



Leeb-Haigh, Sylvia L

A00437499

Last, First Middle

Student ID

CREDENTIALS CONFERRED:

Bachelor of Science

Awarded 06 Sep 2024

TRANSFER CREDIT:

Start	End	Credits	Title
01/2018	03/2021	90	Portland Community College

EVERGREEN UNDERGRADUATE CREDIT:

Start	End	Credits	Title
09/2022	03/2023	32	The Fungal Kingdom *8 - Fungal Biology and Ecology *6 - Lichen Biology and Ecology *6 - Lichen Taxonomy *6 - Fungal Taxonomy *2 - Research Seminar in Mycology *4 - Independent Project: Lichen Community Ecology
04/2023	06/2023	12	Field Plant Taxonomy and Biodiversity Conservation *4 - Bryophyte Taxonomy *4 - Field Plant Taxonomy *4 - Principles of Ecological Restoration
04/2023	06/2023	4	Statistics I and II: Accelerated 4 - Statistics I and II: Accelerated
04/2023	06/2023	2	Undergraduate Research with P. Yu *2 - Tutorial in Shellfish Aquaculture
06/2023	09/2023	6	WSDOT Wetlands Monitoring Internship *6 - Wetland Monitoring Science
09/2023	06/2024	20	Undergraduate Research with C. LeRoy *4 - Stream Ecology Research *4 - Organic Matter Dynamics Research *4 - Aquatic Macroinvertebrate Identification *4 - Collaborative Research with the LandComp Consortium *4 - Field and Lab Methods in Freshwater Ecology
09/2023	12/2023	4	GIS and Mapping in Excel 2 - Geographic Information Systems (Certificate Sequence) 2 - Microsoft Excel (Certificate Sequence)
09/2023	12/2023	4	GIS: Introduction and Principles 4 - Geographic Information Systems (Certificate Sequence)
09/2023	12/2023	2	Undergraduate Research with P. Yu *2 - Tutorial in Shellfish Aquaculture
01/2024	03/2024	4	GIS: Mapping with ArcGIS Pro 4 - Geographic Information Systems (Certificate Sequence)



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EVERGREEN UNDERGRADUATE CREDIT:

Start	End	Credits	Title
01/2024	03/2024	4	GIS: Publishing Story Maps and Apps <i>4 - Geographic Information Systems (Certificate Sequence)</i>
04/2024	06/2024	8	Quamash EcoResearch Pollinator Ecology Internship <i>*4 - Field Research in Pollination Ecology and Plant Identification</i> <i>*4 - Practical Entomology and Pollinator Identification</i>

Cumulative

192 Total Undergraduate Credits Earned



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Enclosed you will find evaluations of my academic work while an undergraduate at The Evergreen State College. Evergreen provides written narratives of student performance at the end of each quarter in place of letter grades. Accordingly, you will find detailed accounts of my work, learning, and opportunities. Students at Evergreen each build a unique academic path. I structured my learning around environmental science programs, with an emphasis on ecology and environmental science coursework to create a science major with strong quantitative, field, and lab skills.

Evergreen offers an interdisciplinary and unique approach to education which I found very intriguing and useful. Before Evergreen, I received my Associate of Arts degree from Portland Community College where I took a wide array of classes that led me to pursue environmental science and ecology. General coursework in biology, chemistry, math, and writing easily translated to my learning at Evergreen and gave me a good footing to start my studies in the sciences.

My first year at Evergreen focused on fungal, lichen, bryophyte, and vascular plant taxonomy through dichotomous keys, microscopy, and fieldwork. Taxonomy work was intertwined with ecological restoration seminars to understand the importance of our changing lands from climate change and human activity. My fieldwork and lab skills were reinforced during a wetland ecology internship through the Washington State Department of Transportation. This internship used qualitative and quantitative vegetation sampling techniques to monitor wetland mitigation sites across Washington. I was able to improve my plant identification skills acquired in previous plant taxonomy classes and apply them in a professional setting. Understanding ecological restoration empowered me to question and learn about the overall ecological impact of the Department of Transportation infrastructure and practices.

I wanted my second year at Evergreen to dive deeper into research and continue my field and lab experience from the previous year. I partnered with Dr. Carri LeRoy to participate in a global collaboration called LandComp which focused on the influence of land use type on leaf litter decomposition and aquatic macroinvertebrates. It was very fulfilling to see this project in its entirety and be a part of every process. I expanded my fieldwork skills by locating sites for agricultural, forested, urban, and plantation streams and conducting water sampling and stream measurements. I further developed lab skills by identifying aquatic macroinvertebrates through dichotomous keys and used various lab equipment to analyze leaf litter and water samples. Geographic Information System (GIS) classes helped me create useful maps showcasing land types within watersheds necessary for my project. This research gave me the skills needed for field and research-based jobs, and it was exciting to be selected to continue this work through the Summer Undergraduate Research Fellowship offered through Evergreen. These experiences with research and the wetland ecology internship gave me the confidence to complete a second internship combining field and lab experiences in a pollination internship through Quamash EcoResearch. I participated in a project evaluating the effects of conservation grazing on pollinator communities in working lands. I spent time in the field surveying for pollinators, and time in the lab identifying pollinators.

I had many meaningful experiences during my undergraduate education. The freedom to design and tailor my degree made me better prepared for employment and future graduate studies in environmental science and ecology. My time at Evergreen was challenging, rewarding, and immensely valuable. I was pushed to become the best student and researcher possible and I am proud of my journey to complete my Bachelor of Science degree.



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April 2024 - June 2024: Quamash EcoResearch Pollinator Ecology Internship

8 Credits

DESCRIPTION:

Faculty: Carri J. LeRoy, Ph.D.

For the **Quamash EcoResearch Pollinator Ecology Internship**, the student worked on a three-year project evaluating the effects of conservation grazing (i.e., a combination of rotational grazing, invasive plant removal, and native plant supplementation) on pollinator communities on working lands. The student visited eight total sites, each of which was visited twice. In the field, the student assisted in netting and dispatching pollinators for later ID at the Quamash EcoResearch Lab. The student learned common grassland plants and flower-visiting insects through sight identification, and learned insect pinning and sorting techniques. When not in the field or lab, the student conducted literature reviews of relative scientific papers and kept an annotated bibliography.

