The Utah Botanical Gardens: An Educational Resource for the University and the Community

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SUMMARY. University students have been involved with the Utah Botanical Gardens (UBG) since their inception in 1954 as part of the Utah State University (USU) Utah Agricultural Experiment Station (UAES). Students and professors travel from USU to visit UBG, conduct class tours, and participate in research projects. Students also work at UBG as summer interns, and in 1986, USU began offering off-campus horticulture classes for credit at UBG. Today, 20 different classes are taught at UBG or nearby sites. These classes are part of the USU Applied Ornamental Horticulture degree program and can also be used to qualify as a Certified Nursery Professional by the Utah Nursery and Landscape Association.

The Utah Botanical Gardens (UBG) is a partnership between the Utah Agricultural Experiment Station (UAES), Department of Plants, Soils, and Biometeorology (PSB), and Utah State University (USU) Extension. The UBG is located in Farmington, 60 miles (96 km) south of the USU campus in Logan. The Utah Board of Regents has designated USU to be the provider of horticulture degree programs in the state, and in 1986, the PSB Department began offering an off-campus credit horticulture program at the UBG. This primarily brought classes to the Wasatch Front (major metropolitan area surrounding Salt Lake City) where the majority of the horticulture students and green industry employers are located; because these students were employed during the day, classes were taught in the evening. The off-campus program was an extension of the Applied Ornamental Horticulture 2-year degree that has been offered on campus at USU since 1977.

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Garden history

Ornamental plant trials were initiated in 1926 at the Farmington Field Station of the Utah Agricultural Experiment Station where researchers evaluated trees and shrubs. In 1954, flower variety trials were added, and the station became known as the Farmington Display Gardens. In the early 1970s, plant materials were reconfigured from row plots to landscaped beds and theme gardens to achieve a more aesthetically pleasing effect and greater accessibility.

In 1980, an extension gardening office was opened to provide improved educational programs and services for the public, including the first Master Gardener program in the state. Since 1980, the UBG has been used for hundreds of Master Gardener classes, public classes, pruning demonstrations, and greenhouse classes. Horticulture classes from the USU campus visit the UBG for field trips, laboratories, and demonstrations. In 1984, the site officially received its current name of the USU/UBG from the Utah Legislature. In 1986, the UBG became directly involved in horticulture training by offering USU credit classes on site.

Credit classes offered

Surveys in 1979 and 1986 (Long, 1987) show that ornamental horticulture employers prefer employees with education and experience. In Utah, employment in the ornamental horticulture industry increased from 7,800 people in 1979 to 11,740 people in 1986. A 1992 survey (Snyder and Wilde, 1992) indicated that the Utah green industry employed more than 15,400 people with a total payroll of \$350 million. With a growing green industry, there was an increased demand for trained, experienced horticulture students.

From 1986 to 1989, off-campus, credit-based horticulture classes were taught at the UBG in Farmington by campus faculty, who also coordinated the program. The first courses offered were Sustainable Landscapes, Annual and Perennial Plants, and Horticulture Science.

Beginning in 1989, classes for credit were expanded to the Salt Lake County extension office. Later, with increasing student numbers, classes were taught at the University of Utah's (U of U) Red Butte Garden and Arboretum, Salt Lake Community College (SLCC), Weber State University (WSU), Utah Valley State College (UVSC), Provo High School and Orem High School. The classes are USU courses, although they

are taught at several locations, since enrollment and student registration are handled by USU Extension Continuing Education. As more classes were offered, additional instructors were selected from main campus faculty, extension horticulture agents, high school vocational instructors, and adjunct faculty from the green industry.

In 1994, 82 students attended one or more classes at the UBG or nearby locations. Classes taught at the UBG remain some of the most popular due to the plant collections and greenhouses, nearby research plots, and easy access and parking. In 1995, an off-campus program coordinator was placed at the UBG in Farmington. The coordinator is assigned to the PSB Department and develops class schedules, advertises classes, and assists students with career plans. Having a local coordinator helped increase student enrollment. By 1997, 174 students were taking 24 different classes along the Wasatch Front. In 1998, USU switched from a quarter to a semester system, resulting in the combining and renaming of several classes. Currently, there are 19 courses offered with 17 different instructors (Table 1). The majority of students take only USU horticulture classes in the evening. Some students take elective and general education classes at the U of U, SLCC, UVSC, or WSU during the day and USU horticulture classes at night. Information sheets are prepared that list USU equivalent courses at other institutions for students seeking a B.S. degree from USU.

