

PSU Sustainability-Related Courses and Research

Sustainability Courses

Graduate level courses are identified with *

Biology

- BIOL 113** **Environmental Life Science-** A basic ecological approach to the principles and processes of life with emphasis placed on human pressures and technology, and the effect of these on the organism-environment complex. Laboratory exercises accompany lecture.
- BIOL 313** **Principles of Conservation-** History and philosophy of conservation, resource economics and risk management, causes of and solutions to environmental problems based on the theories and practices of resource management. Prerequisite: General education requirements in natural and physical sciences.
- BIOL 615** **Environmental Protection-** A review of the history of conservation and environmental law, the legal, political, social, and scientific aspects of environmental protection, and major federal environmental laws. Prerequisite: BIOL 513 Resource Conservation.
- BIOL 617** **Environmental Health-** The risks of human health from pollution; the major routes of exposure in humans from environmental contaminants in air, water, and soil; human health standards; sanitation; overview of occupational health and safety; calculations of exposures and dose/response effects; and risk assessment and management.
- BIOL 635** **Wildlife Ecology and Management-** Lecture and laboratory. Application of ecological principles toward the manipulation of terrestrial wildlife populations. Laboratory sessions stress techniques, local management practices and discussion with wildlife personnel.

Chemistry

- CHEM 626** **Polymer Synthesis and Characterization Lab-** Polymer experiments (including biopolymers to replace petroleum) to accompany CHEM 625 Polymer Synthesis and Characterizations.

Engineering Technology

- *E TECH 795** **Special Topics: Renewable Energy-** Selected topics in engineering technology. Regularly scheduled classroom and laboratory study pertaining to a distinct body of technical knowledge.
- *E TECH 795** **Special Topics: Design for Sustainability-** Selected topics in engineering technology. Regularly scheduled classroom and laboratory study pertaining to a distinct body of technical knowledge.

***MECET 862 Alternative Energy Concepts-** Introduction to energy topics. Includes fossil fuels, nuclear fuels, renewable energy and hydrogen as an energy source. Environmental impacts of energy technologies. Resource availability.

Environmental Safety Technology

EST 215 Intro to Environmental Compliance- Investigate regulatory requirements legislated to protect natural resources specific to air, water and solid waste management. Students will investigate the history, the development, and the implementation of laws, regulations, standards, and practices associated with the preservation of the environment.

EST 101 The Environmental and Safety Industry- Overview of the environmental and safety industry including issues associated with general industry and construction, the environment, and professional organizations designed to introduce good safe practices, reduce injuries and improve our way of life for a better society. Course will include numerous activities to support course objectives.

EST 498 Environmental Safety- Review requirements designed to provide guidance and direction in phases of environmental programs, controls and regulations related to occupational safety and health, environmental, and chemical safety. Students will acquire skills enabling approved identification and control of household and industrial chemical hazards, monitor and administer hazardous waste disposal programs, while ensuring EPA and State compliance.

EST 505 Water Quality and Solid Waste Management- Explore requirements designed to protect natural resources specific to water quality and the impacts of waste associated with natural and industrial settings. Students will investigate current compliance standards, technology developed to mitigate the influence of residential, commercial, and industrial influences on the environment.

EST 605 Special Topics: Environment & Safety- Selected topics in safety or environmental issues. Regularly scheduled classroom and laboratory studies pertaining to a distinct body of knowledge. May be repeated with different subject matter.

Health, Human Performance and Recreation

REC 240 Intro to Therapeutic Recreation- Theoretical, philosophical and historical foundation of therapeutic recreation and a survey of the major services and settings for the ill and handicapped.

History, Philosophy and Social Sciences

GEOG 302 Environmental Geography- The physical geography of the Earth and the interface between human activity and the environment. Topics include ecosystems and the bioclimatic environment, resources and energy generation, atmospheric structure and air pollution, the hydrologic environment, land use and pollution.