EVALUATION:

Written by: Carri J. LeRoy, Ph.D.

Sylvia participated in a pollination science internship through Quamash EcoResearch. The project explored the effects of conservation grazing on pollinator communities on working lands. Sylvia learned valuable field and lab methodologies including netting, collecting, and pinning insects, and identifying key morphological features of different insect taxa. Sylvia kept careful records of time spent on each activity, for a total of over 200 hours in spring quarter.

Sylvia learned key morphological features from identification books and specimen boxes. Sylvia also learned about important morphological features through editing a bee glossary for retired entomologist, David Caepart. Sylvia learned proper pinning procedures for different taxa, including where to pin and how to spread and display wings. Sylvia built on a foundation of knowledge using dissecting microscopes to make observations and learn key diagnostic features for a variety of taxa, including bees. Sylvia used both dichotomous keys and interactive online keys for identification.

With Quamash EcoResearch, Sylvia visited various farms participating in a grazing research program, and learned to survey plots for flower-visiting insects. In addition to insect identification, Sylvia learned to identify over 40 new flowering grassland forbs and shrubs by sight. Sylvia learned to net and vial insects in the field without damaging rare native flowers. Finally, Sylvia learned to record important information in the field and when identification was possible, specimens were released into the wild.

Sylvia's Field Supervisor, Susan M. Waters, Ph.D., Pollination Ecologist, Quamash EcoResearch, wrote the following about Sylvia's internship:

"This document describes the achievements and contributions of Evergreen student, Sylvia Leeb-Haigh, during a ten-week, 4-day-a-week internship with Quamash EcoResearch in spring 2024. This field ecology project characterizes plant-pollinator community interactions in privately owned working lands in western Washington that are undergoing restoration via conservation-focused cattle grazing prescriptions. Specifically, we assess pollinator diversity and construct plant-pollinator networks using pollinator observations, weighting interactions with floral abundance metrics.

Sylvia was an outstanding contributor to foundational field research for our project. As a member of a highly collaborative group of four field techs/interns, Sylvia mastered identification of approximately 30 flowering shrubs and forbs in the field (both native and exotic). Sylvia also independently observed and collected pollinators visiting flowering forbs and shrubs during



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timed observations, employing netting techniques for both top-down and side-swipe capture. Sylvia learned correct pinning protocols for both larger and smaller specimens (i.e., using points), and pinned over a hundred specimens. Sylvia worked with existing specimens to learn to look for key characters that distinguish flower-visiting insect families and genera (e.g. wing venation patterns, basal vs. apical abdominal banding, propodeal corbiculae), and helped to test and evaluate a pilot illustrated glossary of insect characters that supports taxonomic keys. Finally, Sylvia helped troubleshoot field issues, traded information with other techs, and generally contributed to a collaborative and productive team culture.

It was wonderful to have Sylvia as an intern. Beneath a quiet demeanor, Sylvia was an astute observer with great attention to detail, who rapidly mastered the list of plant identities, easily became adept at pollinator captures, and showed considerable progress in learning basic elements of pollinator identification. Sylvia was up for anything, ready to collect data even when tasks were repetitive or sites were far away. Sylvia's low-key open-mindedness, respectfulness, and motivation to learn made for an excellent team member. Sylvia's intelligent questions and consistent interest in insects was a pleasure to mentor. In all, Sylvia practiced and mastered a range of botanical, entomological, and ecological skills, and it was wonderful to have their participation in our research."

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 8

*4 - Field Research in Pollination Ecology and Plant Identification

*4 - Practical Entomology and Pollinator Identification

* indicates upper-division science credit



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January 2024 - March 2024: GIS: Publishing Story Maps and Apps

4 Credits

DESCRIPTION:

Faculty: Jonathan L Batchelor, PhD

The course, *GIS: Publishing Story Maps and Apps*, is an intermediate class utilizing the Esri, Inc (Environmental Systems Research Institute) online software framework. This class was an introduction to the web applications: StoryMaps, instant apps, Experience Builder, insights, business analyst, urban, quick capture, and dashboards. The course consisted of 9 weekly labs covering applications of GIS web mapping on real-world data sets. 9 weekly discussion topics were required for students to share researched topics related to web mapping.

The course culminated in a student-designed final project that required the creation of an online StoryMap with a cohesive narrative and the utilization of express maps, sidecars, instant apps, embedded video, experience builder, and dashboards.

This class is part of a series of courses that comprise the Geographic Information Systems Certificate sequence.

EVALUATION:

Written by: Jonathan L Batchelor, PhD

Sylvia Leeb-Haigh did excellent work for the class GIS: Publishing Story Maps and Apps. Sylvia submitted 9 out of 9 labs and engaged with 9 of 9 assigned discussion board posts. Sylvia designed and created a final project StoryMap that included a narrative and combination of web apps about Big Foot sightings in the USA. Interactive web apps were embedded into the final project about potential threats to Big Foot such as fire and a lack of tree cover. A guided tour of potential locations to spot Big Foot was included and a comprehensive listing of sources was provided. The final project was well done and was a great example of creative map making and story telling.

During this course, Sylvia worked extensively with web mapping applications and created StoryMaps with interactive apps and maps and had an introduction to the programming language arcade. Student-created projects included:

- A historical StoryMap about John Snow and the London cholera outbreak of 1854.
- Produced a StoryMap using instant apps such as guide tour and attachment viewer to compare historical imagery and information from the 1916 Easter Rising in Ireland.
- Showcased housing ownership rates using experience builder
- Interactive dashboards were created to monitor real-time power outages in California.
- Used Business Analyst to evaluate building sites based on demographic data and transportation times.
- Used ArcGIS insights to model return on investment for college education.
- QuickCapture was used to build a field survey that showed photo locations and orientation inside an experience builder web app.

Sylvia demonstrated a high level of skill in web mapping applications, established an strong foundation in GIS concepts, and was qualified to expand GIS learning through future courses.



