Sustainability in Education PSC Sub-Committee

2030 OBJECTIVE: Increase sustainability throughout academic curricular and co-curricular programming at PCC in collaboration with the PCC Curriculum Office, the Learning Assessment Council (LAC) and other PCC entities.

2016 ACTION ITEMS:

- Implement the Sustainability Practices and Academic Resources for Curriculum (SPARC) Council's "7 Green Outcomes" into current and newly development courses at PCC;
- Design and implement a search capability through Courseleaf to easily identify courses with green content;
- Continue development of distinguishing "focused" courses and and "related" courses parallel with AASHE STARS reporting;
- Provide continued support to faculty in curriculum development to ensure the creation of new or revised sustainability courses at PCC;
- Award the Sustainability Focus Award to students who have completed coursework with a sustainability focus;
- Support professional development and capacity building related to sustainability curriculum for faculty;
- Build sustainability into student, faculty and staff orientations to support curriculum initiatives at the college;
- Design a sustainability curriculum packet to include in materials for various faculty orientations;
- Collaborate with the LAC in assessment strategies and examples through the addition of the "7 Green Outcomes" to CCOGs; and
- Through PCC's Core Outcome #2, create collaborations with the Internationalization Committee, the Diversity Council, the Service-Learning program and community partners to address global environmental awareness, environmental justice, social equity, and food security in sustainability curriculum.

A Building Contruction Technology student gets hands-on experience in the outdoor lab.

2030 OBJECTIVE: Increase focused educational programs and options to meet green workforce needs.

2016 ACTION ITEMS:

- Explore the development of an academic Sustainable Agriculture Program;
- Explore offering LEED certification education and establish partners with businesses working in this field; and
- Explore new opportunities to create focused educational programs in coordination with the State of Oregon 40-40-20 Initiative and the US Science, Technology, Engineering and Mathematic (STEM) movement.

SUSTAINABILITY IN EDUCATION NARRATIVE

PCC prides itself on being an accessible and affordable higher education institution. By providing this education, the college has six core outcomes that graduates should be able to demonstrate. As PCC students take various courses and pursue their academic pursuits, one of the core outcomes in their educational experiences is to be more aware of environmental issues and understand their role and place in a global context, as expressed in PCC's Core Outcome #2 "Community and Environmental Responsibility." Graduates are expected to be able to apply scientific, cultural and political perspectives to natural and social systems and use an understanding of social change and social action to address the consequences of local and global human activity.

To help guide PCC's sustainability and green technology curricular activities, the PCC Cabinet established a district-wide academic sustainability committee, SPARC, in 2009. Members include staff, administrators, and instructors from across the disciplines. The committee regularly meets each term with a rotating chair position.

SPARC is guided by the college's Climate Action Plan and PCC's Core Outcome #2. SPARC supports the creation of college initiatives to broaden the curriculum with sustainability and leads the efforts to support faculty in the development of that curriculum. SPARC works collaboratively with the college's curriculum office, as well as the grant's office and community education. SPARC is charged to:

- Support the design and development of sustainability curricula;
- Maintain an historical record of PCC's efforts in green technologies; and
- Coordinate potential grant efforts for new curricula development and other efforts;
- Maintain a historical record of PCC's efforts in green technologies; and
- Serve as an advisory board to faculty for sustainability-related academic, curricular and program development.

In addition to offering sustainability courses, PCC has many partnerships with local businesses and organizations to provide workforce training for green jobs.

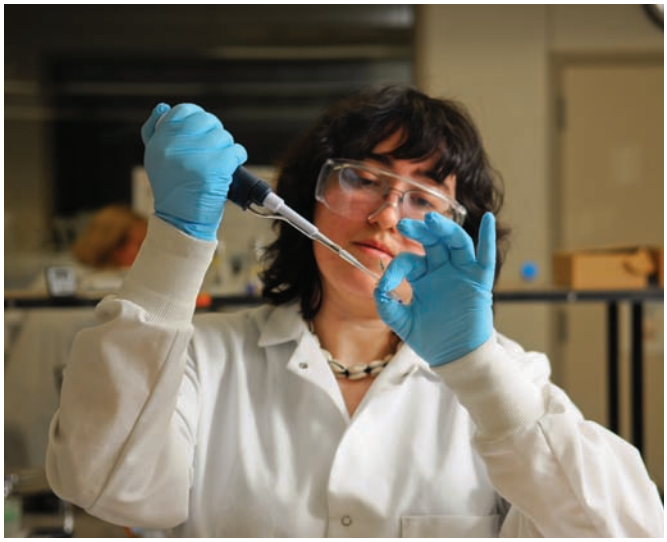
SPARC developed the following **"7 Green Outcomes"** to guide the development and approval of new sustainability curricula in any PCC discipline:

i. 1) Critically examine the complex and interconnected relationship between human behavior and the environment through a lens of sustainability and "the triple bottom line" - people, planet and profit.