- GEOG 502** **Global Environmental Change-** The physical dimensions and the human causes and consequences of global environmental change, including air pollution and the enhanced Greenhouse Effect, ozone depletion, deforestation and land degradation.
- PHIL 114** **Environmental Ethics-** Major theories of moral obligation and justice and their application to the environment and environmental issues. This course philosophically investigates ethical issues that arise from the use and exploitation of the environment, such as the value of biodiversity, obligations to future generations, obligations to non-humans, and the ethics of environmental risk management.
- POLS 512** **Environmental Politics-** Analysis of historical and contemporary concerns and values relating to environmental protection and natural resource management and their manifestation into political movements and policy.
- SOC 443** **Race and Ethnic Relations-** Comparative examination of racial and ethnic groups, with special attention given to the concept of race; the nature and causes of racial-ethnic inequalities; prejudice and discrimination, and racially motivated violence.

Sustainability, Society and Resource Management

- SSRM 200** **Intro to Sustainability, Society and Resource Management-** An overview of the SSRM major as an integrated studies program. This is a joint initiative between the departments of Biology, Geography and Communication. Sustainability allows companies to increase profits, manage risks, and to engage many stakeholder groups, such as employees, the local community, and stockholders. In doing so, organizations are able to operate more efficiently, improve corporate reputations and corporate relations, and have a more positive impact on their local and regional communities.
- SSRM 600** **Senior Seminar in SSRM-** A required capstone course that serves as the platform for the application of sustainability knowledge and theory in an interdisciplinary context. This is a joint initiative between the departments of Biology, Geography and Communication.

Courses That Include Sustainability

Anthropology

- ANTH 301** **Food and Culture-** Food is more than just nutrition; in every culture, past and present, food is central to building and maintaining economic and political systems, social relationships among family members and between friends and enemies, religious taboos, ethnic identities, and gender norms. The trade in food stuff is at the heart of colonization and globalization, the lack of food at the heart of labor migrations and the horrors of malnutrition and starvation. The science of food drives biogenetic engineering to either profit for some or life for many. In this course, we will examine these issues, ranging from seemingly universal meals (think stew!) to mass-produced

hamburgers, counting the human, animal, and environmental costs of each, and maybe even sharing a few recipes.

Automotive Technology

- AT 519** **Mobile Fuels, Lubricants, Alternate Fuels-** Covers the production, distributions, testing, and use of mobile fuels, lubricants, and alternate fuels in the transportation industry. Environmental issues related to these fuels are addressed in the course.
- AT 679** **Future Power for Auto Tech-** Advanced automotive technologies including gasoline and diesel electronic hybrid propulsion, repair, safety and high voltage systems, battery systems, alternative fuels, and fuel cells.

Biology

- BIOL 111** **General Biology-** Designed to acquaint the student with the fundamental principles and processes of life as found in animals and plants and their relation to the everyday life of man.
- BIOL 330** **Principles of Ecology-** The theories which form our basic concepts of ecosystems. Abiotic, individual, species, population, community and ecosystem perspective of living systems. Human ecosystems and man as a member of natural systems.
- BIOL 212** **Principles of Biology II-** A continuation of Principles in Biology including principles of science, basic chemistry, origin of life, cell biology, genetics, viruses, prokaryote life, evolution, systematics, biology of protista, fungi, plants, and animals.
- BIOL 304** **Soil Ecology-** Fundamental chemical, physical, and biological properties of soils, their formation, fertility, and management.
- BIOL 382** **Plant Diversity-** An overview of the major groups of plants with emphasis on morphological characteristics, evolution and distribution.
- BIOL 537** **Regional Natural History-** Classification, identification, ecology, and collection techniques emphasized in the survey of regional flora, fauna, and geological features.
- BIOL 634** **Fisheries Management-** Lecture, laboratory and field. Fish population dynamics, methods of assessment and techniques for management of fisheries. Includes an actual field problem.
- BIOL 639** **Terrestrial Field Ecology-** ecture, laboratory and field. Field techniques used to determine community structure and population dynamics in terrestrial systems. Purpose of ecological assessment, design of projects, sampling, data exploration, analysis, interpretation and reporting. Addresses environmental consulting and scientific research projects.