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SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 4

4 - Geographic Information Systems (Certificate Sequence)



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January 2024 - March 2024: GIS: Mapping with ArcGIS Pro

4 Credits

DESCRIPTION:

Faculty: Jonathan L Batchelor, PhD

The course GIS: Mapping with ArcGIS Pro is an intermediate class utilizing the Esri, Inc (Environmental Systems Research Institute) software ArcGIS Pro. The course consisted of eight weekly labs covering applications of GIS analysis on real-world data sets. Eight weekly quizzes on Geospatial concepts were also administered. Topics covered spatial analysis with US census data, National land cover datasets, aerial imagery archives, and several other publicly available datasets. Data was acquired from ArcGIS online, Living Atlas, and online data repositories.

The course culminated in a student-designed, final project that incorporated both vector and raster analysis along with demonstrating strong cartographic skills.

Course concepts were:

- Data Management
- Managing Vector Data
- Managing Raster Data
- Joins and queries of Attribute Data
- Editing vector data
- Spatial Queries and Boolean Operators
- Performing Joins and Overlays
- Raster Analysis

This class is part of a series of courses that comprise the Geographic Information Systems Certificate sequence.

EVALUATION:

Written by: Jonathan L Batchelor, PhD

Sylvia Leeb-Haigh did excellent work for the class GIS: Mapping with ArcGIS Pro. Sylvia submitted eight out of eight labs and designed and presented work on a final project that included spatial analysis on identifying areas within Washington State where bigfoot is most likely to reside. The analysis required the collecting and sorting of Big Foot sighting information and determining if there was a correlation between Big Foot sightings and forested areas. Elevation, major highways, and human population were also all considered in determining locations where Big Foot would most likely be sighted.

During this course, Sylvia worked extensively with Geodatabases and image service layers from ArcGIS Online and the Living Atlas. Sylvia demonstrated an understanding of coordinate reference systems, both geographic and projected. Sylvia georeferenced historical imagery and contemporary maps performing digitization of map elements and showing proficiency in editing and overlay techniques. Sylvia performed extensive queries and joins on geospatial data using both attribute tables and spatial relationships.

Sylvia demonstrated a high level of skill in GIS analysis, established a strong foundation in GIS concepts and was qualified to expand GIS learning through future courses.



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SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 4

4 - Geographic Information Systems (Certificate Sequence)



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September 2023 - December 2023: Undergraduate Research with P. Yu

2 Credits

DESCRIPTION:

Faculty: Pauline C. Yu, Ph.D.

This student opportunity "Undergraduate Research with P. Yu" was also known as "Advanced Research in Environmental Studies: Oyster Aquaculture," as the specific project was the maintenance of a small bivalve shellfish growing operation located at the Evergreen Beach. The learning opportunity involved in-person work during low tide events approximately every 2 weeks of the quarter, and online synchronous meetings held over video conference on the other weeks with a group-led selection of a reading and discussion topic related to bivalve biology and aquaculture.

EVALUATION:

Written by: Pauline C. Yu, Ph.D.

Sylvia has met, with distinction, all the requirements of the work for this Undergraduate Research Unit on Oyster Aquaculture. Sylvia attended most of the scheduled work parties and was enthusiastic throughout. Sylvia was an active participant in the seminar discussions, even with some scheduling conflicts, and Sylvia was an engaged contributor to the decision-making on selecting topics for readings. Sylvia was a valued member of the Evergreen Shellfish Garden community, taking agency and ownership for the care of this valuable campus resource.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 2

*2 - Tutorial in Shellfish Aquaculture

* indicates upper-division science credit



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September 2023 - December 2023: GIS: Introduction and Principles

4 Credits

DESCRIPTION:

Faculty: Jonathan Batchelor, PhD

The course GIS: Introduction and Principles is an introductory class utilizing ArcGIS online web maps to cover basic cartography and the use of simple web applications. The course consisted of 8 weekly labs covering core concepts of Geographic Information Systems.

Course concepts were:

- Online data management
- Principles of Map Making and Cartography
- Data model types
- Geographic and Projected coordinate systems
- Vector and Raster data
- Feature creation and editing
- Intro to Demography and Census Data
- 3D mapping and elevation
- Intro to Temporal Satellite Imagery

This class is part of a series of courses that comprise the Geographic Information Systems Certificate sequence.

EVALUATION:

Written by: Jonathan Batchelor, PhD

Sylvia Leeb-Haigh did outstanding work for the class GIS: Introduction and Principles. Sylvia submitted 8 out of 8 labs on time. Sylvia designed and presented work on a final project that included printed paper maps of UFO and bigfoot sightings. The maps were very well-designed and included customized QR codes leading to web applications showcasing the data. A fun topic to showcase Sylvia's cartographic skillset.

During this course, Sylvia worked extensively with Esri's ArcGIS Online environment. Sylvia demonstrated an understanding of basic cartography and online mapping. Sylvia worked with online data repositories such as ArcGIS Online and Living Atlas along with adding their own tabular XY data and geocoding. ESRI instant apps were used to share data via QR codes. The course final project required the use of an external graphics program to create a cartographic layout of multiple GIS layers along with the creation of online apps that were linked to the paper map via QR code. Final projects were presented for peer review with an in-person map gallery.

Sylvia demonstrated a high level of skill in using ESRI applications for online map creation and basic cartography.

Sylvia developed a strong foundation in online GIS applications and is qualified to continue GIS learning through future courses.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 4

4 - Geographic Information Systems (Certificate Sequence)



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September 2023 - December 2023: GIS and Mapping in Excel

4 Credits

DESCRIPTION:

Faculty: Kale Albert McConathy

In this course students learned introductory level concepts and skills for both Excel and GIS. Computer labs used Esri's (Environmental Systems Research Institute) ArcGIS for Excel as a plugin in Excel, giving students a solid foundation for further the use of excel for data compilation, data manipulation, and mapping. Students learned the basics of manipulating spreadsheet data and converting it to GIS layers. Students learned how to manipulate spreadsheets and produce visually appealing maps to communicate patterns and trends in tabular data. GIS is a method of visual communication, and this class was an experiment in using commonly used spreadsheet data to communicate spatially informed concepts. Excel is one of the most commonly used programs for data and this class gives a foundation for professional and academic development through the teaching of excel concepts.