ii. 2) Critically evaluate the root causes of environmental problems, including historical, cultural, ethical, political, economic, social, structural, and/or infrastructural issues, in order to recommend, implement and/or engage in problem-solving to address the challenges and opportunities of promoting sustainable development.

iii. 3) Examine existing and alternative resource use and identify quantitative or qualitative processes to educate and provide services to prevent, reduce, or mitigate environmental degradation and increase resource and energy efficiency.

A Bioscience student developing her skills in the on-campus lab.



iv. 4) Express the significance of environmental sustainability in written, oral, artistic, physical, and/or mechanical forms.

v. 5) Use an awareness of the impacts of ecological issues and policies on communities of diverse backgrounds, on the local, regional, national, and international level, in order to interact with sensitivity, respect, and a sense of responsibility to others and the future.

vi. 6) Apply sustainable practices in the workplace and communities, as citizens, and/or in the development of public policy.

vii. 7) Apply an understanding of basic ecological principles (the interconnectedness of organisms to each other and their environment) to environmental problems and sustainability issues.

To further support and encourage the development of new sustainability curricula across the college, the **SPARC Council has sponsored and organized 2 PCC Faculty Sustainability Curriculum Workshops**. In 2011, 25 PCC Faculty participated in the 1st workshop with presentations highlighting sustainability resources and practices from Food Services, Engineering, Business, Sociology, Environmental Sciences and the LAC. In 2013, 32 PCC Faculty participated in "The PCC Project: Sustainability Across the Curriculum," with speakers from Portland State University, Evergreen College's Bioregional Sustainability Curriculum Project, the Piedmont/Ponderosa project (national model) and University of Oregon. Participants are encouraged to complete a sustainability curriculum plan for a new or revised course and to meet in the 2013 Fall term to track curriculum development progress.

In addition ot offering sustainability courses, PCC has many partnerships with local businesses and organizations to provide workforce training for green jobs. The development of green curriculum at PCC was catalogued by an engineering faculty for the State of Oregon's Community College Workforce Development. The Green Training Performance System project catalogued all green-related credit and non-credit courses at PCC from 2009, 2010 and 2011.

SUSTAINABILITY IN EDUCATION CURRICULA ACCOMPLISHMENTS

In support of PCC's Core Outcome #2 and goals from the 2009 Climate Action Plan, the following section outlines the efforts of numerous PCC Departments to develop and implement sustainability curricula.

Architecture

This two-year degree (A.A.S.) develops design and technical skills needed for a career in Residential or Home Design. Skill sets developed are also applicable to working with architects as a Drafter. The broad based curriculum emphasizes technical skills as related to construction documentation, building systems and codes, sustainable design principles, and CAD.

Sustainable design and construction concepts are embedded in all applicable courses, including Design, Building Systems, and Residential Codes. Sustainable content includes energy efficient design and analysis, passive solar design, sustainable materials analysis and selection, daylight design, alternative energy sources, water harvesting concepts, and embodied energy and cost benefit analysis.

The Sustainable Building Certificate builds on the Architectural program by combining additional coursework in sustainable design, products, materials, and construction with environmental science, sociology and ethics. These courses add both depth and breadth in the area of sustainability, and are taught by highly qualified instructors from the fields of architecture, and construction, who have specialized training in sustainable design practices.

Interior Design

Students of Interior Design at Portland Community College are concerned with creating interior environments which support and enhance the lives of their clients. Our students learn to develop a methodology of programming for client needs that encompasses aesthetics, sustainable design practices, design history, color, light, furniture, and kitchen/bath design for residential remodels. Students attain a commitment to incorporate energy saving strategies, healthy indoor air quality, resource conservation and waste reduction within the study of residential interior design.

Automotive – Alternative Fuels

Automotive service technicians inspect, test, diagnose, repair and supervise the repair of mechanical and electrical systems on hybrid and electric automobiles and light trucks. Other responsibilities may include accounting, record keeping, sales, customer relations and management.

Science

The sciences (Biology, Chemistry, Environmental Studies and Resources, Geology and Physics) are involved in solving some of the most pressing environmental problems facing our society today, such as medical issues, dwindling energy resources and the need for new and better materials and worldwide food shortages.

