

Growing minds

PART 1

The foundation of learning

Oregon's higher horticulture education programs feed the pipeline of nursery talent

BY TRACY MILLER

WHEN RYAN CONTRERAS, associate professor at Oregon State University (OSU) in Corvallis, Oregon, talks to students with an interest in plants and the horticulture program, one point inevitably rises to the top.

"I can guarantee you a job in the nursery industry," he tells them. "There is so much advancement and opportunity coming out of college."

The nursery industry has a compelling need for new talent, and several higher education institutions in Oregon are training the next generation of horticulturalists for a variety of careers.

This article provides an overview of three college-level degree programs in the state and the approach, facilities and requirements that have been developed for teaching, training and connecting undergraduate, graduate, and returning adult students in nursery greenhouse and production.

Oregon State University

According to Contreras, outside of the horticulture research undergraduate degree that is often the program of choice for individuals who would pursue graduate studies, the undergraduate degrees at OSU (see chart) attract a wide variety of students.

"Basically, the core of our degree programs does a good job of training students wherever they want to go," Contreras said.

The curriculum is flexible to various fields and career direc-

tions. It provides the fundamentals of plant nutrition, growth and life cycles, pruning, irrigation, propagation, greenhouse and field growing, and more. Enrolled students have access to labs, greenhouses, the Corvallis Farm Unit, and a group of OSU-owned farms and labs. Each provides hands-on learning opportunities and includes — among other things — a 90-acre vegetable crops farm, a 115-acre planting and field laboratory, and a 14-acre vineyard.

A mixture of coursework gives students a taste of every level of work in the industry. For example, a student interested in growing and marketing flowers would seek specific classes on floriculture. In other cases, floriculture may not even be on another student's radar. The range of topics in the core curriculum prepares all graduates to be viable job candidates in the industry from various entry points.

"The most valuable skills students pick up are problem-solving ones," Lloyd Nackley, assistant professor of nursery and greenhouse plant production at OSU, and nursery crops research leader at the North Willamette Research and Extension Center (NWREC), said. (More than 50 full-time and part-time professors, researchers and extension agents make up the faculty in the OSU Horticulture Department.)

Students learn how to handle everyday management challenges like they were on the job. Program graduates will have grown plants to a specific grade or standard in a greenhouse >>>

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Master's students Adigun McLeod (left) and Cara Still (right) conduct flow cytometry analysis of plant cells to determine DNA content, or genome size, as part of breeding research in the Contreras Lab.

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— from propagation to the final product. They will have practiced using fertilizer, substrates, and heating or cooling to manipulate their products.

Although there would be thousands of plants in an actual nursery setting, the small-scale growing assignments — with 100 plants produced in 10 unique ways — teach students practical skills for their first jobs and internships.

Students can earn up to 12 credit hours for 360 hours they work on the job as an intern. Each internship is individualized for both on-campus and eCampus learners. The eLearning program is especially attractive to veterans and other individuals going through a career change.

“Internships are the most important thing we require all students to do,” Contreras said.

It's important enough that the department is in the process of bringing in a dedicated internship coordinator.

“Internships provide further introduction to production, plant pathology, integrated pest management and farm growing,” Nackley said.

Actual, on-the-job training during a student's junior and senior year brings home how it all works. The internships expose students to the broad scope of job opportunities in the marketplace and give them consistent access to several business leadership levels throughout their four years at OSU.

Students also experience eye-opening site visits to nurseries; unique guest lectures by regionally-based OSU alumni; and research projects that faculty and instructors developed in direct partnerships with United States Department of Agriculture-Agricultural Research Service (USDA-ARS) industry advisors. Specifically, there is a nearby National Clonal Germplasm Repository and its Horticultural Crops Research Unit on campus.

OSU is rated an R1 university. It meets the 10 activity indicators in research activity and expenditures set by the Carnegie Classification of Institutions of Higher Education. As a research institution, the Horticulture Department maintains a close



relationship with the USDA, which mentors graduate students and hires graduate and undergraduate students full-time and part-time in summer and year-round.

The OSU and USDA nursery working group (www.diggermagazine.com/osu-and-usda-nursery-working-group) includes 16 members from the OSU faculty and four staff from the USDA. They work together to provide research-based findings to advance nursery practices and benefit producers in Oregon.

In all those ways — research, proximity to nursery operations, direct working relationships with the nursery industry — an OSU student experiences how the industry is facilitated, both regionally and nationwide.

“I think that our level of connection with the nursery industry and our level of preparation for nursery-specific jobs really benefits students who want to stay in the field. They are employable upon graduation,” Nackley said.