Every module typically included one to two labs, a brief lecture or reading and an overview of previous homework and lessons. Modules covered elements of the following topics:

- Basics of excel tables
- Excel Functions
- Pivot tables and Pivot Charts
- Geocoding
- Data quality and data integrity
- Use of geography codes for data enrichment
- Coordinate Systems
- Symbolization and Labels
- Data conversion
- GIS Demography and Tapestry Segmentation
- Managing dates/times in Excel and mapping with time
- History of Mapping
- Data Management/manipulation

Students were encouraged to think beyond the bounds of assignment to make unique spreadsheets, charts, and maps while compiling progressively more sophisticated excel and mapping skills.

This class is a part of a series of courses that comprise the Geographic Information Systems (Undergraduate) Certificate sequence.

EVALUATION:

Written by: Kale Albert McConathy

Sylvia Leeb-Haigh was successful in GIS & Mapping in Excel, having participated during class sessions, and fully completing all charting, spreadsheeting, and mapping assignments. The class had two distinct areas, Excel & GIS and Sylvia Leeb-Haigh did well in both elements.

At the conclusion of the *GIS Intro and Principles* course, Sylvia Leeb-Haigh demonstrated the ability to create and manage tabular data sources, perform data validation, use functions and equations, and showed a marked improvement in their data literacy skills from the beginning of class. They also showed an improved understanding of GIS skills, basic map making, and map reading. They were able to



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effectively communicate patterns in data to an audience via diverse methods of map symbology, charting, and pivot tables.

Overall Sylvia Leeb-Haigh showed good time management skills through good attendance and timeliness in homework submissions. They also showed good attention to the requirements for assignments and fulfilled every assignment requirement for all assignments.

Sylvia Leeb-Haigh was able to independently derive patterns in datasets and reconcile them with potential causation based on data or context.

Sylvia Leeb-Haigh demonstrated skill in basic web GIS, which will serve Sylvia Leeb-Haigh well in future GIS coursework.

Sylvia Leeb-Haigh established a strong foundation in Excel and GIS concepts and is qualified to expand GIS learning through future courses.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 4

2 - Geographic Information Systems (Certificate Sequence)

2 - Microsoft Excel (Certificate Sequence)



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September 2023 - June 2024: Undergraduate Research with C. LeRoy

20 Credits

DESCRIPTION:

Faculty: Carri J. LeRoy, Ph.D.

Rigorous quantitative and qualitative research is an important component of academic learning in environmental studies. **Undergraduate Research with Dr. Carri LeRoy** was designed to allow an advanced student to delve into real-world research with faculty currently engaged in specific projects. The experience helps students develop vital skills in research design, data acquisition and interpretation, written and oral communication, collaboration, and critical thinking skills—all of which are of particular value for students who are pursuing a graduate degree, as well as for graduates who are already in the job market.

The student participated in a global, collaborative, research project managed out of the University of Maryland- Baltimore County, called LandComp, to examine decomposition rates of three different species of leaves in four different land use types (urban, agricultural, forested, plantation forest) at over 100 sites around the world. The experience allowed the student to learn to follow detailed protocols, weigh leaf samples to create leaf litter bags from provided materials, deploy litter bags in four streams, and process litter bags and macroinvertebrate samples. In addition, the student learned various field and lab techniques to support the project. The student performed a literature review on on relevant topics, drafted a manuscript on aspects of the project, and learned to contribute data to a collaborative datasheet.

EVALUATION:

Written by: Carri J. LeRoy, Ph.D.

Sylvia was a diligent and hard-working student throughout this research experience. Sylvia carefully read protocols, asked questions, and was able to coordinate a large-scale experiment in-line with collaborators from across the globe. Sylvia worked a total of 200 hours on this project in fall quarter, 200 hours in winter, and an additional 100 hours in spring, for a total of 500 hours on this research project, overall. Sylvia kept detailed track of tasks and activities in a time-sheet that was provided to the faculty mentor roughly biweekly throughout the year.

Sylvia also worked to read relevant scientific articles and kept track of learning in an Annotated Bibliography. Sylvia read six scientific journal articles and kept detailed notes on each article.

Sylvia excelled in independent work this year and was an excellent overall research assistant who took on a leadership role in spring quarter to mentor another undergraduate research assistant working in the lab. Provided with a protocol and a few photographs, in fall quarter, Sylvia proceeded to create 192 leaf litter bags from three different leaf species and organize all litterbags into groups to be deployed at four stream locations. Sylvia's organization allowed the installation of the litterbags to proceed in an orderly manner and to maintain the integrity of each bag by allowing the collection of handling loss fragments. Sylvia researched each field site, did a site visit to assess the feasibility of including it in the research plan, and decided on four strong field sites for this study.

Sylvia was an excellent collaborator in the field. Arriving early to prepare materials, program dataloggers pack equipment into backpacks and arrange the transportation of delicate instruments were important contributions Sylvia made to this research project. Sylvia worked carefully, but quickly, in the field to collaboratively take a variety of field measurements that helped to characterize each site: pool width, pool depth, pool velocity, canopy cover, sediment/substrate size, riparian species identifications, pH, conductivity, dissolved oxygen, and temperature. Sylvia collaborated with her faculty sponsor to share



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these data with the LandComp consortium. In addition, Sylvia helped to choose pool locations for the deployment of leaf litter bags and the collection of water samples for nutrient analysis. After field work, Sylvia learned to decontaminate boots and waders to halt invasive species spread, filter water samples for nutrient analysis, and prepare for the next field excursion.

