

CCASE Handbook

Chapter 2: Sustainability Curriculum: 3 Models for Transformation

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This chapter contains information and advice for building capacity and creating conditions for sustainability curricula to emerge. Creative variety spans hundreds of community colleges endeavoring to transform their curricula in both liberal arts and Career and Technical Education (CTE). How do community colleges prepare students for sustainability-related careers? How do we help students transfer to 4-year partner universities? What are the guidelines across states, industries, and levels? What are the minimum qualifications and how do we best train faculty to teach sustainability?

Most sustainability across the curriculum initiatives are started by one or two individuals who have the foresight, determination and opportunity to actualize curricula in this emerging field. But institutions often lack coherent approaches, and procedural obstacles for introducing new courses or programs can exhaust the drivers.

Once colleges begin to develop sustainability curricula, Professional Development must soon follow, since learning to design and teach sustainability courses means learning to weave this new content into existing areas of expertise across disciplines. It is ultimately about transforming the curriculum and it changes the instructor: the way they think and teach will begin to shift. Later chapters will introduce models for Professional Development in Sustainability Curriculum as well as assessment methodologies to ensure improvement.

The goal of this chapter is to help curriculum designers and initiative champions get more colleagues around the table to buy into curricular transformation. Having a plan and learning from what works and doesn't work at other colleges can help. One of the first ideas that will pop up might be something like "how about we develop some modules that all instructors can use?" While that sounds efficient, and could be a way of getting the faculty user to explore ways in which sustainability material relates to his/her own discipline, it usually doesn't work because the accompanying transformation is not supported. You can't just stick it in without doing the complex work of acquiring sustainability knowledge.

Another helpful first step is to get the lay of the land on your campus: How is curriculum developed? Where do the rules come from? What are the state standards? Who tracks the meeting of general education requirements? Get to know the leaders on your campus to find out what mechanisms are most amenable.

This section is a case study from Bristol Community College www.bristolcc.edu. We offer this example of how one community college has developed various sustainability

curricula, and we invite readers to submit how YOUR college has done sustainability curricula. [CAMPUS CASE STUDY QUESTIONNAIRE.](#)

Link to 12 Faculty Course syllabus

https://docs.wixstatic.com/ugd/3270ef_0b6e05d07286405eb40c4aa7fc659098.pdf

ACTION/APPROACH

There are three main models for sustainability curricula that work at community colleges: infusion, new courses, and new programs. The methods used depend on the character and possibilities within each institution.

1. INFUSION

Infusion refers to sustainability material being woven throughout an academic educational experience. Infusion can take place within a course; throughout a major, certificate program or non-credit training; or across the entire college curricula. This method is usually faculty-driven and usually includes supported professional development and/or incentives for faculty. Infusion also can be student driven, like an Honors or Service-Learning option. Infusion is most often applied within a course. The infusion model works well at community colleges with articulation and transfer agreements with a four-year college since new transfer-level courses or programs have to be designed to articulate to a four-year program.

PROS: At the course level, infusion requires that the subject matter of an existing offering becomes transformed so that traditional subject matter incorporates current ecological realities throughout the course. It can be implemented and piloted quickly since the change is with the instructor. Infusion requires the instructor to delve into sustainability knowledge and to redesign her/his course.

Infusion invites the instructor to engage in a deep exploration and understanding of the issues comprising sustainability. Furthermore, in so doing, it encourages the instructor to explore the paradigm shift from a "growth-driven society" to a degrowth paradigm and to its numerous implications.

CONS: Infusion can be labor intensive, not only in getting up to speed with existing knowledge, but in keeping up with the latest information and new developments in this emerging and evolving field.

Institutional support in the form of release time is most optimal to allow instructors the opportunity to become knowledgeable about sustainability and to explore ways in which this knowledge can be intertwined with traditional subject matter. However, constrained college budgets combined with already over-worked faculty often means that no release time is available, thus requiring the instructor to carve out time from her/his personal schedule to infuse the course. This has been the case in BCC's Hospitality Program.

Example of Infusion from Bristol Community College:

E. Jon Bjornson, head of BCC's Hospitality Program, illustrates a successful model in which sustainability education is filtered throughout every program course.

HOS121 – Throughout Introduction to Hospitality, participants discuss how wasting resources occurs in relation to the 15 areas covered in the textbook. Each chapter has a small green section that discusses Sustainability. Students’ final papers are about Sustainability in the Hospitality Industry where by they identify and suggest ways that a local hotel can reduce wasting of resources.

