**Sustainability course inventory 2015-2016**

**Definition for Sustainability in the Curriculum at Wittenberg:**

Wittenberg aligns its goals for sustainability education with the Brundtland report’s definition of sustainability: meeting the needs of the present generation without compromising the ability of future generations to meet their needs.  Addressing sustainability challenges requires interdisciplinary thinking, flexibility, creativity, and ongoing collaboration.  Sustainability courses can fall into the following two categories:

        Sustainability-focused courses concentrate on the concept of sustainability, including its social, economic, and environmental dimensions, or examine an issue or topic using sustainability as a lens.

        Sustainability-related courses incorporate sustainability as a distinct course component or module or concentrate on a single sustainability principle or issue.

To help identify if a course incorporates sustainability either as a central focus or as a module, several sample sustainability learning outcomes follow:

Students will be able to:

       Demonstrate an understanding of key sustainability challenges.

       Understand interdisciplinary aspects of sustainability including the feedbacks between science, economics, society and/or cultural influences.

       Approach sustainability topics through team activities that encourages multiple disciplinary lenses.

       Critically engage in problem-solving related to sustainability (e.g. case studies, field studies, evaluations of best practices, research).

A course does not need to include all of the above learning outcomes to be considered sustainability-focused or sustainability-related and the above list is far from comprehensive.

Sustainability-focused courses

**COMM 363. Environmental Communication. 4 semester hours**

An advanced course in which students utilize rhetorical theory to analyze public, private, and technical discourses about the environment. Includes the study of environmentalism as a social movement and contemporary environmental issues, both in the United States and within a larger global context. Prerequisites: COMM 200 and COMM 280 or 290, or permission. Alternate years.

**ESCI 100N. Global Climate Change. 4 semester hours.**

This course will examine the science of global climate change and human-introduced climate forcing. It will survey the environmental impacts of global climate change and what this means for the habitability of the earth for humans and other species. Topics will include global climate, stakeholder analysis related to energy use and global climate change, and examining the consequences of rapid climate change. Students will investigate a climate change issue of importance to them (locally, regionally, or globally). The course is designed primarily for non-science majors. Prerequisite: Math placement score 22.

**ESCI 250B. Environmental Research Methods. 5 semester hours.**

Study and application of the methods environmental scientists use to investigate environmental questions, including sampling strategies, tools, sample collection and analysis, and presentation.  Prerequisites:  ESCI 101 and one additional course from the foundational courses approved for the environmental sciences major.

**FREN 261F: L’Environnement naturel du monde francophone (The Natural Environment of the Francophone World): 2 semester hours.**

This is a content-based reading and conversation course that focuses on the role of the natural environment in the lives of Francophones; it explores some of the distinctive ways in which French-speaking people around the world express their regard and concern for the natural world. Prerequisite: FREN 112 or placement.  Offered every third semester.  Successful completion of this course satisfies the university's general education requirement for Foreign Language.

**GEOL 115B. Topics in Physical Geology. 4 semester hours.**

Intended for the non-science student.   Study of selected topics related to physical geology.   Topics covered vary according to disciplinary interests of the instructor or current issues in physical geology.   Offered subject to demand and availability of an instructor.

**GERM 261: Umwelt: Natur und Kultur (Environment: Nature and Culture): 2 semester hours**

This is a content-based reading and conversation course that focuses on the role of the natural environment in the lives of contemporary Germans; it explores some of the distinctive ways in which those Germans express their regard and concern for the natural world. Prerequisite: successful completion of German 112 or placement. Alternate years.

**PHIL 207. Science in Social Context. 4 semester hours.**

The course focuses on sustainable science broadly construed to include studying environmental racism and environmental justice, as well as what it means to have sustainable science. Though this aspect of it is not an environmental focus, it includes what it means to have an epistemologically and practically sustainable scientific practice.

**SPAN 261. El mundo físico (The Physical World) 2 sem. hr.**

This course serves as an introduction to the Hispanic world by highlighting the diverse nature and cultures of Spanish-speaking people focusing on climate, geography and environmental issues. The course will also develop language skills that will enhance student’s ability to express themselves in Spanish. Prerequisite: Spanish 112 or Spanish 150 or placement at the 200
level. Every year.

