2013 - 2014 MES Elective Course Descriptions

(Course descriptions and times are subject to change)

Fall 2013

Fire Science and Society – Richard Bigley, WA Dept. of Natural Resources & Sarah Hamman, Center for Natural Lands Management

Fire plays the role of ecosystem engineer in forests and grasslands throughout the world. This role has changed over the past hundred years, however, with increasing human populations, sprawling development into fire-prone areas, and altered perceptions of this vital ecological process. With fire suppression and exclusion, we are seeing dramatic changes in the structure and functioning of fire-influenced ecosystems and the role of fire in natural resources management and policy. There are significant ecological, social and political implications of these changes, ranging from the listing of fire-adapted endangered species to more rigorous air quality regulations to altered pressures and priorities for the timber industry. Adapting policies in the anticipation to climate change has become a major priority. It is becoming more important for citizens to understand both the benefits and the risks associated with fire as it is increasingly impacting people in their daily lives. This course will introduce students to the language, the ecology and the politics surrounding wildland fire and increase your effectiveness with opportunities that involve fire science, application and management. It also includes a weekend field trip.

Disaster Management – Martha Henderson, MES Director

Disaster management is rapidly becoming a constant factor in environmental conditions. This class will include research and analysis of the physical, historical, cultural and political contexts of disasters. Relationships between climate and storm events, global and local management systems, and public capacity to cope with disasters will be examined. Specific disaster events such as Hurricane Sandy, the Gulf oil spill, Chehalis River flooding events, and the potential of earthquake, tsunami, and volcano events it the Pacific Northwest will be highlighted. Students will be asked to read public documents, critical examinations, and personal accounts of disasters. Finally, students will be asked to research a specific disaster and highlight management issues. One field trip and several guest speakers will be included in the class.

Climate Change, Greenhouse Gasses, and Our Environment: A World Reinvented – Paul Pickett, WA Dept. of Ecology

This elective will address: the science of global greenhouse gas emissions and climate change, including the work of the Intergovernmental Panel on Climate Change; current strategies to reduce GHG emissions, such as carbon cap-and-trade, carbon taxes, and renewable energy; potential impacts of climate change and ocean acidification on the Pacific Northwest, including the Pacific Coast, Puget Sound, rivers and streams, agriculture, forests, arid lands, and human infrastructure and communities; current efforts to adapt to impacts; the interactions of the scientific, economic, legal, political, cultural and social aspects of the problem; and new and emerging ideas about the problem and how to make progress in solving it.

Conserving and Restoring Biodiversity – Timothy Quinn, Washington Department of Fish and Wildlife

This course focuses on the biology that underlies conservation and restoration issues around the world. There are many ways to approach the study of conservation and restoration biology and I will mostly emphasize the scientific elements of these disciplines. I also will provide you with a practitioner's perspective of the relationship of biology and policy from work done in Washington State. This course will introduce you to the literature, controversies, and promising methodologies for a variety of conservation/restoration biology applications. In addition, I will invite a number of local experts to come and provide perspectives on their work in applied fields of conservation. We will read, discuss, and write on a variety of topics. Your assignments include written and oral exercises, and peer evaluations aimed at helping you develop your ideas and increase your ability to communicate those ideas. I want to introduce you to the principal concepts and methodologies of conservation and restoration biology, enrich your understanding of the scientific contributions necessary for solving conservation problems, foster your understanding of the scientific process in general and as applied in conservation settings, and further your powers of analysis and ability to communicate effectively.

Winter 2014

Freshwater Ecology – Carri LeRoy, MES Faculty

In terms of providing habitat for threatened and endangered species, freshwater habitats rank as the most imperiled ecosystems on Earth. Historically and currently used for transportation, irrigation, energy production, waste disposal and recreation, it is important to understand how freshwater systems function and how we can work toward ecological restoration of freshwater habitat. This program will focus on the foundations of and research methods in freshwater ecology. Topics covered will include basic water chemistry, stream flow dynamics, primary productivity, aquatic insect ID, trophic dynamics, ecological interactions, organic matter and nutrient dynamics, current threats to freshwater ecosystems and ecological restoration. The course will focus on current research in ecosystem ecology, community ecology and ecological genetics in riparian zones, streams, rivers and lakes. Seminar readings will focus on human-freshwater interactions and regionally important freshwater topics in the Pacific Northwest. Field trips will be undertaken regardless of weather conditions to local freshwater environments and the course will include several hands-on lab activities.