HOS130 – Introduction to Geotourism focuses on local tourism in New Bedford, MA, and Cape Cod with themes of Sustainability woven throughout the course.

HOS132 – Geotourism Management is a continuation of HOS130 and as such also focuses on local tourism and Sustainability efforts that local communities can make.

HOS137 – In Event Planning, participants discuss hosting a “green” event. Using china, crystal and silver will make the event classier; however, they can be tricky at an outdoor event, so how can you use environmentally friendly disposables? NO STYROFOAM!! Participants discuss recycling efforts at the event. Usually, people cooperate with recycling efforts if they see organizers making an attempt to separate paper, glass and plastic.

HOS223 – Convention Sales and Service discusses resource conservation in planning of conventions and how to promote these activities.

HOS224 – Hospitality Sales and Marketing takes the perspective of sustainability and how to market what a hotel company can do to be more sustainable. We discuss the importance of LEED-certified buildings and how hotels that advertise that fact actually draw in customers who are sustainability minded.

In HOS226 – Accommodations and Lodging Management is the Capstone course, so by this time students have been exposed to Sustainability efforts in all the classes. Participants discuss what can be done to promote sustainability, and this is a major focus in their final paper about building a hotel.

HOS231 – Community-Based Tourism is the third course in our Geotourism Certificate program and it again focuses on helping a local tourism entity, similar to an internship. Emphasis is placed on Sustainability efforts.

2. NEW COURSE

New Course: Single Instructor

By “new course” we mean a newly developed course that has content focused entirely on a substantive area within the sustainability field (e.g., Green Engineering; Permaculture Design; Ecoliteracy, Education and Society, Green Business Practices). Most often, a single instructor takes the initiative to develop and teach a new course. Any new sustainability course offering is best integrated into the curriculum if it meets one of the following criteria:

- It is a required course that becomes part of a major or certificate program.
- It is an elective course that meets the requirements of majors and certificate programs.

- It meets General Education requirements.

PROS: While time and labor intensive, developing a new course from scratch can be an exciting and rewarding process, especially when approaching a new subject matter such as sustainability. The new course can become the lightning rod for the development of other new courses - which, in turn, may lead to the institutionalization of an academic concentration or program in sustainability.

CONS: Offering a new course in a non-traditional discipline at a community college can be difficult because many students rely on federal financial aid, which will not pay for a class that does not fit into a degree program. Veterans benefits have similar constraints that must be considered. Thus, it is important when designing a new course to make sure it meets already existing elective requirements (see above.)

An additional factor is that new courses allow the old courses to remain status quo and can draw students away from existing courses, creating competition for enrollment. Or the obverse can occur in which the new course does not sufficiently enroll because it does not readily fit into an established, time-honored program. (This latter case occurred at Bristol Community College in Spring 2018 with its 12-Faculty Sustainability Course. (See below)

New Course: Multi-Faculty and Multi-Disciplinary

Co-teaching a course taught by two or more faculty from different disciplines is not new to academic settings, and certainly this is a mode that can be used in sustainability education, especially if at least one instructor has expertise in sustainability upon which the other instructor(s) can depend to help shape and guide the course. This can be accomplished in a Learning Community (pairing existing courses) or by designing a new multidisciplinary course.

PROS: This approach allows faculty who are interested in developing instructional material in sustainability, but who have little-to-no experience in this emerging field, to develop ideas and practices supported by a sustainability colleague. With guided assistance (suggested literature, websites, films, experts-in-the-field, consults) faculty new to sustainability can begin to put together solid lecture materials, assignments, and activities appropriate to their own discipline. Moreover, once faculty have prepared this material, they tend to introduce it into their other courses.

In addition, a multidisciplinary course allows faculty from differing fields to present their disciplines' sustainability perspective to students who might not ever take a course in that area of study (e.g. a culinary arts major is unlikely to take a course in energy engineering and vice-versa). Thus, students' view of the world, and of sustainability issues, is widened substantially. They see that sustainability thinking is not relegated to one or two areas of study (typically engineering or environmental studies), but rather, it is relevant and applicable to a wide range of fields.