Sustainability-related courses

**BIOL- 140 – Organic Evolution – 4 credits**

Scholars often refer to Darwin’s ideas on evolution as one of humankind’s greatest intellectual achievements. In this course, we will examine Darwin’s ideas on evolution through his own work and follow his reading with a text presenting our modern understanding of the process. Evolution, as we currently understand it, is an unpredictable and natural process of temporal descent with genetic modification that is affected by natural selection, chance, historical contingencies, and changing environments. The concept of organic evolution has affected almost all other fields of knowledge and is considered one of the most influential concepts in Western thought. We will focus on the biological aspects of evolution and its influence on physiology, morphology, ecology, and the classification of organisms. The course will introduce students to the basic principles of modern evolutionary biology, both to the theory and its predictions, and to the data and observations underlying the theory. It will first introduce the nature and organization of genetic variation in populations. We will then consider how this genetic variation is expressed and filtered in natural populations to produce evolutionary change. The final portion of the course will concern the origins of biodiversity and the study of phylogenetic relationships. By the end of the course, students should be able to understand the basic concepts of evolutionary biology and its importance in the biological and medical sciences, and be equipped to use these principles to inform their understanding of sociological issues associated with public perceptions of evolutionary biology and its ramifications.

**BIOLOGY 148N - Biology in a Changing World**
**(4 semester hours)**

Our planet is currently experiencing a global biodiversity crisis; extinction rates at present are at least 100 times that of any natural extinction event to have ever occurred in our history. Humans are a driving force in the loss of earth’s species and the degradation of ecosystems. Undoubtedly, biological interactions and critical processes may be dramatically altered in our rapidly changing world. This biology course for non-majors will explore patterns that have historically impacted global biodiversity, how human induced alterations such as climate change and habitat loss are threatening the biodiversity of species, the implications of a widespread loss in biodiversity for humans, and the ability of current or future conservation practices to shape our fate. The course will draw heavily from empirical research and case studies to highlight the predicament of unfortunate species which are currently facing a very uncertain future.

**BIOL 214 – Developmental Biology**
**(5 semester hours)**
**McWhorter, Michelle**

**Prerequisites:  Biology 170 and 180**
Developmental biology is the study of how single celled zygotes (or fertilized eggs) become multi-cellular organisms with specialized tissues and organs.  This course is designed to provide an overview of the major features of animal development focusing primarily on the cellular and molecular mechanisms that underlie these developmental events.  Lecture topics will include gametogenesis, fertilization, gastrulation, and organogenesis.  Laboratory components will use a range of developmental model organisms to highlight some of the main tenants of developmental biology.  There will be an emphasis on how cells in the developing embryo differentiate into specific cell types, germ layers, tissues, and organs.

**BIOL 241 - Freshwater Ecology**
**5 semester hours**

This course will focus on the characteristics, processes, and community interactions within freshwater ecosystems including ponds, lakes, and wetlands. Students will gain an understanding of the physical, chemical, and biological importance of freshwater ecosystems. This course will place a heavy emphasis on threats to freshwater habitats, strategies for mitigation, conservation, and management, and current and proposed policies which govern aquatic habitats. Laboratory sessions will include excursions to nearby wetlands and lakes and will include a semester long research project. This course fulfills Group 4 and Botanical requirements for biology majors.

**BIOL 242 – Behavioral Ecology**
**5 semester hours**

**Prerequisites:  Biology 170 and 180**
This course will explore how the behavior of organisms contributes to survival and reproductive success of individuals. We will examine the evolution and significance of a wide variety of animal behaviors including life history strategies, foraging decisions, sexual selection and mate choice, cooperation and altruism, parental care, and predator-prey dynamics.   This course will draw heavily from primary literature and empirical research of animal behaviors, with an emphasis on current methodology and experimental design. The course will combine weekly discussions, lectures, and labs to provide an overview of the past, present and future of the field of behavioral ecology. A semester-long project will require student groups to design and conduct an observational or manipulative experiment on some aspect of behavioral ecology and present these results in the form of a manuscript and a 15 minute conference style presentation.  This course fulfills Group 4 and Zoological requirements for biology majors. Writing intensive.