Advanced GIS – Greg Stewart, Northwest Indian Fisheries Commission
Advanced GIS is a fast-paced course designed to teach graduate students to use Geographic Information Systems (GIS) for mapping, spatial data management, and spatial data analysis. Instruction is based on reading assignments, lectures, and weekly hands-on labs using ArcGIS 10.1. Evaluations are based on the quality of student-produced map and analysis products and two quizzes. No previous experience with GIS is required, but students should have experience with quantitative software and must be able to demonstrate a solid understanding of MS Windows file management. Students will be expected to use the software outside of class, and student versions of the software will be made available, but support is limited to college computers (note: software runs only under MS Windows, see requirements: http://resources.arcgis.com/en/help/system-requirements/10.1/).

Contemporary Challenges to Building a Clean Energy Future – Alan Hardcastle, WSU Extension Energy Program
This course will examine current trends in the clean energy sector and the intersections with efforts to develop a green and sustainable economy and environment that also enhances social equity. The class will integrate research and readings with guest lectures and seminar discussion to explore the current social, technical and political context for the shift to clean energy. The class will include a special focus on the energy labor market, human resources, education and training, and societal implications for regional alternative energy and energy efficiency initiatives.

Environmental Education – Jean MacGregor, Curriculum for the Bioregion Project Director, Evergreen
It is widely agreed that an environmentally literate and concerned citizenry is crucial to environmental quality and long-term sustainability—but how and where is environmental and sustainability literacy fostered? And where "environmental education" occurs, is it effective? This class explores the history, philosophical underpinnings, and current trends in environmental education for both youth and adults, in both formal sectors (schools and colleges) and non-formal ones.
This class provides a theoretical and practical introduction to the field of environmental education and interpretation. It will be useful to students interested in environmental teaching or communications as a career, or to those whose environmental work might involve education or outreach components.

Spring 2014

Environmental Advoacy – Ted Whitesell, MES Faculty
Prevention and resolution of environmental problems depends significantly on effective environmental advocacy. Science, government regulation, and market mechanisms are insufficient without it. The purpose of this 4-credit graduate elective is to learn and practice skills needed to be an effective environmental advocate, including analysis of a contested policy situation, development of an effective strategy to affect its outcome, and methods for implementing the strategy through organized, collective action. This knowledge is useful for those working within government, the private sector, environmental advocacy groups, and as citizen activists. We will study cases that illustrate the successes and failures of various attempts to influence events, including guest lectures by participants in those cases. We will learn to practically apply social science theoretical frameworks in ways that help create effective strategy. The course provides a critical survey of approaches to environmental advocacy – from global to local – emphasizing strengths and weaknesses. Students will research, write and present on a case of their choosing, preferably from their own experience, that illustrates the principles we study. They will have the opportunity for experiencing a physical analog for policy conflict through one or more practice sessions in the martial art of Aikido. After taking the course, students should have improved abilities to diagram the sequence of events leading to an environmental policy decision, locate decision points and key players, find pivotal opportunities for intervention, assemble coalitions capable of effecting change, and act ethically and appropriately to carry out strategy from within their role in the public or private sector.

The Global Carbon Cycle – Erin Ellis, MES Faculty
The global carbon cycle is fundamentally tied to many of the most important environmental issues of the twenty-first century, including climate change, energy consumption, ocean acidification, deforestation, and the pollution of freshwater ecosystems. As such, an accurate understanding of the carbon cycle is necessary to guide policy to work towards an effective solution to many of these complex issues. Accordingly, this program will explore the fundamentals of the global carbon cycle. Specifically, we will study the distribution of carbon between different reservoirs on Earth (i.e. the atmosphere, the ocean, and the land), and then examine the sequence of biogeochemical processes that control the cycling of carbon between these reservoirs. Further, we will use case studies of current hot research topics to explore how anthropogenic activities are altering the global carbon cycle in different ecosystem types (forests, lakes, rivers, and the ocean). Additional topics to be covered include greenhouse gasses, the effects of elevated atmospheric carbon dioxide levels on terrestrial and aquatic organisms, carbon sequestration, the global nitrogen and phosphorus cycles (as they relate to the carbon cycle), ocean acidification, and deforestation. Seminar readings will be based on primary literature in addition to the required program text. Hands-on laboratory activities and a field trip will be used to support lectures and seminar readings.