Fall 2019 Sustainability Courses

*Undergraduate Level*

- **Sustainability Focused Courses**

College of Arts & Sciences:

**Growing Sustainability through Agriculture (GEV 3000)**

Contemporary topics in Geography and Environmental Science. Topics will be announced on a semester-by-semester basis. Specific information will be available on the department’s web page.

**Intro to Sustainability Study (GEV 3001)**

Development that meets the needs of the present without compromising the needs of future generations. Social, engineering, and economic dimensions, which make up the sustainability model.

**Intro to Global Studies (GIS 2000)**

Gateway course to Global Interdisciplinary Studies, preparing for area studies specializations and GIS interdisciplinary programs. Focuses critical thinking skills through the comparative lens of both global and interdisciplinary analyses. Mandatory preparatory course for advanced study in GIS major.

Villanova School of Business:

**Business in Emerging Markets (MGT 2352)**

Focuses on management and strategy in "big emerging markets," like Argentina, Brazil, China, India, Malaysia, Mexico, Poland, South Africa, Taiwan, and Turkey. Examines social, political, economic, cultural, and financial conditions challenging businesses exporting to or investing in these countries.

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College of Engineering:

**Alternative Energy (CHE 5715)**

Technical, economic, and social evaluations of alternative and sustainable energy sources focusing on liquid fuels as well as other energy sources.

**Intro to Sustainable Energy (ME 5130)**

Technical aspects of sustainable energy technologies such as wind, solar, biomass, ocean waves/tides, geothermal, and hydropower. Issues related to storage, transportation, distribution, industrial usage, and buildings; progress, challenges, and opportunities for technical feasibility and economic viability.

- **Sustainability Related Courses**

College of Arts & Sciences:

**Evolutionary Ecology (BIO 3255)**

Factors affecting the distribution, abundance, and interactions of organisms. Climate patterns, biomes, physiological adaption, behavioral ecology, population dynamics, species interactions, biodiversity, and conservation ecology. Emphasis on community level of organization and below; complements BIO 3385 Global Change Ecology. Hypothesis testing using statistical analysis of data.

**Environment and Human Health (BIO 3661)**

Presentation and discussion of scientific aspects of topics relating to the environment and human health. Specific topics covered vary, but could include biodiversity and health, ecosystem services, infectious diseases, climate change, endocrine disruption, food production (including GMOs), and urban ecology.

**Field Ecology and Evolution (BIO 4451)**

Advanced study of organisms and ecosystems of a particular region (location varies; has included Florida, Puerto Rico, Nova Scotia). General principles explored using examples from focal area: historical and ecological biogeography, habitat patterns, biotic and abiotic interaction, evolutionary processes, and conservation problems

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Ethical Trade & Contemporary Life (ETH 2050)
Major Western ethical traditions as they apply to selected contemporary ethical problems, with special consideration to Jewish and Christian perspectives.

Geography of a Globalizing World (GEV 1002)
The human and physical realms of Geography. Focus on current geographic problems facing specific regions of the world.

Geography of Earth’s Environments (GEV 1003)
World climates, water, landforms, soil, and vegetation form the basis of this global environmental approach.

Environmental Science I (GEV 1050)
Multidisciplinary foundation in Environmental Science; first of two semester course. Science course linking environmental biology, chemistry, earth sciences, and climate change. Collection of data from lab experiments and field-based observations.

Environmental Studies (GEV 1052)
Free elective course to provide Advanced Placement credit for Environmental Science. Prerequisite: Score of 4 or 5 on AP Environmental Science Test.

Global Change in Local Places (GEV 2500)
Geographic research methods to address spatial implications of current local issues. Relationships between global environmental & societal processes & local landscapes. Collection, evaluation, analysis & presentation of qualitative & quantitative geographic data.

Population Geography (GEV 2525)
Geographic dimensions of global population trends, emphasizing global demographic divides. Considers population processes (mortality, fertility, migration), population structures (age, gender, ethnicity), and population policy. Special topics may include population and the environment, food supply, and HIV-AIDS.

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**Statistics in Environmental Science (GEV 3300)**

Statistical methods and application. An introduction to statistical concepts, techniques, and applications to data analysis and to problems in the design, analysis, and interpretation of experiments in the environmental sciences.

**Natural Resources and Conservation (GEV 3580)**

Assessment of natural resource and conservation issues in the U.S. and around the world. Distribution and use patterns of air, water, mineral, energy, and biologic resources. Examination of exploitation, conservation, and preservation management strategies.

**Remote Sensing (GEV 3750)**

Data collection and analysis with high-technology platforms such as conventional and color infrared photography, multi-spectral scanners, satellite imagery, thermal infrared, LIDAR, and radar. Application of remotely sensed data to solve complex, human, environmental, and engineering problems.

**TOP: Atmospheric Science (GEV 4320)**

Advanced laboratory science topics in the Environment presented by senior faculty. Specific subject matter will vary with the expertise of the professor.

**TOP: Environmental Economics (GEV 4330)**

Advanced topics in environmental policy and management presented by senior and visiting faculty. Specific subject matter will vary with the expertise of the visiting professor or senior faculty member conducting the course. Course may be taken under multiple titles.

**Politics and the Environment (GEV 4333)**

Analysis of current affairs related to the environment.

**Oceanography (GEV 4351)**

Biology, geology, chemistry, and physical environment of the ocean.