Civil/Mechanical Engineering Technology

Civil Engineering Technology graduates help design better bridges, keep our drinking water safe, or prevent industrial pollution. Mechanical Engineering students learn to use math, science and communications to solve real life problems in climate control systems, manufacturing, and improving energy efficiency. Civil and Mechanical Engineering courses are included in the EET Renewable Energy Systems option.

Electronic Engineering Technology— Renewable Energy Systems

The Renewable Energy Systems (RES) training prepares technicians for solar power, wind power, fuel cell and other renewable energy fields. Graduates of this degree can be hired to work as technicians in wind manufacturing/servicing areas, solar manufacturing and installation, as well as fuel cell manufacturing. Graduates can also assist engineers with solar systems design projects or projects in many other renewable energy areas.

Automotive studetns work in lab together.

Micro Electronics Engineering Technology – Options in Solar Manufacturing

This program allows students to enter the world of solar cell (photovoltaic) manufacturing, providing the opportunity to learn the entire process of fabrication, metrology, testing and quality control. AAS students will learn to maintain and repair the complex, automated equipment used in producing the cells.

Engineering

Portland Community College offers freshman and sophomore courses in chemical, civil, computer, electrical, environmental, industrial, manufacturing and mechanical engineering tailored to the needs of students transferring to several university programs. Engineering classes are also integrated into some of the new PCC Green Technology options.

Building Construction

This program is designed to help students develop the technical qualifications and life skills needed to enter the construction industry, as well as to help those currently in the construction trades upgrade and learn new skills. Options include Residential Construction, Design/Build Remodeling and Construction Management. A requirement of all three options is BCT 206 Sustainable Construction Practices. Other sustainable or "Green Building" classes such as Alternative Building Design and Construction, Residential Green Roofing and Building Science are offered as electives, and sustainable & energy efficient building practices are a thread running through all of the construction classes.

Facilities Maintenance

In the Facilities Maintenance Technology (FMT) and Industrial Technology (IT) programs, students learn the skills and concepts necessary to install, operate, maintain and repair piping and mechanical systems in residential, large commercial, medical, institutional and industrial buildings. Sustainable and eco-healthy green building practices are incorporated throughout facilities classes. Students also learn troubleshooting skills, problem-solving methods and electrical concepts, which are critical to large employers. Building Commissioning is followed by classes such as: Air Quality for the Indoors, Smart Building Controls, Building Power Cost Management, Solar Electric Panel Sizing, Installation of Photovoltaic Panels, and Commissioning of a Solar Electric System. All of these courses are over 70% hands-on and taught by veteran technicians in their fields.

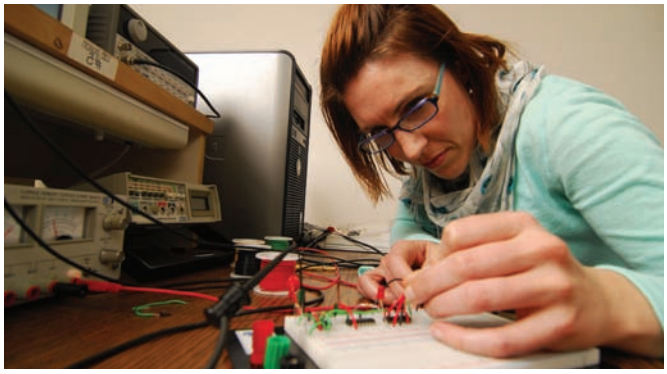
Landscape Technology

PCC's Landscaping Technology program offers courses in biology, horticulture, mathematics, and landscape knowledge, providing students with basic skills and a solid foundation. An Environmental Landscape Technician Degree will be offered in fall 2013 with courses in Sustainable Landscapes, Permaculture, Sustainable Construction Technology II, and Sustainable Grading and Drainage.

This program has one of the best classrooms available: the Pacific Northwest. Not only is the program situated on the beautiful Rock Creek Campus, nestled in the Willamette Valley between the Coast Range and the Cascades, but it also has a large greenhouse and growing facility. Vast resources allow students to develop a broad background of skills in landscaping and horticulture, and to earn specialized certificates.

Community Education

A wide array of non-credit Green Living courses are offered in water conservation, wind power, green home remodeling, green landscape design, the electric vehicle, and Do It Yourself "upcycling." These community education courses help community members save money, conserve resources, and build skills while enhancing their environmental awareness.



Above: A student works in the Microelectronics lab.

Left: The Sylvania campus greenhouse, in full bloom.