Communication

- COMM 450** **Small Group Communication-** Analysis of communication behavior in the small group, with emphasis on small group theory, research, and application to specific forms of group discussion. Students have the opportunity to complete sustainability related research and application projects.
- COMM 601** **Intercultural Communication-** Exploration of cultural foundations of values, perceptions and behaviors as they relate to communication across cultures.
- COMM 730** **Interpersonal Communication-** Advanced survey course in interpersonal communication theory. Application of communication theory to professional and interpersonal situations. Students have the opportunity to complete class project related to sustainability issues.
- COMM 755** **Organizational Communication-** Structure and function of communication in organizations, with emphasis on concepts and theoretic principles needed for effective management of organizational communication processes. Review of specific techniques designed to facilitate effective organizational management. *Students have* the opportunity to learning how to effectively communicate sustainability concepts in an organizational setting.
- COMM 785** **International Communication-** An examination of the role of communications in national development, and of the flow of news and information, entertainment, advertising, and other cultural products.

School of Construction

- CMCET 234** **Construction Industry-** Overview of construction as a profession and of the construction industry including NCCER core curriculum topics, types of construction, professional organizations, contract delivery systems, ethics, communication, Sustainability and software applications within construction.
- CMCET 330** **Mechanical Systems-** Design, installation and operation of HVAC systems, materials and equipment in residential and commercial construction. Includes design projects, blueprint reading, energy efficiency, sustainability and quantification of labor and material units for productivity and cost estimation.
- CMCET 331** **Electrical Systems-** Design, installation and operation of materials and equipment in electrical power/lighting systems for residential and commercial construction. Includes design projects, construction drawing review, labor and material estimating, computer based design, energy conservation, alternative energy and 3D modeling.
- CMCET 690** **Professional Construction Certification-** Preparation for professional certification in the construction industry. Registration for and participation in the American Institute of Constructors CQE Level I (Associate Constructor) examination is required during the semester of enrollment. Meets USGBC requirements for Green Associate exam preparation. SWPPP topics. Prerequisite: Senior standing. Permission of instructor is required.

English

- ENGL 566 American Theme - American Environmental Literature-** A broad study of representative works in a single genre--novel, poetry, drama, short story, or non-fiction--from all major literary periods. May be repeated if genre varies.

Engineering Technology

- *ETECH 805 Current Issues in Engineering Technology- Study of trends influencing engineering technology, including sustainability.** Study of specific activities/topics/trends impacting the various engineering technology disciplines. Case studies and current innovation emphasis.

Environmental Safety Technology

- EST 516 Hazardous Materials-**OSHA, EPA, and DOT guidelines for the proper storage, handling, and transporting of hazardous materials. Successful completion may result in either an 8-hour, 24-hour, or 40 hour HAZWOPER certification.
- EST 614 Environmental and Safety Program Development-** Examine requirements of environmental and safety programs and how to incorporate into an organization's efforts. Students will review developed programs and create their own, which will offer knowledge that can be immediately used upon going into the environmental or safety profession.

Family and Consumer Sciences

- FCS 230 Consumer Education & Personal Finance-** Lecture. Concepts include economic and foundations including sustainability; consumer ethics including , decision making, and protection; fraud; identity theft; and advertising. Personal finance topics include money management, banking basics, consumer credit, credit regulation and mortgage finance legislation. General Education course.
- FCS 430 Family Resource Management-** Lecture. Management processes, techniques including sustainability, technologies and resources essential to managing today's home environment.

Health, Human Performance and Recreation

- HHP 150 Lifetime Fitness-** Basic concepts for the development and maintenance of physical fitness. Concepts are cardiovascular fitness, weight control, nutrition, strength, flexibility, etc. Fitness assessment and exercise prescription included. Sustainability is included by assisting students to develop a perspective of themselves as part of an interconnected world.
- *HHPR 826 Sport and Leisure Facility Development and Operation-** A course on design principles for people in the sport and leisure field. Emphasis will be on the design, construction, and maintenance of sport and leisure facilities including park areas,

playgrounds, gymnasiums, golf courses, and athletic fields. The course includes design and implementing sustainable solutions in sport and leisure facilities.