CONS: The administrative requirements of a multidisciplinary, multi-instructor course can be complex. One individual must make sure that the presenting faculty and students have no glitches in doing evaluation assignments; that final course grades are calculated from each faculty's evaluation requirement; that there is relative coherency in the order of presentations; and that faculty get paid. If there are several instructors involved, it is critical that there is a coordinator who has release time to organize and to administer the course. This can be a problem if budget constraints or lack of will on the part of the college administration prohibit release time opportunities.

Example of a New Course: Multi-Faculty and Multi-Disciplinary from Bristol Community College: Sustainability from Different Perspectives – 12 Faculty
Bristol Community College has designed a multi-disciplinal course taught by twelve (12) instructors. Several instructors already have expertise in focusing on sustainability within their fields; others are new to thinking about sustainability and how it relates to their disciplines. Thus far, instructors from Culinary Arts, Engineering-Energy, English-Ecoliteracy, Health Sciences, History, Hospitality Services, Oceanography, Physics, Psychology, Sociology, Sustainable Agriculture, and Water Management have participated in the course with each subject area having a turn at being "the topic of the week." In each class, the participating instructor presents sustainability challenges and solutions from her/his disciplinal perspective. The benefit of this course for new-to-the-topic faculty is that they have to put together material for only one class session, a far less daunting task than developing an entire course that runs for fifteen weeks.

The class meets once a week (Fridays) for 2.5 hours, scheduled to avoid time conflicts with other courses and faculty meetings. Remuneration for the course is divided equally into 15 weeks, with the instructor of each presentation earning 1/15th of the course intake total.

These are the Administrative Tasks for a multi-disciplinary, multi-faculty course:

1. Arrange which instructors will teach the course and establish a title for each presentation.
2. Sequence and set dates for faculty presentations. Try to set dates for presentations so that each subject logically follows the preceding one (e.g. Culinary Arts follows Agriculture).
3. Contact each instructor to set the date s/he has been given and, of course, rework if there is a time conflict. (For example, if the instructor plans to be at a conference the date s/he has been assigned, the administrator must connect with another instructor to exchange dates and to confirm the new dates with each instructor.)
4. Construct the syllabus, including the name of each instructor, her/his presentation subject, the sequenced date of presentation, office number, phone extension and campus e-mail address.

5. After each presentation, each instructor typically gives an out-of-class quiz or assignment to be graded by her/him. It can be set up on-line via IT or can be handed out at the end of the class.

Each instructor is responsible for arranging how s/he will get the quizzes/assignments from the students, doing the grading and arranging for the graded work to be returned to the students.

Students wanting to discuss a particular grade must contact the appropriate instructor during her/his office hours (For example, a student's question about water systems instructed by Robert Rak, or about the quiz/assignment, must be addressed to Robert Rak.)

6. The administrator must get these grades weekly from the instructors so as to be able to calculate the final quiz/assignment score at the end of the semester.
7. Typically, students are assigned a semester project to be presented orally in class at the end of the semester and to be written as a semester paper which is turned into the administrator. The administrator grades this work.
8. Students also typically are required to do a final semester-review paper by considering materials throughout the course, the areas that most impacted their thinking and why, and what they think they ultimately learned by taking this course. The administrator grades this final paper.
9. The administrator submits to the registrar the final grade for each student based on the averaged quiz scores, the end-of-semester project, and the semester-review paper.
10. Typically, the administrator attends all classes, takes part in each class as a "student," and keeps track of materials that have been presented in class. This is critical for doing the final evaluation of each student.
11. Finally, the administrator oversees the running of the course and trouble-shoots any problems.

The syllabus for the 12-Faculty course is provided [HERE](#).

3. NEW PROGRAMS

New programs require much collaboration, cooperation and coordination from faculty and administration alike. New programs may be developed from already existing courses, newly created courses, or from a combination of the two.

PROS: Depending on the department or division of the college in which it is housed, a Sustainability Program may require a good deal of cross-disciplinary buy-in from faculty. It is not only critical that all participants in the new program "have a seat at the table" in deciding what the program will look like, but it is essential to develop a cooperative collegial spirit from the very beginning to insure success of the program. The intellectual

give-and-take of several colleagues around the table can unleash a plethora of ideas and possibilities which can enliven the entire process.

CONS: This process is time consuming and labor intensive. Developing a new program, whether it be for a degree or a certificate, requires buy-in from multiple actors -- several faculty, the curricula development committee, the college administration, the Board of Trustees, and often the State Board of Higher Education -- all of which takes a good deal of cooperation, communication, patience, and time.