Table 1. Utah State University (USU) credit classes taught at the Utah Botanical Gardens (UBG) and nearby sites. All classes are taught at the UBG. Other sites are used depending on registration and facilities needed. Classes are listed with course number (PLSc = Plant Science), semester credit hours, title, and semester taught (Fa = Fall, Sp = Spring, Su = Summer).

Course no.	Credit hours	Course name
PLSc 2600	1.5	Annual and Perennial Plants (Su)
PLSc 3600	2	Arboriculture (Sp)
PLSc 3010	2	Basic Flower Arrangement (Fa)
PLSc 4500	4	Fruit Production (Sp)
Soils 3000	4	Fund Soil Science (Fa, Sp)
PLSc 3050	4	Greenhouse Management/Crop Production (Sp)
PLSc 3200	3	Horticultural Science (Fa, Sp)
PLSc 2650	1	Identification of Plants (Fa)
PLSc 2610	1.5	Indoor Plants (Sp)
PLSc 2250	1-4	Occupation Experience (Fa, Sp, Su)
PLSc 2200	3	Pest Management (Sp)
PLSc 3700	3	Plant Propagation (Sp)
PSB 1050	1	Plant, Soils, Biometeorology Orientation (Fa)
PLSc 3300	3	Residential Landscapes (Sp)
PLSc 2900	1-4	Special Problems (Fa, Sp, Su)
PLSc 3400	3	Sustainable Landscapes (Fa)
PLSc 3800	3	Turfgrass Mgmt (Fa)
PLSc 4400	3	Vegetable Production (Fa)
PLSc 2620	3	Woody Plant Material (Fa)

Table 2. Major components of the Utah Botanical Garden used in course instruction.

Component	Description
Physical plant	Two classrooms for instruction Propagation greenhouse Solar greenhouse with three different heat-collection systems National Weather Service station
General gardens	Annual flower display gardens, including All-American Selection winners Theme gardens, including perennials, dry river bed, shade plants and herbs Native plant garden Vegetable and small fruit demonstration garden Rose (Rosaceae) garden with hybrid tea, old-fashion, English and heritage selections
Specific collections	Daylily (<i>Hemerocallis</i> L.) collection of 185 selections Peony (<i>Paeonia</i> L.) collection of 20 selections Iris (<i>Iris</i> L.) collection of over 400 selections, including all Dykes Medal winners and a Utah Iris Hybridizer Garden Shrub and dwarf conifer collection Mature shade tree collection planted in 1963

The number of classes taught and students enrolled is unique for an off-campus horticulture program in the intermountain west of the U.S.

Course instruction at UBG

Course instruction at the UBG includes lectures, greenhouse work, and tours of the plant collections on the grounds (Table 2). The 7-acre (2.8-ha) site has mature plantings of trees, shrubs, ground covers, and vines that are adapted to the Utah environment. Plants are labeled with their common name, botanical name, and year planted. Students can discuss different plant materials in the classroom and then observe plants in the UBG just outside the classroom (Fig. 1).

The UBG plant collection is studied extensively in classes such as Arboriculture, Woody Plant Materials, and Annual and Perennial Plants. A favorite teaching technique in these classes is to cover up the plant identification tags with brown paper bags and then quiz students on the plant's common name, botanical name and hardiness zone (Fig. 2). In Arboriculture, students prune plants at the UBG and nearby public schools. The mature shade trees are studied extensively in Residential Landscapes to evaluate size, spacing, and landscape value.

In Turfgrass Management and in Pest Management, students learn to use a sprayer; in Sustainable Landscapes, students study a small section of the UBG in detail and develop a comprehensive maintenance schedule for that section. Students also evaluate water use, irrigation needs, and sprinkler systems in Sustainable Landscapes. In Annual and Perennial Plants, the

class designs and installs an annual flower garden.

In Plant Propagation, the class takes woody and herbaceous cuttings from the UBG collection for rooting observation in the greenhouse. The Flower Arranging class removes cut flowers to practice arrangements. In Fundamentals of Soil Science, students learn principles of soil sampling and dig soil profile pits to study soil types.

In the greenhouse-based classes, students work in the UBG greenhouses to produce plants for the UBG grounds. One greenhouse section is reserved for a study collection of house plants for the Indoor Plants class. Local greenhouse businesses also cooperate by providing cut roses, potted mums, transplant plugs, and other plant materials that are used in class instructions and demonstrations at the UBG.