Sylvia deployed litterbags on four successive days in fall quarter for collection in week three of winter quarter. Sylvia's hard work and dedication to this project allowed for a successful deployment of all 192 leaf litter bags. Sylvia was equally organized for the field work in winter quarter and efficiently harvested all leaf litterbags on four successive days, collecting a new round of water samples for nutrient analysis, filtering the samples and working diligently in the lab for many hours to process all 192 leaf litter samples. Leaf samples were rinsed and placed into paper sacks to dry, while silt and sediment were sieved for microplastic analysis and separated from benthic macroinvertebrate samples for sorting and identification. Sylvia dried and weighed all leaf samples, then worked with another student to grind each sample to a homogeneous consistency. Sylvia took the lead on combusting subsamples of each ground sample for ash-free dry mass analysis. Additionally, Sylvia carefully recorded all weights on a datasheet and entered all data online. Sylvia was diligent in creating a data archive throughout this project, taking and saving photographs of the data sheets for comparison to the recorded and transcribed data, and doing an excellent job with data management. Sylvia collaborated with her faculty sponsor to share these data with the LandComp consortium.

Sylvia also took the lead on the macroinvertebrate analysis for this project. Sylvia is collaborating with another student to sort each macroinvertebrate sample and identify each organism to order or lower taxonomic levels. Sylvia has become a knowledgeable novice aquatic entomologist and is carefully cataloging all individual invertebrates for this project. Over the summer, as a SURF (Summer Undergraduate Research Fellow), Sylvia will enter these data into spreadsheets for community analysis and to share these data with the LandComp consortium.

Sylvia wrote an abstract about this research project for submission to a conference and the abstract was accepted. Although Sylvia chose not to attend the conference to present the work, it is being written up as a short scientific paper. Sylvia has drafted sections of the paper and received faculty feedback on the content of the paper. Sylvia will continue to work on the macroinvertebrate analysis and scientific writing of this research over the summer as part of the SURF project.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 20

- *4 - Stream Ecology Research
- *4 - Organic Matter Dynamics Research
- *4 - Aquatic Macroinvertebrate Identification
- *4 - Collaborative Research with the LandComp Consortium
- *4 - Field and Lab Methods in Freshwater Ecology

* indicates upper-division science credit



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June 2023 - September 2023: WSDOT Wetlands Monitoring Internship

6 Credits

DESCRIPTION:

Faculty: Lalita Calabria, Ph.D.

The **WSDOT Wetlands Monitoring Internship** learning contract was offered in cooperation with the Washington State Department of Transportation (WSDOT). As a participant in this program the intern gained hands-on experience in collecting environmental data from WSDOT wetland mitigation sites. Over the eleven-week course, they learned to use a variety of quantitative and qualitative techniques to conduct environmental monitoring. Fieldwork included conducting surveys of vegetation, hydrology, and wildlife. The greatest percentage of the internship was devoted to learning vegetation sampling, collection, and identification techniques. The intern used basic elements of sampling design to create and implement vegetation-monitoring strategies on several WSDOT wetland mitigation sites. In addition, the intern learned WSDOT protocols to collect plant species that they were unable to identify in the field.

EVALUATION:

Written by: Lalita Calabria, Ph.D.

In a recent letter, field supervisor Sean Patrick, Manager for the Wetland Monitoring Team, provided me with the following information on what Sylvia accomplished during the internship at the Washington State Department of Transportation:

"Sylvia Leeb-Haigh's work through all phases of the internship program was exceptional. Sylvia was a motivated field biologist, ready to work hard even under difficult field conditions. Sylvia was impeccably punctual and was always prepared for work. Sylvia's attention to detail, high productivity, willingness to take on optional tasks, and sense of humor made it enjoyable to work with them. Sylvia demonstrated the ability to work both in an individual and collaborative work setting. Sylvia's work was completed in an efficient, accurate, and thorough manner. Sylvia's daily preparedness and broad understanding of our processes allowed them to effectively implement our sample designs in the field, while also collecting valuable notes about site conditions to help complete the story of how each site is developing.

Sylvia Leeb-Haigh came into the internship program with a solid foundation in botany. During the summer, Sylvia enhanced their plant identification skills in the field. When tested on the common herbaceous and woody plant species found in wetlands and wetland buffers, Sylvia demonstrated their plant ID knowledge with a nearly perfect score on the woody plant test and very high scores on each of the two herbaceous plant tests.

Sylvia Leeb-Haigh worked as part of a three-member team to produce a written report and oral presentation for one of the compensatory mitigation sites surveyed this year. Sylvia created the majority of the presentation slides, summarized some data for the statistical analysis, and helped write some portions of the report. During the oral presentation, Sylvia gave a clear introduction to the site and presented the monitoring results.

Sylvia Leeb-Haigh's work performance, great attitude, flexibility, and desire to learn made them a valued member of our monitoring team. By the end of the summer, field leads were able to trust Sylvia to finish monitoring tasks with very little direction and guidance. It was a pleasure to work with Sylvia this summer."



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The data collected by Sylvia Leeb-Haigh and other student interns will be used to produce WSDOT annual monitoring reports. These reports are distributed to WSDOT regional offices and to federal, state, and local regulatory and resource agencies as part of WSDOT mitigation obligations. Clearly, this has been a valuable learning experience for Sylvia. Sylvia gained experience and completed an important job for WSDOT.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 6

*6 - Wetland Monitoring Science

* indicates upper-division science credit



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Student ID

April 2023 - June 2023: Undergraduate Research with P. Yu
2 Credits

DESCRIPTION:

Faculty: Pauline C. Yu, Ph.D.

This student opportunity "Undergraduate Research with P. Yu" was also known as "Advanced Research in Environmental Studies: Oyster Aquaculture," as the specific project was the maintenance of a small bivalve shellfish growing operation located at the Evergreen Beach. The learning opportunity involved in-person work during low tide events approximately every 2 weeks of the quarter, and online synchronous meetings held over video conference on the other weeks with a group-led selection of a reading and discussion topic related to bivalve biology and aquaculture.

EVALUATION:

Written by: Pauline C. Yu, Ph.D.