Optimally, it requires that at least one individual has release time to initiate the process of faculty participation, begin conceptualizing the program and its rationale, nail down course content, oversee the nitty-gritty details and paper work, guide the program through the curricula committee, negotiate administration and State Board of Higher Education hurdles, and finally, actualize the program. Budget constraints, administrative waffling, personality conflicts, and multiple unanticipated snags can slow the process or undermine it all together. This process requires that at least one faculty member is determined to make it happen and is willing to work above-and-beyond the call of duty!

At Bristol Community College, there are three programs that have been developed specifically as sustainability oriented programs: Green Engineering, Sustainable Agriculture, and, the newest addition, the Liberal Arts/Sustainability Studies Program. All three programs offer Certificates as well as Degrees.

GREEN ENGINEERING

Through a \$900,000 NSF Grant, the Engineering Department "greened" several existing courses as well as created new courses over a five-year period. Today, all the Engineering Technology and Transfer Programs contain material and orientation toward Sustainability.

SUSTAINABLE AGRICULTURE

This program began by four faculty members -- two in Biology, and one each in Water Engineering and Sociology -- meeting numerous times over the course of an academic year to map out the content of a certificate program in Sustainable Agriculture. Once determined, the program was guided through the College Wide Curriculum Committee (CWCC).

While the President of the college was supportive of the program, it raised issues among some key administrators, especially around issues of initial low enrollment and of future employment for graduating students. Our argument centered on the need to localize agriculture in the face of food security disruptions due to climate change events, threats to conventional fossil fuel access, and economic turbulence; therefore, it was necessary to prepare students for emerging employment in sustainable food production within our region as a means to establish food security, especially through urban agriculture, community supported agriculture (CSAs), and value-added production from all types of agricultural schemes.

As enrollment grew and stabilized, its coordinator, Dr. James Corven, expanded the certificate into a degree program, Life Science/Sustainable Agriculture. Originally this program was designated as General Studies/Sustainable Agriculture to fast-track it through the Massachusetts Board of Higher Education. Had it been presented as a unique major (simply Sustainable Agriculture), it most likely either would have taken a very long time for it to be accepted, or it would have died. By connecting Sustainable Agriculture to the already existing program of General Studies, it had a better chance of passing. Even at that, it took several months before being approved.

This program has an articulation agreement with the Agriculture Program at UMASS-Amherst. A student graduating from BCC in its Sustainable Agriculture Program and who has a 3.0 GPA or better can go into the UMASS-Amherst Agriculture Program tuition free. Furthermore, in Massachusetts there is the MA Transfer Agreement Program whereby students graduating from BCC have all their courses transferred to any of the MA State colleges or universities. In this case, BCC's Sustainable Agriculture courses, which include lab work, transfer as lab-science equivalents.

SUSTAINABILITY STUDIES PROGRAM (SSP)

The Sustainability Studies Program is rooted in the Social Sciences. It began by forming a faculty task force comprised of colleagues who, when approached by the coordinator, had expressed an interest in participating in this effort; thus, we were two instructors from Sociology, and one each from Biology, Business, Engineering and Sustainable Agriculture. We met bi-monthly throughout the academic year, pounding out the structure and the general course content for the program. In the end, it was decided that several new courses (see below) must be developed and that students would be required to choose one "cluster" (see below) of three courses from an existing program -- Engineering, Environmental Studies, Health and Health Sciences, Hospitality, Science, Sustainable Agriculture or Water/Water Management. These courses were in addition to the required general education courses (e.g., English, History, Lab Science, etc.).

Because the field of Sustainability Studies from a Social Science base is very new without comparable models, we decided to establish a Liberal Arts Major with a Sustainability Concentration in order to fast track the program through the Massachusetts Board of Higher Education. Even then it was several months before the Board finally approved the SSP.

We are in the process of creating articulation agreements with other colleges and universities for our SSP graduates. In the meantime, they can participate in the MA Transfer Agreement Program (see above).