**BIOL- 145/245\* – Introductory Wildlife Management – 5 credits**

\*Includes required field trip-laboratory experience (Bio 258)

While a wildlife manager in Mississippi is trying to increase deer browse in a bottomland

hardwood forest, a wildlife manager in suburban Chicago spends her nights with a silenced rifle trying to curb urban deer populations, a publically-held resource. Although the goals of wildlife management may be drastically different, they revolve around only three scenarios: we can increase, decrease, or maintain wildlife populations. Our ability to meet our management goals is rooted in the strength of our science. Truly effective management applies ecological principles to wildlife issues while seeking a balance between the needs of humans and the needs of wildlife. Our goal this semester is to learn the basics of wildlife management, to begin building a toolbox that will serve you well as a wildlife ecologist, natural resource manager, weekend naturalist, informed citizen, or future politician. Prerequisite: sophomore standing.

**BIOL- 250. Topics: Wildlife Techniques. 5 semester hours.**

Wildlife ecology is defined as the application of ecological knowledge to achieve a balance between the needs of human and the needs of wildlife. Like most scientific endeavors, knowledge in wildlife management may be hindered by uncertainty. A good deal of a scientist’s training is meant to eliminate, as much as possible, uncertainty in the way we go about trying to get the truth. This course is often a capstone stone in wildlife ecology undergraduate degrees and provides a toolkit that allows for rigor in answering questions related to wildlife populations. This course provides hands on experience in general wildlife techniques utilized by wildlife professionals. Wildlife managers/ecologists make decisions about how many deer to harvest, which habitat modifications would help Kirtland’s warbler populations, and provide guidance to reduce bird strikes with aircraft. Wildlife management is an applied science, with its fruits improving our ability to manage species in the face of tremendous environmental change. This course addresses topics such as aging and sexing of game birds and mammals, scientific writing, statistical analysis of wildlife data, capture and marking of vertebrates, geographic information systems, abundance and density estimation techniques, diversity indices, habitat analysis, radio telemetry, home range estimation, survival analysis, necropsy, and wildlife management techniques. These techniques are important to the practice of wildlife management and research. This course will not be limited to lectures, but will focus on exposing you to wildlife techniques in hands-on field situations.

**BIOL- 346. Ecology. 5 semester hours.**

Ecology is the scientific study of the interactions and relationships that determine the distribution and abundance of organisms. Branches of ecology permeate issues of disease emergence as well as issues associated with conservation of the earth’s biodiversity. This course examines the principles and processes of ecology and applies them to provide scientific explanations of the world around us. Survey of biotic communities and populations with emphasis upon structure, influencing factors and techniques of study. Individual investigation into the ecology of species also expected of each student. Writing and math intensive. Prerequisites: One Group 2, 3, or 4 Biology course after Biology 170 and 180 and Math Placement 22. Every year.

BIOL- 347. Evolution. 4 semester hours.

The course will introduce students to the basic principles of modern evolutionary biology, both to the theory and its predictions, and to the data and observations underlying the theory. It will first introduce the nature and organization of genetic variation in populations. We will then consider how this genetic variation is expressed and filtered in natural populations to produce evolutionary change. The final portion of the course will examine biodiversity, the manifestation of evolutionary processes. By the end of the course, students should be able to understand the basic concepts of evolutionary biology and its importance in the biological and medical sciences, and be equipped to use these principles to inform your approach to your field of interest.Critical examination of the evidence for biological evolution with particular emphasis upon the historical development of the concept; evolutionary mechanisms; species diversity, both past and present; and the geographical distribution of living organisms. No laboratory. Prerequisite: Two biology courses in addition to Biology 170 and 180. Writing intensive. Every year.

**BUSN 320. Supply Chain Management. 4 semester hours.**

This course is designed to provide students with an integrated and multi-functional supply chain management view in the context of the organization and its environment. Students are provided with the opportunity to integrate concepts, skills and techniques acquired in this course and in other management courses to develop the analytical and decision-making skills needed to cope with supply chain organizational business realities. The strategic supply chain management course addresses the central theme of (1) how managers develop an astute "game plan" for running a supply chain and (2) how they implement and execute the supply chain with proficiency. Emphasis is on the formulation, application and justification of supply chain management tactical and strategic courses of action. Alternate years.