- REC 276** **International Field Studies-** An international experience where students provide recreation programs, teach skills or train others to provide services related to recreation, wellness, physical education or therapeutic recreation. Experiential learning using journaling, discussion and other reflective methods of learning. Sustainability as part of experiential learning is available.
- REC 435** **Design/Maintenance of Rec Facilities-** Design principles for large park areas, playgrounds, gymnasiums, athletic fields, and other recreation venues. Includes implementing sustainable solutions in recreation facilities.
- REC 438** **Issues in Recreation-** Current trends and issues (including sustainability) in the administration and management of recreation and leisure services in public, private and commercial settings.

History, Philosophy and Social Sciences

- GEOG 304** **Human Geography-** Study of the Earth's human landscapes and the cultural, economic, political and environmental processes that shaped them with an emphasis on understanding how culture and cultural patterns have developed, particularly under the influence of changing economic and political conditions.
- GEOG 507** **Geography of the Global Economy-** Introduction to the location and differentiation of economic activities in today's global society. Globalization and its effects on both developed and developing countries. The relationship between human geography and its effect on the environment is discussed.
- GEOG 401** **Urban & Regional Planning-** The nature and components of public planning (including sustainability) at the sub-state level in North America. Planning for cities, counties, towns and other units of local government.
- GEOG 300** **Elements of Geography-** Physical, environmental and cultural elements of the Earth. Introduction to the spatial nature of geography in a variety of different contexts. Recommended geography course selection for elementary education majors.
- GEOG 602** **Service Learning in Sustainability-** Supervised work experience related to sustainability. A minimum of 20 contact hours are required for each credit hour.
- GEOG 603** **Service Learning in GIS Laboratory-** Supervised work experience related to GIS applications. (There is opportunity to include sustainability aspects in GIS) A minimum of 20 contact hours are required for each credit hour.
- JUST 104** **Intro to the Justice System-** Roles of law enforcement personnel, the courts, and correctional agencies. Philosophical and theoretical views in historical perspective. (Includes social justice aspect of sustainability.)

- JUST 109** **Principles of Justice Studies-** The nature of justice, how justice is linked to power, ideology, social control, social change. Generative themes in various dimensions of justice such as social and economic justice, gender, race and criminal justice.(Includes social justice aspect of sustainability.)
- JUST 223** **Basic Interviewing and Counseling Skills-** The role and purpose of accepted interviewing techniques and their application to counseling, interrogation, and other social situations. (Includes social justice aspect of sustainability.)
- JUST 322** **Ethics and Justice Policy-** Ethical theories and their application to principles of justice, law, and social policies. (Includes social justice aspect of sustainability.)
- JUST 328** **Police and Justice-** Objectives, strategies, programs, institutional arrangements, roles, perspectives, and interagency relationships of police. (Includes social justice aspect of sustainability.)
- JUST 475** **Community Policing-** The development of community and problem-solving policing. Emphasis is placed on the critical issues in community policing, especially the patterns of interaction between police and the public.
- JUST 480** **Women, Crime, and Justice-**A historical examination of social, economic, and legal factors that have defined violence against women, violence by women, and the role of women in the justice professions.
- JUST 500** **Criminal Law and Society-**Criminal process and constitutional and legal problems associated with arrest, search and seizure, and due process of law. Criminal liability and crimes against persons, property, and society; governmental sanctions of individual conduct as formulated by legislatures and the courts.
- JUST 502** **Criminal Profiling-** The dynamics of human behavior as related to criminal activity. Utilizing sociological, psychological, and criminological theories, the course focuses on the analysis of the crime scene and the various characteristics of the offenders revealed by that analysis. Discusses in detail strategies employed by the FBI and state and local profilers.
- JUST 591** **Native American Sovereignty & the Law-** Use of Native American case law to explore the dynamics of Indian sovereignty from the Doctrine of Discovery in the 16th century to contemporary politics of tribal self-determination, including federal Indian law cases and the Wounded Knee trials.
- POLS 609** **Administrative Law-** A comprehensive study of public law standards that shape decision-making in U.S. regulatory agencies. Focus on rule-making, enforcement, and adjudication. Study of decision-making in U.S. regulatory agencies that may influence environmental *laws*.
- POLS 616** **Interest Groups and Social Movements-** Examination of various groups attempting to influence governmental policy, their form, function, and method. Prerequisite: POLS 101 U.S. Politics or POLS 320 Introduction to Political Science.