Below is the content of the new courses developed for the Sustainability Studies Program (SSP) at Bristol Community College:

SUS 101 Sustainability and Humankind's Dilemma: Life on a Tough New Planet

This course focuses on fundamental sustainability crises confronting humankind in the face of climate change, peak oil, resource depletion, species extinction, and societal collapse. Areas covered include social-structural conditions driving ecological overshoot; human threats to natural systems; population and Earth's carrying capacity; globalization, poverty and failing states; environmentally-based national and transnational conflicts; emerging pathogens and diseases; systems analysis of societal complexity and systemic breakdown. Three lecture hours per week. 3 credits Fall

SUS 102 Resilient Sustainability: Preparing for the Future

This course focuses in the multitude of socially-based adaption strategies currently emerging or in existence to meet the numerous sustainability crises facing humankind. Areas of study include the paradigm shift towards sustainable resilience: transitional sustainability movements; the New Urbanism and reconfiguration of the built environment; reinvigoration of community; education for employment in a post-carbon world; post industrialized agriculture and evolving alternative food systems; harnessing renewable energy; strengthening physical health and mental well-being; steady-state elements and the New Economy; bioregionalism and the nation-state; population stabilization and the eradication of poverty; "untrashing" the planet and its vital resources; sustainable conservation and curtailment practices leading to resilience. Three lecture hours per week. 3 credits Spring

> SUS 104

SUS 201 Sustainability, Human Rights, and Climate Justice

This course focuses on the disproportional burdens associated with climate change that experts anticipate will be experienced by poor countries and poor populations, with emphasis on Africa, Asia and Small Island States. Substantive areas include the causes and consequences of uneven development and climate-driven threats and impacts on agriculture and food security; ecosystem goods and services; livelihoods and income generation; health, disease and pandemics; water and energy access; sea-rise and built-environmental infrastructure; sociopolitical destabilization, conflicts and terrorism; involuntary displacement and migration; and gender equity. Particular concerns center on international geo-political relations, global interconnectivity, nations' ethical responsibilities toward the poor in the face of climate crises, and transitional mitigation and adaptation responses. Prerequisite(s): SUS 102, SUS 104, SCI 110 and HUM 150. Three lecture hours per week. 3 credits Fall

SUS 203 Sustainable Economics: The Rise of the New Economy

This course focuses on the contradictions within contemporary capitalism, their impacts on the physical and human environment, and the emerging economic transformation. Issues addressed include the future of economic growth and globalization; impacts on consumer society; the rise of natural and human capital; steady state, gift and shared economics; participatory budgeting; re-localization of labor; cooperatives and worker-owned production; emerging small businesses; developmental

of local and regional currencies; bio-regional productions; and alternative finance and banking systems. Pre- or co-requisite: **SUS 201**. Three lecture hours per week. 3 credits Fall

SUS 204 Civic Engagement: Sustainability Capstone Project

This field intensive course serves as the student's civic engagement capstone experience after having completed all prerequisite SUS classes. It is designed for students to apply the knowledge and skills gained via the SUS courses to a real world situation in the field, chosen by the student in collaboration with her/his capstone advisor, and facilitated through BCC's Office of Civic Engagement. Each student will spend a minimum of 6 hours per week in the field at the chosen site and meet weekly with the capstone advisor to review progress in the field. Prerequisite(s): **SUS 203**; Co-requisite **SOC 253**. Three lecture hours per week. 3 credits Spring

SCI 110 Science vs. Pseudoscience

Every day the public is faced with news of new scientific findings that have a great impact on our lives and health - from the latest causes of cancer to the dire predictions of climate science. This course is aimed at Sustainability majors and non-science majors, to help them gain an understanding of how science is done. Topics will include the peer review process, common experimental designs, the importance of sample size, interpreting graphs and statistics, and the role of the media in conveying science. This course will provide students with the tools to help them critically evaluate science in the news. Three lecture hours per week. 3 credits Fall, Spring

The following courses already existed. It was decided that they, too, should become part of the required courses for the SSP.

HUM 150 Ecoliteracy, Education and Society

This course investigates how educational theory and practice should respond to 21st Century ecological challenges such as climate change, health and food crises, degradation of culture, language and knowledge, as well as the destruction of sustainable indigenous practices and other convivial social relationships under globalization. Through a vigorous survey of contemporary postindustrial society, the course tries to offer practical and theoretical venues for sustainable educational experiences. Students are introduced to multiple educational perspectives to literacy and learning, which address the crucial inter-relationship of all life and all living things, in an effort to foster sustainable and democratic sensibilities of learning, knowledge and society. Three lecture hours per week. 3 credits Fall, Spring, Summer