A nearby UBG partner also used in teaching classes for credit is the UAES Kaysville Research Farm. This 62-acre (25-ha) farm is located 2 mi (3.2 km) from the UBG and is used by campus-based research faculty for studies on tree fruits, vegetables, ornamentals, and rangeland grasses. Many research leaders also teach classes at the UBG, working on their research plots during the day and then teaching an evening class. These research plots are frequently utilized for selected teaching activities. Classes normally visit the Kaysville Farm for the first part of the weekday class, or on Saturday, as part of a lab exercise.

Fig. 1. Students in a class at the Utah Botanical Gardens learn about different plant materials and can then observe plants in the gardens just outside the classroom.

Fig. 2. Students in a Woody Plant Materials class take a quiz which asks for common name, scientific name, and hardiness zone of landscape plants.

Students in the Fruit Production class prune a selected block of trees after a demonstration by the class instructor, grafting and budding are demonstrated in the orchard, and insect monitoring traps can be seen in the Integrated Pest Management Research Orchard. Proper pesticide use and storage are demonstrated for students using a modern pesticide storage building and rinse pad.

Partnership with Utah green industry

The Utah Nursery and Landscape Association (UNLA) has been an important partner in promoting horticulture classes for credit at UBG (Linde, 1992). Each quarter, a list of upcoming classes is sent to nurseries, greenhouses, golf courses, public works departments and previous students. The list is also published in the UNLA newsletter and a compilation of job openings from UNLA businesses is included in a class schedule that is sent quarterly to current students. The UNLA offers two college scholarships each year for horticulture students, with many having gone to students in the off-campus program. Three USU horticulture class instructors serve as ex-officio members of the UNLA Board of Directors, enabling them to monitor needs for new or expanded class offerings.

The UNLA helps sponsor an annual Utah Green Industry Conference

and Trade Show. Students enrolled in USU classes are able to attend for a reduced rate and can earn Special Problems credit by attending the conference and writing a summary report. This elective credit helps fulfill degree requirement hours.

Degree and certification programs

Students who take classes at the UBG qualify for USU degrees and special certification programs. For example, many students work in golf course grounds maintenance. By completing an Associate Degree, these students can obtain the Certified Golf Course Superintendent (CGCS) designation with only 5 years of experience instead of 8 years. A CGCS designation enables students to advance in this profession and gain employment at more prestigious golf courses.

For many years, the UBG has been an educational resource for the certification exams of the Utah Certified Nursery Professional program in conjunction with the UNLA. With the development of a broad range of credit-based classes, the certification program was modified to provide certification upon completion of these classes: PISc 2200—Pest Management, PISc 3200—Horticultural Science, PISc 3300—Residential Landscapes, and PISc 2620—Woody Plant Materials. In 1997, ten of 24 new nursery professionals completed certification by taking credit-based classes (Jones, 1998).

The future

The 72-year history of the UBG in Farmington will soon draw to a close. Because of expansion of the

adjacent state highway, the gardens will be relocated and become part of the new Utah Botanical Center (UBC) on 94 acres (38 ha) adjacent to the existing UAES Kaysville Research Farm. This move will consolidate horticulture research and education programs. Office space, classrooms, research plots, extension staff, and teaching faculty will be at one location. At the new Kaysville location, work is under way on utilities, roads, and relocation of plant material from the current Farmington site. Development of a woody plant material teaching garden is one of the first projects for the new facility, grouping trees and shrubs by plant family. Another project is establishment of a Certified Nursery Professional testing facility in cooperation with the UNLA.

In planning the UBC, surveys were made of PSB faculty, county extension agents, Master Gardeners, the Utah nursery industry, and local citizens. The feedback from over 580 surveys lead to a refinement of the UBC mission and the development of a master plan.

The UBC will emphasize sustainable urban landscapes, resource conservation, and environmental sensitivity, addressing issues of wetland restoration and water quality enhancement. Off-campus, credit-based horticulture classes will continue and will be expanded with additional classroom space, more greenhouses, and satellite television programs.

The off-campus credit-based classes have become invaluable for horticulture students who want to work near their homes and attend university classes at night. Improved teaching facilities and an expanded plant material collection at the UBC will enable PSB and USU extension to meet the growing demand for horticulture education.

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