- POLS 630** **International Political Economy-** Examination of the interdependent relationships between government, politics, and economics, and among the countries and economies of the world.
- SOC 100** **Intro to Sociology-** An introduction to the study of human society by using basic sociological concepts including sustainability concepts: poverty, human rights, and well-being of society.
- SOC 220** **Social Problems-** An intensive study of selected major current social problems including sustainability concepts: poverty, human rights, and well-being of society.
- SOC 360** **Community Sociology-** A study of the forces and agencies which determine the nature of the organization of the community. Investigations into local community problems may be used to implement the understanding of the community including sustainability.
- SOC 512** **Social Stratification-** A study of the factors which account for differences in influence, power, and social prestige held by different individuals and groups in the community and the society.
- SOC 527** **Correctional Systems-** A critical examination of existing and alternative systems for the control and rehabilitation of persons processed by the juvenile and criminal courts. Includes human rights, in proportionate incarceration and other sustainability issues.
- SOC 547** **Criminology-** Analysis of the social phenomenon of crime, examining the definition, causation, incidence, social control and treatment of criminal behavior in human society, with special emphasis on contemporary issues in criminology.
- SOC 548** **Juvenile Delinquency-** Examination of current knowledge about causation, prevention and effective treatment of juvenile delinquency. Includes evaluation of contemporary prevention and control systems, including juvenile courts, diversion programs, institutional care and community based treatment methods.
- SOC 633** **Women, Men, & Society-** An intensive examination of gender differences; the meaning of masculinity and femininity; the relationship between men and women; and the nature and causes of gender inequality.
- SOC 676** **Global Sociology-** Comparative analysis of the Global Political Economy and the effects of globalization. Includes economic, political, sustainability and cultural analysis of ethnicity and social and economic development.
- SWK 201** **Intro to Social Work-** History, development, and philosophy of social welfare as an institutional system in our society--its organization, function and prospective developments. Exploration of the profession's role within the system and its relationship to other helping professions. Designed to assist the student in his/her exploration of social work as career choice.
- SWK 221** **Basic Helping Skills-** The skillful use of self in a professional to promote client engagement and effectiveness in a planned change effort.

- SWK 340** **Social Work w/ Families & Children-** The emphasis of this course is on theoretically guided and evidence based social work practice with children and families. The course introduces students to the requisite principles, methods, and theories for effective practice in the area of social work with children and families.
- SWK 341** **Social Work & the Aged-** Social work and social welfare policies, services and interventive processes are studied with reference to the needs of older Americans.
- SWK 342** **Health Care & Social Work-** Policies, services, and interventive processes related to medical and health care settings.
- SWK 343** **Social Work w/ Families Affected by Disability-** A study of theory, research, and best practices related to family-professional partnerships with families affected by disabilities.
- SWK 344** **Mental Health Theory & Practice-** Policies, services and interventive processes in mental health and retardation settings.
- SWK 365** **Social Process & Social Policy-** An analysis of the probable origins of major social problems and the social policies (historical, current, and proposed) that have been offered to address them. The influence of societal values on definitions of social problems. Provides a context for social work practice.
- SWK 399** **Social Work & the Court Process-** Focuses on the documentation, court preparation, and testifying in child and adult abuse cases. The course will examine evidentiary rules, court procedures and methods of presenting effective testimony related to abuse and neglect.
- SWK 420** **Advanced Social Work Practice I-** The integration and application of social work knowledge, values, and skills to intervention at various systemic levels, with an emphasis on assessment within a generalist framework. Social work with individuals and families and case management receive special attention.
- SWK 465** **Social Welfare Policy Analysis-** A continuation of SWK 365 Social Process and Social Policy. Analysis of social welfare policies and the assumptions underlying their development. Analytical models are introduced. The process of policy development and prevention/remediation issues are examined.

Mathematics

MATH 133 **Quantitative Reasoning-**Designed for the students NOT planning to major in a field that requires advanced mathematical skills. Prepares students for the mathematics encountered in other college courses that use quantitative reasoning. Emphasis on developing critical thinking and quantitative reasoning skills needed to understand major issues in society such as sustainability.