SUS 104 Sustainability from Different Perspectives - 12 Faculty

This multi-disciplinary course is designed to introduce students to key environmental and ecological crises facing humankind with an emphasis on sustainability issues and responses from different disciplinary perspectives. Taught by twelve faculty representing several different areas of knowledge including agriculture, business, culinary arts, engineering, health care, history, literature, oceanography, physics, socio-environmental policy, sociology, and water sciences, this course serves as an introduction to the basic

concepts of climate change, resources depletions and species extinctions while focusing on adaptation responses from various disciplinary perspectives. Three lecture hours per week. 3 credits Spring

SOC 253 Environmental Sociology: Ecology and the Built Environment

This course is a survey course of contemporary environmental and social science theory, research and data analysis. It explores the social construction of reality, the role of the corporate and social media, as well as, public policy formation and its consequences for humanity, civilization and the biosphere. The course concludes with an analysis of creative responses to environmental crises and their impact in human consciousness, education, science, culture, society, social movements, social change, human rights, environmental, social and economic justice, and revolution. It explores alternatives to the old infinite growth model of economics and social organization. Three lecture hours per week. 3 credits, Fall, Spring

Following are the "clusters" required in the SSP:

Select a

CLUSTER COURSES and DESCRIPTIONS

ENGINEERING

EGR 102 Introduction to Sustainable and Green Energy Technologies

This course is designed to introduce students to emerging renewable energy technologies and sustainable building design practices. Both the practical applications and underlying theories are addressed. Topics include: The Construction/Engineering Design and Implementation Process, Green Building Practices, especially those related to Energy Efficiency, Environmental Conservation, and Resource Management, Wind Turbines, Solar Energy, and other forms of renewable energy. Three hours of lecture per week. Instructional Support Fee applies. 3 credits Fall, Spring

EGR 141 Introduction to Environment

This course is designed to examine the impact of human activities on the natural world in the context of our emerging awareness of the scope of environmental problems and against the background of our understanding of normal ecosystems. The focus will be on topics concerning population, agriculture, energy, air pollution, water resources and waste management. Three lecture hours per week. Competency met: Scientific Reasoning and Discovery (3.0) 3 credits Fall

EGR 183 Energy Efficiency and Conservation Measures

This course is designed to give students the skills to identify and understand energy efficiency and conservation methods used to reduce energy consumption. Students analyze residential and commercial facilities for opportunities to employ these energy-saving measures. Students become familiar with the use of energy monitoring and measuring equipment used for energy auditing. Students also learn to calculate energy

savings and determine environmental impacts of these energy saving methods. Three lecture hours per week. Instructional Support fee applies. 3 credits Fall

ENVIRONMENTAL STUDIES

EGR 102 Introduction to Sustainable and Green Energy Technologies

This course is designed to introduce students to emerging renewable energy technologies and sustainable building design practices. Both the practical applications and underlying theories are addressed. Topics include: The Construction/Engineering Design and Implementation Process, Green Building Practices, especially those related to Energy Efficiency, Environmental Conservation, and Resource Management, Wind Turbines, Solar Energy, and other forms of renewable energy. Three hours of lecture per week. Instructional Support Fee applies. 3 credits Fall, Spring

EGR 141 Introduction to Environment

This course is designed to examine the impact of human activities on the natural world in the context of our emerging awareness of the scope of environmental problems and against the background of our understanding of normal ecosystems. The focus will be on topics concerning population, agriculture, energy, air pollution, water resources and waste management. Three lecture hours per week. Competency met: Scientific Reasoning and Discovery (3.0) 3 credits Fall

EGR 244 Water Supply and Hydrology

This course prepares students for entry into the field of water supply management and the operation of drinking water treatment facilities. The principles of hydrology associated with groundwater and surface water supply management are studied, including the hydrologic cycle, precipitation type and measurement, aquifer types and groundwater flow measurements, surface water flow measurements, and surface water and well sampling. Students study source water supplies and protection, regulations, physical and chemical treatment processes, and operator safety. This class includes field trips and preparation for taking the State Drinking Water Treatment Plant Operator Certification Examination. Three class hours and three laboratory hours a week. Instructional Support Fee applies. 4 credits. Spring.