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TOP: Global Environment History (HIS 1065)
Selected core courses exploring relationship between environmental and technological change in different eras and societies.

TOP: Commodities & Global Capitalism (HIS 1165)
Selected core courses that take a global or comparative approach to major issues.

Environmental Ethics (PHI 2121)
The relation of the physical and biological environment to ethical values. Priorities among environmental, economic and political values as a basis for ethical decisions.

Villanova School of Business:
Auditing (ACC 2430)
Auditing standards employed in verification of and reporting on financial statements, evaluation of controls, statistical sampling, substantive testing, legal liability and professional responsibilities, and professional standards of ethics. Includes written and oral group case assignments and application of computer technology. Restricted to Accounting majors and minors.

Global Political Economics (ECO 3108)
Socio-economic conditions, political history, and government policy and the global impact on international trade and monetary relations; regional integration; stability of international economic systems; economic development and transition strategies; role of multinational corporations in the global world.

Global Leadership (MGT 2360)
Help students gain insights about the nature of culture, the nature of leadership, and their intersection. Provide students with an increased understanding of, (1) existing theory and research on different leadership and culture topics and, (2) themselves with respect to leadership development and cultural intelligence.

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**Real Estate Development (RES 4150)**

Senior capstone class that focuses on the development process from land acquisition to final product incorporating real time real estate development projects. Specific topics include land acquisition, tax issues, optimal land use decisions, architectural and sight design, contracting and construction, leasing and marketing of properties and optimal exit strategies.

**Corporate Responsibility & Regulation (VSB 2007)**

Examines law, ethics, corporate responsibility, and business regulation. Studies the sources, substantive principles, and evolving nature of law, and its role in ethical business decision making.

**Strategic Thinking & Implementation (VSB 4002)**

Emphasizes strategy concepts to achieve integrative cross-functional solutions for competitive advantage. Application of strategy tools as well as concepts from prior course work. Application of knowledge to global and ethical challenges emphasized through the practice opportunities used in this course.

**College of Engineering:**

**Water & Wastewater Treatment (CEE 3321)**

Water quality problems and eutrophication; Clean Water and Safe Drinking Water Acts; analysis and design of unit processes in water and wastewater treatment facilities including sedimentation, coagulation and flocculation, adsorption, filtration, disinfection, activated sludge and trickling filters.

**Environmental Engr Lab (CEE 3921)**

Water quality problems and eutrophication; Clean Water and Safe Drinking Water Acts; analysis and design of unit processes in water and wastewater treatment facilities including sedimentation, coagulation and flocculation, adsorption, filtration, disinfection, activated sludge and trickling filters.

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Transport System Design (CEE 4226)
(CEE Senior Elective and/or Technical or Free Elective) Engineering applications of transportation design process including design philosophies, elements of systems capacity design, intersections, and interchange design. Use of national and state codes and computer-based design software.

Solid and Hazardous Waste (CEE 4331)
(CEE Senior Elective) Solid waste generation, composition, collection, management and regulations; hazardous waste classification, regulation and management; air pollution control methods.

Water Resources Egr Design (CEE 4521)
(CEE Senior Elective) Design fundamentals of hydrology and open channel hydraulics using production-level programs. Topics include design storms, storm water design and open-channel river modeling.

Heat Transfer (CHE 3031)
Principles of heat flow, mechanisms of conduction, convection and radiation, correlations for heat transfer coefficients, heat transfer equipment and process applications.

Thermodynamics II (CHE 3131)
The fundamental property relation, thermodynamic properties of single and multiple pure phases, homogeneous multicomponent phases, ideal and non-ideal liquid solutions, phase equilibria, chemical reaction equilibria, problem solving techniques, applications.

Principles of Air Pollution Control (CHE 5002)
Causes, effects and control of air pollution, emphasizing abatement technologies: classification and sources of airborne pollutants, particulate control devices, VOC abatement technologies, NOx and SOx abatement, and meteorological effects.

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Polymer Sciences and Engineering (CHE 5632)
Basic principles of polymer science: nature and structure of organic high-polymers, polymerization reactions, physical and chemical properties, mechanical testing, viscoelasticity, flow and processing applications.

Intro to Electrical Energy Systems (ECE 4810)
Fundamentals of energy conversion and storage, conventional and renewable sources of energy, introduction to the electric energy system grid, control and economic operation of the electric energy system grid, and introduction to smart grid and smart metering technologies.

Fluid Mechanics (ME 3600)
Fluid properties, fluid statics; kinematics of flow; conservation of mass, energy, momentum; dynamic similarity; fluid resistance, boundary layer theory; flow in conduits; lift and drag; potential flow; compressible flow.

Heat Transfer I (ME 3950)
Steady state, unsteady state conduction in one & two dimensions; numerical methods of solution; forced & free convection in internal & external flow; heat exchangers; multi-mode heat transfer.

Thermal Fluids Lab (ME 4003)
Laboratory experiments in thermodynamics, fluid mechanics, heat transfer, aerodynamics, engine performance, and energy conversion.

College of Nursing:
Imperatives for Global and Public Health (NUR 3122)
Factors that influence the health of communities and populations locally, nationally and globally. Public health principles and sciences, epidemiological data, environmental health, social determinants of health, genetics/genomics, influence of culture and health behaviors and health vulnerabilities are addressed.

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