**CHEM 321. Inorganic Chemistry 5 semester hours.**

Overview of the quantum mechanical model of atomic and molecular structure, including valence bond and molecular orbital theory, symmetry and group theory applied to molecular structure, acid-base models, ionic bonding and structure, transition metal chemistry, and selected topics from organometallic chemistry, bioinorganic chemistry and instrumental techniques. Weekly laboratory required, which includes computational chemistry and the synthesis and characterization of inorganic compounds. Prerequisites: Chemistry 201, 281 and Physics 218. Every year.

**COMM 280. Reasoning and Communication. 4 semester hours.**

Study of and practice in practical reasoning, critical thinking, listening, reading, writing, speaking and relational skills, and informed deliberation of critical contemporary issues. Writing intensive. Prerequisite: English 101. Every year.

**ESCI 101B. Introduction to Environmental Science. 5 semester hours.**

An introduction to environmental science, including concepts used by environmental scientists to frame the study of environmental problems and human impacts on the natural environment and its resources, including climate, water, soils, vegetation, and wildlife.  The laboratory experience focuses on the tools and methods used by environmental scientists to study the environment, natural resources, and human impacts associated with the extraction and use of resources.

**GEOL 110B – Introduction to Geology**

**4 semester hours**

**Open to all students, except those who have previously taken Geology 110B-115B, 150B, or 160B.  A math placement score of 22 or above is recommended.**
This course provides students with a survey of physical geology and how geologic knowledge can influence the decisions we face as citizens.  Students will gain an understanding of the nature and findings of the scientific study of earth materials, selected geologic processes and “deep time”. Content areas will probably include minerals and rocks, geologic time, plate tectonics, earthquakes, volcanoes, streams, shorelines and glaciers.  Students will have input into the final selection of topics.

**GEOLOGY 160B – Environmental Geology
5 semester hours**

Environmental Geology is an introduction to applied geology for both science and non-science students. The primary objective of the course is to understand human interaction with the physical environment.  We will study natural hazards, such as flooding, mass wasting, and coastal erosion, natural resources, such as groundwater and wetlands, and the impact humans have on them.  Classes and labs will focus on typical environmental problems and techniques used by geologists to study natural hazards and resources and to develop mitigation strategies when our impact on them is excessive.  Geology 160 counts as an introductory course for the geology major and minor, the environmental science major and environmental studies minor, and the marine science minor.

**GEOLOGY 315Z – Watershed Hydrology
4 semester hours**

**Prerequisite:  A minimum score of 22 on the Math Placement Exam is required.  Geology 150B, 160B or 170B, or one course from the Geology 110B-115B Series in combination with Geology 151.**
Watershed Hydrology is designed to highlight methods used by hydrologists, hydrogeologists, and environmental scientists in their study of surface and subsurface hydrology of watersheds.  The course will focus on watershed processes, including precipitation, infiltration, generation of runoff, groundwater flow and streamflow, and the ways by which we measure and analyze them.  Class sessions will focus on concepts, and lab sessions will focus on methodology for collecting, modeling, analyzing or displaying hydrologic data.

**GERM 362. Naturwissenschaften und *Mythos*: die Nachtseite der Naturwissenschaften (Natural Sciences and *Mythos* –Science and Imagination). 4 semester hours.**

The course explores the connections between natural sciences and culture, emphasizing ways in which scientific advances both influence and reflect cultural developments. Students will explore connections between the arts and the sciences and between inspiration, creativity and theories of nature as they examine ways in which the scientific and cultural imagination intersect to frame our understanding of our place in the world. Writing intensive. Prerequisite: At least eight semester hours in German at the 200-level or permission of instructor

**POLI 101S. American National Government. 4 credits.**

Study of the basic concepts, background, constitutional basis, organization, functions, and political processes of the United States government. Every year.

**POLI 251S. International Relations. 4 credits.**

Introduction to some key theoretical concepts and approaches to the study of international relations. Also an application of the concepts to historical case studies of war and peace, diplomacy, arms control, international political economy, international organizations and other issues. Every year.

**RELI 378R. Bioethics. 4 semester hours.**

Seminar on contemporary issues and debates in bioethics. Topics may include abortion, genetic engineering, reproductive technologies, euthanasia, autonomy, paternalism, use of human subjects in research, access to health care, allocation of scarce resources and environmental ethics. Writing intensive. Every year.