Nursing

NURS 405 Gerontological Nursing- Three credit hours total. Two hours theory and one credit hour is clinical which is equivalent to three clock hours of clinical per week for a total of 48 hours. Promotes successful healthy aging while addressing the physical, psychosocial, and spiritual needs of older adults utilizing a holistic framework. Covers living safely in one's environment, economic considerations, and international perspectives.

Physics

PHYS 171 Physical Science- The principles of mechanics, electricity and magnetism, atomic science, earth and space science. Includes discussion of global temperature and the earth's atmosphere.

PHYS 160 Physical Geology- Introduction to minerals and rocks on the earth's surface and interior; dynamic geological processes, including plate tectonics, volcanism, orogeny, glaciation, weathering, and erosion.

PHYS 166 Meteorology- A descriptive survey of atmospheric science integrating the concepts of weather patterns, climate, atmospheric composition and structure, pressure, wind, and impact of pollution.

Psychology

PSYCH 389 Research Methods I- Study of elementary descriptive and inferential statistics employed in behavioral sciences research, including an introduction to research methodology. Research applications may include a sustainability-related topic.

PSYCH 392 Research Methods II- Study of research designs and their applications, specific to broad methodological issues, research ethics, and the interpretation of research findings. Research applications may include a sustainability-related topic.

PSYCH 394 Principles of Learning- Overview of the basic principles of human and animal learning, focusing on the biological and cognitive bases of behavior acquisition and the processes of learning. Observes how learning influences human behavior, including behaviors that may allow humans to live more sustainably.

PSYCH 691 Evolutionary Psychology- A survey of how the basic principles of natural selection and sexual selection govern behavior and mental processes. A major focus will be research findings that describe how evolutionary processes apply to behavior including human behavior and mental processes. Examines how psychology has been influenced by human relationships to the environment throughout time.

PSYCH 724 Physiological Psychology- Relationships between various body systems and behavior with special emphasis on latest relevant empirical data. Laboratory experiences will be included. Relationships between body systems and behavior. May help understand sustainable thinking and decision-making.

***PSYCH 830 Psychology of Learning-** Theoretical foundations of learning including conditioning, cognitive, and social approaches. Application of these theories to the basic problems encountered in education and psychology. Observes how learning influences human behavior, including behaviors that may allow humans to live more sustainably.

Teaching and Leadership

***TCHL 832 Elementary School Science-** Designed to assist K-8 teachers to analyze and synthesize contemporary issues in science education including sustainability. Hands-on activities will be utilized to assist the teacher in implementing the science knowledge base.

***TCHL-851: Multicultural Approaches to Diversity in the Classroom-** The course is designed for the practitioner to build an in-depth awareness of and sensitivity to the concepts and goals of multicultural education, with a focus on the special needs learners. The course discusses the diverse, historical tapestry of cultures that make up the US and the role language play in cultural identity and emphasizes practitioner application of fundamental diversity concepts in instructional settings.

Sustainability-Related Research

Dr. Ram Gupta: Novel Renewable Polyols Based on Limonene for Rigid Polyurethane Foams

Dr. Ram Gupta: Synthesis of a Novel Limonene Based Mannich Polyol for Rigid Polyurethane Foams

Drs. Ram Gupta, Pawan Kahol, Peter Dvornic: Development of energy storage devices using bio-waste

Drs. Ram Gupta, Pawan Kahol, Peter Dvornic: Synthesis of electro-catalyst for hydrogen production using bio-renewable resources

Trent Lindbloom: NSF Grant – Hybrid Future Power Technology

Bob Schroer: NSF Grant – Advanced Vehicle Systems – Compressed Natural Gas

Marilyn Dishman-Horst: Director of Poverty Center

Alice Sagehorn, Jean Dockers, M. Dishman-Horst: Bright Futures

Tim Bailey: Mining in region; urban planning

Catherine Hooey: Mining in region; land use changes in Canada farms

Kathleen Cameron: Human Rights; Violence against Women

Browyn Conrad: Women Rights; Promise Keepers

Mark Peterson: Mass Movements in the US; Vietnam

Darren Botello-Samson: Environmental Regulation and Politics

Kristen Humphrey: Disability; Poverty

Hyun Jong Kim: North Asia; GIS

Jim McBain: Ethics; Epistemology

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