transfer in forest ecosystems.
- Understand the importance of management of forest genetics as a forest management component.
- Understand how solar radiation, temperature and wind must be part of sustainable forest management.
- Measure and evaluate forest soil components; including water.
- Understand the importance of fire ecology in forest ecology and its sustainable management.
- Quantify fuel loads and susceptibility to fire risks.
- Quantify and understand community ecology of forests and its importance for sustainable management of forests.
- Quantify and understand forest succession.
- Assess and valuate ecosystem services provided by forested ecosystems at local and regional scales.

QSCI 408 Biometry & Ecological Sampling

Statistical inquiry of biological data. Experimental design and data analysis. Encouraging students to think critically and quantitatively about how data are collected, analyzed, and interpreted. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes
Students will be able to:

- Estimate abundance of an organism.
- Determine spatial patterns and indices of dispersion.
- Determine sample sizes and calculate statistical power.
- Correctly select appropriate sampling design.

- Outline experimental designs for sampling.
- Calculate similarity coefficients and cluster analysis.
- Calculate species diversity measures.
- Calculate niche measures and resource preferences.

ENVC 410 Conservation Biology

Exploring the worlds biological diversity including a wide range of species, complex ecosystems, and the genetic variation within species. Conservation biology is an interdisciplinary science that includes not only biological and ecological solutions, but includes socio-economic aspects. Includes ecological modeling. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes
Students will be able to:

- Define and use the conservation biology discipline.
- Utilize ecological software to model ecological parameters.
- Develop a working understanding of biodiversity at several ecological and population levels.
- Understand and quantify the value of biodiversity in various cultural settings and its global patterns.
- Understand the anthropogenic causes of extinction in different socio-economic settings.
- Create conservation plans for populations or species that consider the local cultural values and socio-economic settings.
- Establish protected areas in various socio-economic settings and consider local cultural values.
- Understand how socio-economic aspects influence conservation biology practices across the world.
- Perform population growth models.
- Model viability analysis of endangered populations.

ENVC 412 Natural Resource Policy Analyses

Course evaluates and analyses a broad range of contemporary natural resource policies, case studies, and controversies using bioeconomic resource management models. Topics include wildlife and fisheries policies, forestry policies, tropical deforestation, water rights/management policies, endangered species and nature preservation a, and sustainable development. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes
Students will be able to:

- Trace the development of environment of thought and describe how terms like wilderness, conservation, and ecosystem science have changed in the past 150 years.

- Describe how the natural resource and environmental policy making process works.
- Differentiate between natural resource management agencies and regulatory agencies.
- Explain the role of interest groups, administrative agencies, and Congress in the policy making process.
- Apply basic analytical concepts and tools to systematically analyze and evaluate consequences of natural resource and environmental policy decisions.
- Evaluate the consequences of federal and state policies on natural resource and environmental issues.

ENVC 499 Internship – Service Learning

Supervised work experience in the field. Internship positions must include an interview process. Part of the work experience must include a leadership component. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes
Students will be able to:

- Participate in an interview process in the natural resource field.
- Evaluate project success.
- Perform a meaningful self-analysis.
- Develop leadership skills for building successful work teams in the field and lab.

CMST 413 Leadership Development in Natural Resources

Provide organizational management theory, communication and team building skills to strengthen leadership development in the field of natural resource management. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes
Students will be able to:

- **Identify the strengths and limitations of dominant approaches to organizational management and their implications for communication, leadership and followership.**
- **Recognize the primary forms of formal and personal social power and their associated means of control.**
- **Identify personal leadership habits and tendencies.**
- **Identify and apply appropriate leadership styles contingent upon situations.**

ENVC 420 Estuarine & Nearshore Ecology

Provide an integrated view of the ecological processes in estuaries and nearshore environments. Special emphasis will be on the Salish Sea and the Pacific Northwest coastal environments. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes
Students will be able to:

- Understand coastal and estuarine ground ecology.
- Quantify estuarine chemistry.
- Develop flow charts outlining abiotic and biotic controls of nutrient cycling.
- Calculate primary and secondary production in estuaries and nearshore habitats.
- Quantify detrital food webs in estuaries.
- Measure trophic parameters to understand saltmarsh functions.
- Measure seagrass bed components to understand how they function.
- Quantify tidal flat hydrology, COM, and plankton dynamics.
- Understand and quantify oyster reef dynamics and production by measuring plankton and detrital inputs to the reef.
- Quantify anthropogenic changes to estuarine and nearshore habitat types.
- Assess hydrological and geomorphic changes in estuarine and nearshore habitats.
- Assess biological changes in estuarine and nearshore habitats

ENVC 422 Capstone Project

Carry out a field project including all aspects of documentation. Includes initial proposal, peer review processes, data collection and analysis, secondary research, time estimates, and report writing. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes
Students will be able to:

- Master synthesizing and applying prior knowledge to designing and implementin a field project.
- Be competent in outlining a research project.
- Be competent in evaluating sampling alternatives.
- Capable of manipulate results statistically both descriptive and inferencial.
- Be familiar with researching and evaluating necessary secondary research.
- Be competent with deadline driven projects in a team setting.
- Be competent with presenting work to a group of peers and upper audiences.
- Evaluate how the results and conclusions may impact the local people in which student conducted the study.

ENVC 424 Applied Population and Community Ecology

Principles of population dynamics and ecosystem functioning. Key issues in the study of biodiversity and ecosystems, including functional complementarity, food web stability and complexity, material cycling, and meta-communities. Prerequisite: Admission to BASEC or Department Chair permission.