HEALTH AND HEALTH SCIENCES

BIO 117 Physiology of Wellness

An introduction to the concept of wellness, nutrition basics, exercise habits, weight control, and cardiovascular disease prevention. Topics include wellness concepts, exercise, diet and nutrition, set point theories, and environmental influences. Three class hours a week. Competency met: Scientific Reasoning and Discovery (3.0) 3 credits Fall

BIO 220 Introduction to Nutrition

This course focuses on human dietary needs. The course emphasizes the health-related roles of carbohydrates, fats, proteins, and vitamins. The course also covers minerals,

energy metabolism, food-product labeling, and nutritional requirements of the pregnant woman and fetus. Issues of consumer concern are considered throughout this course. Prerequisite: **BIO 111** or **BIO 121** or **BIO 233** with a grade of C or better; **CHM 111** or higher with a grade of C or better. Three class hours per week. Competency met: Scientific Reasoning and Discovery (3.0) 3 credits Spring

HLT 115 Personal and Community Health

This course helps the student develop standards and principles of good health for the adult based on scientific research. It provides for study in attitudes and practices as they influence effective living, common adult health problems, significant diseases and public health responsibilities, community health and services, and special problems of concern in the area of community health to a democratic society. Prerequisite: A score of 68 or higher on the College Reading placement test or **RDG 090**. Three lecture hours per week. 3 credits Fall, Spring, Summer

HOSPITALITY

HOS 121 Introduction to Travel, Tourism and Hospitality

This course will be taught in three different modules to expose students to the concentration areas of travel, tourism and hospitality. The focus of this course will be introductory in nature. It will provide students with an understanding of how people use their free time, what reasons prompt them to travel and the value they expect from their travel dollar. Each module will provide students with an overview of the specific area of study with an emphasis on industry trends and future developments, terminology and an understanding of interrelationships of the three. Three lecture hours per week. 3 credits Fall

HOS 224 Hospitality Sales and Customer Service

This course will deal with the broad scope of marketing and sales activities that take place within the tourism, convention, hospitality, and casino industries. Emphasis will be placed on analysis, structure, and strategy of the marketing department within the tourism, convention, hospitality, and casino businesses. Students will learn about departmental budgets, allocation of resources, market research, media selection, and the effectiveness of a marketing plan. There will be case studies and assigned readings of current marketing trends. Prerequisite: **HOS 121** with a grade of C+ or higher. Three lecture hours per week. 3 credits Fall

HOS 226 Hotel Accommodations Management

Students will gain an understanding of the operational aspects of various departments within a hotel or motel, and the relationship of each department to the hotel as a whole. They will explore the functions of each separate area within the hotel, its operational procedures, staffing, customer service, and changing trends. Also covered will be the different employment opportunities and career paths available within the industry. Three lecture hours per week. 3 credits Spring

SCIENCE

SCI 112 Principles of Ecology

An introduction to basic principles of ecology. The interaction of abiotic and biotic components of ecosystems are discussed as well as the effects of human intervention. Some labs are field trips. Three lecture hours and two laboratory hours per week. Instructional Support Fee applies. Competency met: Scientific Reasoning and Discovery (3.0) 4 credits Fall

SCI 119 Coastal Science

An overview of the physical and biological structure of our southern New England coastline and the factors, including humans, which act on it. Particular emphasis will be given to consideration of the processes which shape the shoreline and to the biology and ecology of the most significant organisms of coastal communities such as salt marshes, sand dunes, rock shores and beaches. There will be several field trips to study local examples of the features and communities discussed. Prerequisite: One year of high school laboratory science or one semester of college laboratory science . Three lecture hours and three laboratory hours per week. Instructional Support Fee applies. Competency met: Scientific Reasoning and Discovery (3.0). 4 credits Fall

SCI 240 Introduction to Oceanography

This course is a study of the inter-relationships among geological, chemical, physical, and biological processes and systems in the world's oceans. Emphasis is placed on methods of the collection of oceanographic data as well as its interpretation and significance to the current world problems, including global climate change. The course is designed for students with a strong interest in the marine environment who have some preliminary background in one of the traditional areas of environmental science, namely biology, chemistry, or geology. Although the course does not require advanced mathematical skills, lab exercises may require simple computations, graphing, and map reading. Prerequisite: One semester of a college-level laboratory science with a grade of C or better, or completion of **CHM 090** with a grade of B or better, or permission of the instructor. Three hours of lecture and two hours of laboratory per week. Instructional Support Fee applies. Competency met: Scientific Reasoning and Discovery (3.0) 4 credits Fall, Spring, Summer

SUSTAINABLE AGRICULTURE

AGR 114 Sustainable Agriculture I

This course is an introduction to the principles and practices of sustainable agriculture for small organic farms and gardens. Topics include sustainable agriculture principles and practices, economics, soil science, conservation, tillage, and fertility, composting, cover crops, crop rotation, plant biology, weeds, pest and disease control. Three hours of lecture and two hours of laboratory per week, including field trips. Competency met: Scientific Reasoning and Discovery (3.0). Instructional Support Fee applies.