Sylvia has met with distinction all the requirements of the work for this Undergraduate Research Unit on Oyster Aquaculture. Sylvia attended all of the scheduled work parties and was enthusiastic throughout. Sylvia was an active participant in the seminar discussions and was an engaged contributor to the decision-making on selecting topics for readings. Sylvia was a valued member of the Evergreen Shellfish Garden community, taking agency and ownership for the care of this valuable campus resource.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 2

*2 - Tutorial in Shellfish Aquaculture

* indicates upper-division science credit



Leeb-Haigh, Sylvia L

A00437499

Last, First Middle

Student ID

April 2023 - June 2023: Statistics I and II: Accelerated

4 Credits

DESCRIPTION:

Faculty: Carri J. LeRoy

Statistics I and II: Accelerated created an opportunity for students to learn concepts and methods in introductory statistics at a fast pace. Students learned basic parametric and non-parametric statistical methods to analyze real-world data. Statistical concepts included probability, basic summary statistics, and a suite of nonparametric and parametric statistical tests: Student's t-tests, Chi-square tests, analysis of variance (ANOVA), simple linear regression, correlation, advanced ANOVA, classification and regression tree (CART) models, non-metric multidimensional scaling (NMDS) ordinations, and meta-analysis techniques. Students learned to interpret findings, write about their results, and create useful figures and tables. Students completed weekly readings, bi-weekly quizzes, and weekly statistics lab assignments. Final conceptual and practical exams provided students opportunities to demonstrate knowledge gained.

Students had opportunities to learn various statistical software packages this quarter, including: JMP Pro 16, JASP 0.14.1, R 4.3.0, RStudio, PAST, and basic data management in Excel.

EVALUATION:

Written by: Carri J. LeRoy

Sylvia completed all weekly statistics lab assignments. The work on all labs was excellent. In fact, Sylvia not only showed mastery of all statistical methods presented this quarter, but also learned to do most methods in R coding language (RStudio). Sylvia should be commended for taking on the challenging task of learning a computer programming language. It is an important skill that will benefit future work and graduate studies. Sylvia did consistently strong work on biweekly quizzes covering statistical concepts and methods. Sylvia did very strong work on a cumulative final exam covering statistical concepts and methods. In addition, Sylvia did excellent work on a practical exam that required students to assess data, decide on appropriate statistical tests, manage data, analyze data, interpret results, and create appropriate graphs.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 4

4 - Statistics I and II: Accelerated



Leeb-Haigh, Sylvia L

A00437499

Last, First Middle

Student ID

April 2023 - June 2023: Field Plant Taxonomy and Biodiversity Conservation

12 Credits

DESCRIPTION:

Faculty: Frederica Bowcutt, Ph.D. and Lalita Calabria, Ph.D.

In this upper division program students cultivated floristic skills. Students attended lectures, labs, workshops, and seminar discussions as well as in-person field exercises. Their understanding was assessed through field and lab assignments, quizzes, exams, and response papers to assigned readings. Plant identification skill building was a significant focus of the program. Students learned to use dichotomous keys to identify unknown vascular and non-vascular plant specimens using microscopes. For labs, they used Hitchcock and Cronquist, *Flora of the Pacific Northwest* and McCune and Hutten, *Common Mosses of Oregon and Washington*. Using Simpson, *Plant Systematics*, students also studied diagnostic characters of common vascular plant families. They received instructions in the collection and preparation of herbarium specimens and learned about the importance of herbaria to biodiversity studies. Applying their new floristics skills, students also studied topics in ecology and conservation with an emphasis on temperate forests and camas prairies. In support of this content, students attended two field trips and read Glime's *Bryophyte Ecology* and various scientific journal articles.

For the seminars and lectures focused on ecological restoration, students read all or part of the following texts: Holl, *Primer of Ecological Restoration*; Apostol and Sinclair (eds.), *Restoring the Pacific Northwest*; Bowcutt and Hamman (eds.), *Vascular Plants of the South Sound Prairies*; Martin, *Wild by Design: The Rise of Ecological Restoration*; and multiple journal articles. In response to the reading assignments, discussions, and associated lectures, students wrote short essays that summarized key concepts. Providing examples from local restoration efforts, they also synthesized the program material in a final assignment and considered how ecological restoration can contribute to biodiversity conservation.

EVALUATION:

Written by: Frederica Bowcutt, Ph.D. and Lalita Calabria, Ph.D.

Sylvia was an engaged student who participated actively in our learning community. In the vascular plant taxonomy portion of the program, she demonstrated an outstanding ability to use a technical dichotomous key to identify unknown vascular plants based on their lab notebook, quizzes, and final exam. Based on her perfect final exam, Sylvia can sight recognize fifty common western Washington plants using correct scientific nomenclature including binomials and family names. She made excellent use of her field journal to document field observations and cultivate her sight recognition skills. Sylvia produced twenty-five colorful vascular plant species monographs that effectively convey morphological information. She also demonstrated aptitude in botanical illustration. On her prairie restoration quiz, Sylvia explored how geology, climate, and cultural factors influence vegetation patterns. Drawing from her field observations, the assigned scientific articles, and other high-quality sources from the scientific literature, Sylvia crafted satisfactory explanations of causal relationships.

Sylvia's detailed answers on the weekly study questions and performance on the quizzes indicated an excellent understanding of bryophyte ecology and conservation topics. Sylvia's bryophyte identification notebook was outstanding and reflected an excellent understanding of field collection methods, morphological features, and microscopic identification of bryophytes. Sylvia's keying quizzes further demonstrated a solid grasp of morphological terminology and using dichotomous keys to identify an unknown bryophyte species. On the final sight identification exam, Sylvia demonstrated an excellent ability to identify twenty-five bryophyte species using scientific names. It was clear that Sylvia invested a great deal of time and effort into this portion of the program.