Chemeketa Community College

Of Oregon's nursery and greenhouse industry sales, 40% comes from businesses

in Chemeketa Community College's service district of Marion, Polk and Yamhill counties.

The Salem-based Horticulture Department has focused its efforts to provide education, training and job opportunities in this important sector of the Oregon job market.

The college opened a brand-new 5-acre Agriculture Complex this spring, ready for students to plant their first crops. Although cost originally prohibited the addition of a greenhouse, a donation received in January from **Northwest Farm Credit Services** funded a full, working greenhouse to this state-of-the-art educational hub. It has indoor and outdoor classrooms, labs, garden/farm demonstration fields, an ornamental yard, soil labs, and a beneficial insectary space.

Larry Cheyne, interim director of Agricultural Sciences and Technology, explained that this new facility gives students access to the tools and technology necessary in horticulture production. Chemeketa students can now learn how to produce a wider variety of products than they could with their previous set-up. It

also provides an opportunity for students to partner with local businesses and experience hands-on plant propagation, automation, HVAC systems, greenhouse and hoop house growing, plant trials and more.

As part of the complex, the half-acre Woody Ornamentals Demonstration and Learning Lab offers specific opportunities for students to learn and interact with industry members. With initial funds from the J. Frank Schmidt Foundation, a donation from Morgan Stanley Smith Barney and a nearly \$274,000 award received in June 2020 from the National Institute of Food and Agriculture (NIFA), the new lab enables the horticulture program to expand its workforce development and education program. The college will provide training for the industry-accepted practices of woody ornamental production. The space is divided into three growing areas: ball and burlap, bareroot and pot-in-pot.

Joleen Schilling, program chair of the Horticulture Department, explained that workforce development helps individuals grow in their current positions on the job. The project was designed with a twofold purpose.

“The idea was to create an opportunity for students to get hands-on experience and as well be valuable to the industry; to simultaneously serve the industry with data from trials.”

Students get real-time training in crop management, soil requirements, nutritional management, water requirements, pest management, pruning and harvesting. Later in the program they learn marketing, sales and delivery.

“Honestly, the experience moves from start to finish,” Schilling said.

The NIFA grant also provides for a full-time technician who works with students at the lab and with the industry advisors to identify specific species of crops for planting, trialing and evaluating.

The funds are also being used to develop an irrigation certificate and a nursery apprenticeship program. It will add to the existing crop health certificate program, which focuses on integrated >>

College horticulture programs in Oregon

Oregon State University

Corvallis, Oregon and various locations

Contact: **LeeAnn Julson** — LeeAnn.Julson@oregonstate.edu

<https://horticulture.oregonstate.edu/>

Enrollment: **225 students**

Courses offered: **62 for-credit undergraduate courses**

Degrees offered:

- **Horticulture Bachelor of Science (BS)**

Options include:

- **Ecological Management of Turf, Landscape, and Urban Horticulture**
- **General Horticulture** (Online)
- **Horticultural Research**
- **Plant Breeding and Genetics**
- **Sustainable Horticultural Production**
- **Therapeutic Horticulture**
- **Viticulture and Enology**

- **Horticulture Master of Science (MS)**

- **Horticulture Graduate (Ph.D.)**



Chemeketa Community College

Salem, Oregon

Contact: **Joleen Schilling** — Joleen.schilling@chemeketa.edu, 503-399-5150

<https://www.chemeketa.edu/programs-classes/program-finder/horticulture/>

Courses offered: **29 credit-bases courses**

Degrees offered:

- **Horticulture Associate of Science (AS)** (transfer degree to OSU)
- **Horticulture Associate of Applied Science(AAS)**



Clackamas Community College

Oregon City, Oregon

Contact: **April Chastain** — april.chastain@clackamas.edu, 503-594-3292

<https://www.clackamas.edu>

Students: **300 students**

Courses offered: **63 credit bearing classes** plus non-credit workshops and continuing education units (number varies)

Degrees offered:

- **Horticulture Associate of Science (AS)** (transfer to OSU),
- **Horticulture Associate of Applied Science (AA)**
- **Landscape Management Associate of Applied Science (AAS)**

Option:

- **Arboriculture**

- **Organic Farming Certificate of Completion**
- **Horticulture Certificate of Completion**
- **Landscape Practices Certificate of Completion,**
- **Irrigation Technician Career Pathway Certificate,**
- **Plant Health Management Career Pathway Certificate**



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Students learn the process of planting by flat filler in a lab setting.