AGR 115 Sustainable Agriculture II

This course is a continuation of Sustainable Agriculture I and covers the principles and practices of sustainable agriculture for small organic farms and gardens. Topics include agriculture management practices, (record keeping, planning, and enterprise budgets), organic certification, season extension techniques, plant propagation, cultivation of annuals and perennials. Three hours of lecture and two hours of laboratory per week, including field trips. Competency met: Scientific Reasoning and Discovery (3.0) Instructional Support Fee applies. 4 credits Spring

SOC 216 Food, Famine, and Farming in the Global Village

This course analyzes the social-structural forces that shape the global food system with particular focus on societal problems emanating from the fossil-fuel-based, industrial agricultural model that now dominates world-wide food production, distribution, and consumption. Areas covered include a historical overview of subsistence strategies, the Green Revolution, threats to food security and water access, first-world obesity and third-world famine, the impact on food systems due to climate change and fossil fuel depletion, population swells, food-based social movements, and alternative food systems. Three hours of lecture per week. 3 credits Fall

WATER AND WATER MANAGEMENT

EGR 141 Introduction to Environment

This course is designed to examine the impact of human activities on the natural world in the context of our emerging awareness of the scope of environmental problems and against the background of our understanding of normal ecosystems. The focus will be on topics concerning population, agriculture, energy, air pollution, water resources and waste management. Three lecture hours per week. Competency met: Scientific Reasoning and Discovery (3.0) 3 credits Fall

EGR 241 Wastewater Technology I

A survey course which introduces the student to the physical and chemical processes associated with water quality, pollution and treatment of liquid wastes. Topics covered will include: basic environmental concerns, hydrology, water quality and pollution, wastewater flow characteristics, collection systems, water monitoring and sampling procedures. The program will also prepare the student for the State Operator's Certification Examination. Three lecture hours per week. 3 credits Fall

EGR 244 Water Supply and Hydrology

This course prepares students for entry into the field of water supply management and the operation of drinking water treatment facilities. The principles of hydrology associated with groundwater and surface water supply management are studied, including the hydrologic cycle, precipitation type and measurement, aquifer types and groundwater flow measurements, surface water flow measurements, and surface water and well sampling. Students study source water supplies and protection, regulations, physical and

chemical treatment processes, and operator safety. This class includes field trips and preparation for taking the State Drinking Water Treatment Plant Operator Certification Examination. Three class hours and three laboratory hours a week. Instructional Support Fee applies. 4 credits. Spring.

BLUE CENTER FOR WATER TECHNOLOGY

At a community college, education often goes beyond the classroom and into the community. This is as true with Sustainability as it is with other academic areas. Professor Robert Rak won a BCC Presidential Fellowship to advance "water knowledge" in local communities. Below is his description of the process he followed to develop the Blue Center for Water Technology focused on communities protecting and preserving their water sources.

"The Blue Center for Water Technologies was established in 2015 through a Bristol Community College Presidential Fellowship. The Mission of the Blue Center is to protect and preserve our water resources through education and community collaboration.

During the Presidential Fellowship year, a National Science Foundation (NSF)/Advanced Technological Education proposal was prepared and submitted.

In 2016 the National Science Foundation awarded Bristol Community College a \$602,000 award for the New England Water Treatment Training (NEWTT) project to develop training programs for water and wastewater operators that would be developed with direct input from industry and would be implemented in community colleges throughout New England.

In the area of community collaboration, the Blue Center has worked with regional municipalities and contractors to develop internship programs for our students which often have led to their being hired to fill needed positions within the organizations.

We work with high schools to provide the opportunity for them to borrow our laboratory equipment through our Lending Laboratory, which was developed and expanded under an earlier NSF grant. This will be extended to community colleges through the NEWTT project.

We also offer communities assistance in projects that they are conducting in areas where we may have a level of knowledge and appropriate equipment for their needs."

Most likely other models of Sustainability Education are likely to evolve as this new discipline grows, but for now, there's plenty of work to be done at community colleges employing the methods discussed herein.