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Sylvia wrote four excellent responses to the ecological restoration reading assignments. She developed an understanding of the relevance of reference models, stakeholder involvement, careful planning, adaptive management, and ongoing monitoring to restoration work. Sylvia also demonstrated familiarity with key terms. Using various Pacific Northwest case studies as examples, she identified key steps necessary for successful project outcomes as well as common causes of poor results. In her final synthesis assignment, Sylvia skillfully considered how partnering with Indigenous peoples can enhance biodiversity conservation while addressing important environmental justice issues. She also addressed some of the challenges to incorporating Indigenous traditional ecological knowledge into ecological restoration projects. Her written assignments reflected outstanding critical thinking and expository writing skills. Overall, Sylvia is well prepared for continued, advanced work in plant sciences.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 12

- *4 - Bryophyte Taxonomy
- *4 - Field Plant Taxonomy
- *4 - Principles of Ecological Restoration

* indicates upper-division science credit



Leeb-Haigh, Sylvia L

A00437499

Last, First Middle

Student ID

September 2022 - March 2023: The Fungal Kingdom

32 Credits

DESCRIPTION:

Faculty: Lalita Calabria, Ph.D. and Paul Przybylowicz, Ph.D.

The Fungal Kingdom was a two-quarter, junior/senior program focused on the taxonomy, physiology and ecology of fungi, with an emphasis on Pacific Northwest fungi and lichens. There were both 16- and 12-credit options available in both quarters. The major learning objectives were to: 1) develop a detailed understanding of the biology, ecology, and taxonomy of lichens and fungi; 2) become proficient using field and lab methods for mushroom and lichen collection and identification, including dichotomous keys, molecular systematics, and chemical testing; 3) demonstrate the ability to recognize the common fungi and lichen species of the PNW; and 4) to develop scientific literacy, critical thinking and research skills, as well as science communication skills. Students' understanding was assessed through weekly study questions, several quarter-long projects, seminars, participation and two exams in the fall and biweekly quizzes in the winter. Each major component of the program is described below.

The text for fungal biology and physiology was *21st Century Guidebook to the Fungi*, 2nd Edition by Moore, Robson and Trinci, along with selected scientific research papers. Lichen lectures were supported by readings from *Lichens of North America* by Brodo, Sharnoff and Sharnoff, a series of essays titled *Ways of Enlichenment* by Goward and a selection of peer-reviewed literature. Topics covered during fall quarter included: lichen biodiversity, evolution and reproduction, fungal diversity and classification, molecular systematics, cell biology, spore production and discharge, genetics, human uses of fungi, and bioinformatics. During winter quarter, the focus was fungal and lichen ecology. Topics covered included: ecophysiology of lichens and fungi, environmental monitoring using lichens, lichen conservation and the ecology of various groups of fungi—pathogens, decay, mycorrhizae, and endophytes.

In fall quarter, field collection and identification skills were a significant focus. Students used dichotomous keys to identify unknown mushroom and lichen specimens and developed fluency in identification terminology. Every student compiled both a lichen and mushroom Identification Notebook which included 12 specimens with detailed descriptions, key characters and photos for each specimen and drawing of key features for several specimens. Field identification skills were further developed using *iNaturalist*, an online citizen science tool to document biodiversity. Weekly observations for both mushrooms and lichens were required. Each student completed a reflective summary of the collective results from the quarter. A sight identification exam tested students' ability to identify local mushrooms and lichens from memory using scientific names.

Weekly research seminars focused on current topics in mycology. Topics covered included bioremediation, radiotrophic fungi and medicinal uses of fungi. Students summarized peer-reviewed articles to inform critical discussions to develop informed perspectives.

During the winter, students further expanded their lichen identification skills through a plot-based forest survey. Students worked in teams to identify all lichens collected and then analyzed class data and presented their results. In addition to macrolichen surveys, students participated in two workshops, one focusing on *Usnea* species and a second on crustose lichen ID.

Students learned molecular and bioinformatic approaches for identifying fungi, including how to extract DNA from both environmental isolates and tissue samples, perform PCR amplification, clean and compare sequence data with sequences in online DNA databases, create a multiple sequence alignment with DNA data, construct a phylogenetic tree and interpret the relationships between different fungal



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taxa. Other fungal identification skills covered included culturing and sterile technique, along with compound microscope slide preparation and observation of microscopic fungi.

During winter quarter, 16-credit students completed either an independent research project or a literature review on a particular mycology topic. This work culminated in a written report or paper, along with a public presentation.

EVALUATION:

Written by: Paul Przybylowicz, Ph.D. and Lalita Calabria, Ph.D.

Sylvia Leeb-Haigh was an engaged and self-motivated learner, who contributed to our learning community. Sylvia met all the major learning objectives for this program. Sylvia attended most of the program meetings and submitted all the program work. Overall, the quality of Sylvia's work was very good and demonstrated a high level of engagement with the program.

Sylvia made significant progress in fungal and lichen biology, ecology and taxonomy. Sylvia completed all weekly study questions, which indicated a very good understanding of the material covered in lecture and readings. Sylvia's performance on the quizzes and exams indicated a very good understanding of fungal and lichen biology and ecology topics.

In the taxonomy portion of the program, Sylvia worked hard in the lab and field to increase her ability to identify mushrooms and lichens. Sylvia's mushroom identification notebook was excellent. Her detailed descriptions of plant associations and excellent field notes documented careful attention to detail. Sylvia included a few more challenging mushrooms in her collection; all were correctly identified and properly prepared. Sylvia's lichen identification notebook was outstanding and included accurate and complete descriptions, photographs and drawings that highlighted distinguishing features for each specimen.

On the final sight identification exam, Sylvia demonstrated an excellent ability to identify 44 common mushrooms and 40 lichen species using scientific names. Overall, Sylvia showed an excellent grasp of morphological terminology and using dichotomous keys to identify an unknown species.

Sylvia was an active participant in research seminar discussions. Sylvia completed all the seminar response posts which were generally outstanding. Sylvia asked good questions and contributed her thoughts in a supportive manner. As a result, Sylvia deepened her skills in interpreting primary scientific papers and science media sources from a critical perspective. Overall, Sylvia worked hard and made significant progress. She is well prepared for more advanced work in mycology.

Sylvia contributed regularly to the class *iNaturalist* project through weekly observations, comments and detailed notes. It was clear that Sylvia used this online community science tool to deepen their understanding of the natural history of the PNW.