PHOTO COURTESY OF CLACKAMAS COMMUNITY COLLEGE

pest management, biological control agents and plant problem identification. Students can participate in the program while working toward either a two-year associate of science (AS) degree or associate of applied science (AAS) in horticulture. The AS program was recently approved in the last two years.

“The new [AS] degree was designed to help students who want to transfer to OSU and major in horticulture,” Schilling said. “The workforce skills are limited; its intention is for students to get the general education courses and courses in horticulture that transfer seamlessly to OSU. When they get there, they are at junior standing.”

The AAS degree provides a good introduction and overview to horticulture, and specifically nursery greenhouse. “Students gain tangible, real-world skills to enter into the workforce at the technician level, where they can usually advance pretty readily,” Schilling said.

Students enrolled in the program secure growing contracts in the industry, work with seed producers, grow the material and do the marketing. Contract assignments are varied and have included such projects as producing bedding plants for the City of Salem parks department, fuchsias for Garland Nursery, and vegetable starts for the community gardens and youth farm of Marion Polk Food Share.

The AAS is focused on contextualized applied learning, where students take what they learn in classes and labs and then apply their skills during their internships. In addition to field trips to nurseries and industry guest speakers on campus, Cheyne also explains the value of Cooperative Work Experiences (CWE). They are internships that involve completing documented, measurable workplace objectives and career-related assignments to earn college credit. He considers them a third way for students to connect with industry contacts, adding project management skills, problem-solving, leadership, and team building to their technical skills.

Throughout their studies, students begin to identify career directions, conduct



informational interviews with nursery industry employers who come to campus, and engage in other career development activities. Internships usually occur at the end of the second year.

“Because of the timing, many of the students who do an internship at the end of their degree end up getting hired,” Schilling said.

Chemeketa is the first college in Oregon recognized as a Hispanic-Serving Institution (HSI), with enrollment of Hispanic students in certificate or degree credit programs reaching 25% in 2015.

“It’s definitely an honor to be an HSI which provides access to some research and supports to enhance students in their pursuit of a degree,” Cheyne said. “Where we have focused on is recruitment and retention.”

The college has reached out to high school campuses and partnered with on-campus programs that have a large Latinx population — such as in Woodburn and Salem — to support student success in pre-college work.

“Our Intro to Horticulture course is currently available at two high schools,” he said. “And we plan to have some of our horticulture students be ambassadors for the program.”

Chemeketa has also conducted career

days and offered guest lectures targeted to Latinx students. Schilling believes these events show the career opportunities in horticulture for these students.

Clackamas Community College

Flexibility is built into the horticulture program at Clackamas Community College (Oregon City, Oregon) in multiple ways. The core program allows students to start their coursework and figure a particular career direction over time. Some students begin their studies, get hired for a job and then finish the degree on their own schedule. The college offers a number of degree types to meet the needs of all students.

The main degrees in the Horticulture Department are three, two-year programs: the Horticulture associate of science (AS), to prepare for transfer to a four-year bachelor’s degree program; the Horticulture associate of applied science (AAS); and the Landscape Management associate of applied science (AAS) including an Arboriculture option; and a one-year certificate in Organic Farming.

The one-year Horticulture Certificate of Completion is essentially the first year of the two-year program, and can be a good fit for individuals who have job experience or a four-year degree, and >>>



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A Clackamas Community College student measures pH and EC in a fertilizer solution

PHOTO COURTESY OF CLACKAMAS COMMUNITY COLLEGE

who are looking to make a career change.

April Chastain, department chair of Horticulture at Clackamas Community College and the landscape management lead, considers the one-year certificate appropriate for students with no knowledge of horticulture looking to gain an entry-level position.

Most of the students — about 98% — at Clackamas are enrolled in the AAS program, according to Frank Kilders, one of the department's four full-time faculty members and the nursery/greenhouse lead. It's common for students to get to the one-year point and then choose to continue and earn the two-year AAS. Students can develop a specialty as they go through the two-year AAS.