Learning outcomes

Appendix A

Students will be able to:

- Model and evaluate maintenance of species diversity and functional groups.
- Measure and evaluate how biodiversity influence ecosystem functioning.
- Measure and evaluate how material cycling influence the functioning of ecosystems.
- Model and evaluate how stability and complexity influence ecosystems.
- Through modeling, quantify and evaluate the spatial dynamics of biodiversity and ecosystem functioning.
- Measure and quantify biotic and abiotic factors influencing animal populations.
- Understand biogeography global distribution of taxa.
- Quantify population growth of animal populations.
- Describe and measure regulation factors of populations.
- Quantify population growth for different life history patterns of organisms.

Appendix B

Sample Schedule BAS Environmental Conservation (BASEC), SVC

Program	Course Number	Title		Credits
FIRST YEAR - FALL				
CHEM	301	Environmental Chemistry*		5
ENVC	304	River Ecology & Watershed Management*		5
CMST	303	Communication in Natural Resources		3
ENVC	302	Data Management		2
			Total:	**15**
FIRST YEAR - WINTER				
ENVC	310	Soil Ecology*		5
ENVC	315	Limnology & Reservoir Ecology*		5
QSCI	318	Quantitative Analysis of the Environment†		5
				15
FIRST YEAR - SPRING				
ENVC	320	Landscape Ecology*		5
ENGL	324	Advanced Writing in Science		5
ENVC	327	Advanced Wetland Ecology*		5
				15
SECOND YEAR - FALL				
ENVC	405	Behavioral ecology*		5
ENVC	407	Forest Ecology*		5
QSCI	408	Biometry & Ecological Sampling		5
			Total:	**15**
SECOND YEAR - WINTER				
ENVC	424	Applied Population and Community Ecology*		5
ENVC	412	Natural Resource Policy Analyses*		5
ENVC	499	Internship - Service Learning		3
CMST	413	Leadership Development in Natural Resources		2
			Total:	**15**
SECOND YEAR - SPRING				
ENVC	420	Estuarine & Nearshore Ecology*		5
ENVC	410	Conservation Biology		5
ENVC	422	Capstone Project		5
			Total:	**15**
			TOTAL CREDITS:	**90**

*Lab Fee for this course

† Math 146& Introduction to Statistics is a prerequisite

Lab Equipment Purchased Since Fall 2014

Hot Stir Plate	**pH Strips**	**Sedgewick-Rafter Counting Cells**
Digest Block	**Bunsen Burner**	**Bottle for Alkalinity Titrant**
Test tubes for Block	**Absorbent Pads**	***Safety***
Incubator	**Crush Rods for YSI**	**Goggles**
Turbidity Meter	**Test Tube Rack (w/ 20-25mm insert)**	**Respirator**
Auto Titrator	Rack Insert (16-20mm)	Medium
5010 YSI DO Pobe	**Bottle Dropper**	Large
Conductivity Probe .5cm	**Cover Slip 24x60**	**Respirator Cartridge**
Conductivity Probe 10cm	**Lens Paper**	**Nitrile Gloves**
YSI 9500 (Photometer)	**Watch Glass (50mL beaker)**	Small
Thermometer (Fridge)	**Test Tube Rack (40mm)**	Medium
Thermometer (Oven)	**Alcohol Wipes**	Large
Autoclave	**Solujet**	***Software***
Stereoscopes	***Chemicals***	**Visionlite (Spec)**
Mini Fridge	**Ethanol**	***Additional Equipment***
Oakton Con/pH/salinity/TDS	**Sodium Carbonate**	**Outboard motors (2)**
Pipettes	**Sulfuric Acid**	**Wheel Chocks**
Eppendof Pipette (10µL-100µL)	**Calcium Standrd (Alkalinity) (1000ppm)**	**Microsoft Suface Pro 4 (2)**
Pipette Tips (200µL)	**Nitrate Standard (1000ppm)**	
Eppendof Pipette (100µL-1000µL)	**pH**	
Pipette Tips (1000µL)	Buffer pH8	
Eppendof Pipette (.5mL-5mL)	Buffer (4,7,10)	
Pipette Tips (5mL)	3MKCl for pH Probe	
Fisherbrand Pipette (10µL-100µL)	3MKCl for pH Probe	
Pipette Tips (200µL)	**Conductivity**	
Fisherbrand Pipette (100µL-1000µL)	Standard 100microS	
Pipette Tips (1250µL)	Standard 1000microS	
Fisherbrand Pipette (.5mL-5mL)	**HCl (2.5L)**	
Pipette Tips (5mL)	**YSI Chemicals**	
Misc. Lab Items	Alkalinity	
Stir Bars (6pack)	Nitrite	
Aluminum Weigh Dishes (1000pack)	Orthophos	
Hard Cover Lab Book	***Glassware***	
Rubber Fittings for Filtration	**BOD Bottles**	
Size 3	**Distilation Glassware Set**	
Size 4	**Sample Glassware (48 pack)**	
Size 5	**Beaker 50mL (12pack)**	
Calibration Weight 1g	**Beaker 150mL (12pack)**	
Calibration Weight 10mg	**Beakers 600mL (6pack)**	
Scoopulas (6pack)	**Beaker no spout 300mL (6pack)**	
Cleaning Brushes	**Burette 100mL**	
Test Tube Brush	**10mm Cuvettes**	
Beaker Brush	**Volumetric Flask (1000mL)**	
Burette Clamp	**Volumetric Flask (100mL)**	
Cart	**Test Tube for YSI**	