Sylvia contributed to all aspects of the lichen plot research including field sampling, macrolichen identification, data entry and organization. Sylvia's team did an excellent job of accurately identifying all lichens in their plots. Their summary and analysis of the class data was excellent and included a well-defined research question with a graph/table illustrating their results.

Sylvia demonstrated a solid understanding of fungal identification using molecular tools through participation in fungal DNA isolation and PCR labs. With the resulting DNA sequences, Sylvia successfully identified their fungal species and constructed an accurate phylogenetic tree representing eight different classes of fungi.



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Sylvia was an engaged participant in fungal diversity and endophyte isolation labs and showed a solid grasp of the microscopy, culturing and sterile technique skills covered. Sylvia completed all the Excel mushroom farm models. Their final model demonstrated a very good understanding of both the modeling and the cultivation process.

For their research project, Sylvia's team investigated lichen species richness, air quality ratings, and conservation value of campus forests using the Forest Inventory and Analysis (FIA) protocol, a plot survey method developed by USDA Forest Service to monitor forest health nation-wide. They collected and identified all lichens species within ten FIA plots and compared their results with ten smaller diameter plots to better understand how plot size impacts species capture. Sylvia did a great job working collaboratively to refine their question, develop methods and implement their project. Overall, their final paper and final presentation were both very good and highlighted their solid understanding of technical writing skills, lichen survey protocols and forest health metrics.

In conclusion, Sylvia worked hard and made significant progress. She is well prepared for more advanced work in mycology.

SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 32

- *8 - Fungal Biology and Ecology
- *6 - Lichen Biology and Ecology
- *6 - Lichen Taxonomy
- *6 - Fungal Taxonomy
- *2 - Research Seminar in Mycology
- *4 - Independent Project: Lichen Community Ecology

* indicates upper-division science credit



The Evergreen State College • Olympia, WA 98505 • www.evergreen.edu

EVERGREEN TRANSCRIPT GUIDE

Accreditation: The Evergreen State College is fully accredited by the Northwest Commission on Colleges and Universities.

Degrees Awarded: The Evergreen State College awards the following degrees: Bachelor of Arts, Bachelor of Science, Master of Environmental Studies, Master of Public Administration and Master In Teaching. Degree awards are listed on the Record of Academic Achievement.

Educational Philosophy:

Our curriculum places high value on these modes of learning and teaching objectives:

- Interdisciplinary Learning
- Collaborative Learning
- Learning Across Significant Differences
- Personal Engagement
- Linking Theory with Practical Applications

Our expectations of Evergreen Graduates are that during their time at Evergreen they will:

- Articulate and assume responsibility for their own work
- Participate collaboratively and responsibly in our diverse society
- Communicate creatively and effectively
- Demonstrate integrative, independent, critical thinking
- Apply qualitative, quantitative and creative modes of inquiry appropriately to practical and theoretical problems across disciplines, and,
- As a culmination of their education, demonstrate depth, breadth and synthesis of learning and the ability to reflect on the personal and social significance of that learning.

Our students have the opportunity to participate in frequent, mutual evaluation of academic programs, faculty and students. In collaboration with faculty and advisors, students develop individual academic concentrations.

Academic Program

Modes of Learning: Evergreen's curriculum is primarily team-taught and interdisciplinary. Students may choose from among several modes of study:

- **Programs:** Faculty members from different disciplines work together with students on a unifying question or theme. Programs may be up to three quarters long.
- **Individual Learning Contract:** Working closely with a faculty member, a student may design a one-quarter-long, full-time or part-time research or creative project. The contract document outlines both the activities of the contract and the criteria for evaluation. Most students are at upper division standing.
- **Internship Learning Contract:** Internships provide opportunities for students to link theory and practice in areas related to their interests. These full- or part-time opportunities involve close supervision by a field supervisor and a faculty sponsor.
- **Courses:** Courses are 2-6 credit offerings centered on a specific theme or discipline.

The numerical and alpha characters listed as Course Reference Numbers designate modes of learning and are in a random order.

Evaluation and Credit Award:

Our transcript consists of narrative evaluations. Narrative evaluations tell a rich and detailed story of the multiple facets involved in a student's academic work. A close reading of the narratives and attention to the course equivalencies will provide extensive information about student's abilities and experiences. Students are not awarded credit for work considered not passing. Evergreen will not translate our narrative transcript into letter or numeric grades.

Transcript Structure and Contents: The Record of Academic Achievement summarizes credit awarded, expressed in quarter credit hours. Transcript materials are presented in inverse chronological order so that the most recent evaluation(s) appears first.

Credit is recorded by:

Quarter Credit Hours: Fall 1979 to present

Evergreen Units: 1 Evergreen Unit (1971 through Summer 1973) equals 5 quarter credit hours

1 Evergreen Unit (Fall 1973 through Summer 1979) equals 4 quarter credit hours

Each academic entry in the transcript is accompanied by (unless noted otherwise):

- The Program Description, Individual Contract or Internship Contract which explains learning objectives, activities and content of the program, course or contract.
- The Faculty Evaluation of Student Achievement provides information on specific work the student completed and about how well the student performed in the program or contract.
- The Student's Own Evaluation of Personal Achievement is a reflective document written by the student evaluating his or her learning experiences. Students are encouraged but not required to include these documents in their official transcript, unless specified by faculty.
- The Student's Summative Self Evaluation is an optional evaluation summarizing a student's education and may be included as a separate document or as a part of the student's final self- evaluation.

Transfer credit for Evergreen programs, courses and individual study should be awarded based upon a careful review of the transcript document including the course equivalencies which are designed to make it easier for others to clearly interpret our interdisciplinary curriculum. These course equivalencies can be found at the conclusion of each of the Faculty Evaluation of Student Achievement.

The college academic calendar consists of four-eleven week quarters. Refer to the college website (www.evergreen.edu) for specific dates.

This record is authentic and official when the Record of Academic Achievement page is marked and dated with the school seal.

All information contained herein is confidential and its release is governed by the Family Educational Rights and Privacy Act of 1974 as amended.

If, after a thorough review of this transcript, you still have questions, please contact Registration and Records: (360) 867-6180.