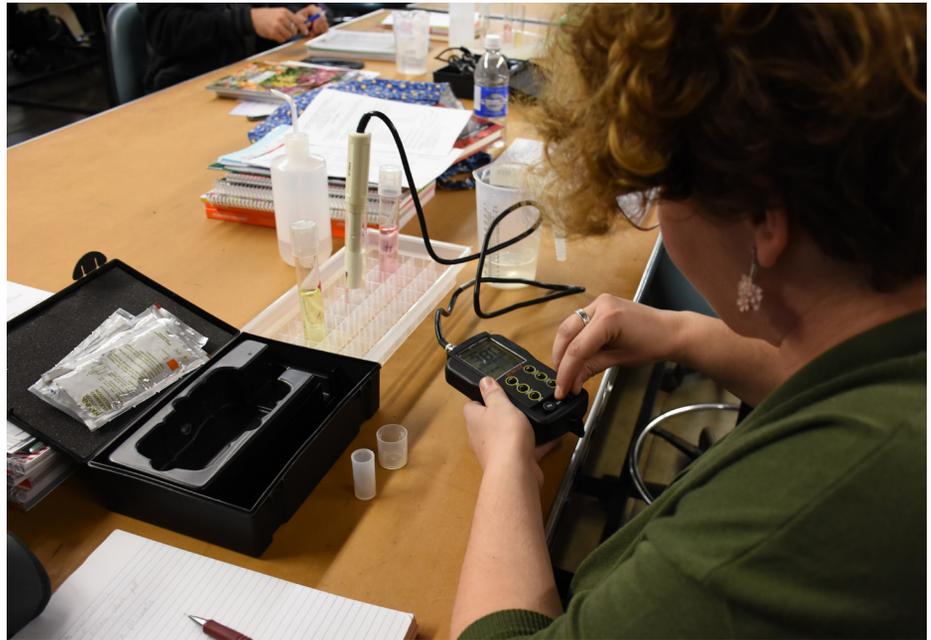
The Horticulture Department, which includes 21 part-time instructors, offers several certificate programs (see chart) that require 45 or less credits. The course credits are stackable — students can apply those degree hours to a two-year AAS. Although there is currently no certificate in propagation, Chastain said the program has a strong focus on it. So much so, the college has a special industry advisory committee exploring a move toward a specific certificate or degree program in propagation, according to Kilders.

A general advisory committee made up of industry representatives provides important input and helps shape the Horticulture Department programs. The committee provides a connection to the industry, aligning the degrees and certificates to industry standards — defining and enumerating appropriate shifts and expansions where and when necessary.

“The horticulture industry supports our department tremendously, donating equipment, plants and their time to the program,” Kilders said.

Training in production and mechanization for students includes access to such equipment as a flat filler, a transplanter and a watering tunnel, and programmable environmental control technology. Clackamas has a farm site, several gardens, a hoop house and four greenhouses — two of which run the entire year and are often the site for classroom lectures.

“Students gain a lot more knowledge



when learning in a practical setting,” Kilders said. “We are ever-changing the curriculum to align to the necessities that the horticulture industry has.”

Chastain believes students are looking for an education that combines the technical aspect of horticulture, the science, as well as business knowledge. This includes plant production planning, inventory control, logistics, marketing, transportation systems and suppliers — big picture problem-solving combined with plant knowledge and business know-how.

“At Clackamas, we have qualified, practice-oriented instructors who have been in their fields for a number of years,” Kilders said. “They are bringing this strength.”

One way that students at Clackamas are introduced to nursery operation problem-solving is through the Horticulture Department's annual plant sale. It is usually held a week before Mother's Day. Leading up to the sale, students practice planning and production through direct action: growing perennials, herbs, annuals, vegetable starts, hanging baskets and native plants, and then selling the products of their learning. In one year, 14,000 plants were produced. The day of the sale, students don matching aprons and serve as many as 500 customers.

“We'll have people lined up around the block, and students get an opportunity to see what it's like to run a retail operation,” Chastain said.

Another way the industry connects with the Horticulture Department is by requiring students to complete a minimum of 6 credits (180 working hours) of CWE for the two-year AAS (3 credits for a certificate; 12

credits for arboriculture).

“CWE makes your education more valuable and relevant — to let your experience draw from work,” Kilders said.

Student placement for CWE can be dependent on a specialty they are interested in, whether it is arboriculture, landscape, nursery, greenhouse or organic farming. Kilders recommends taking CWE as soon as possible after entry into the program. Paid positions can count toward CWE credits.

“There are a lot of success stories with CWE,” Kilders said. “The majority of students I teach get offered a job while they are doing their CWE.”

Meeting future needs

The horticulture programs at higher education institutions in Oregon are closely aligned — analyzing the continuously changing needs of the industry, adjusting the curriculum so students receive appropriate information; bringing more technology into classrooms, greenhouses and school farms; and developing close connections to industry for input on academics, on-campus involvement and off-campus CWEs.

“We are in a generational change, and the industry needs qualified personnel to meet the challenges of growing in the 21st century,” Kilders said.

And that's what these Oregon programs are doing: training students for successful transition from school to the work place. ☺

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