

Agriculture and Natural Resources

The Agriculture and Natural Resource (AGNR) Department prepares students with the workforce skills to enter the rapidly evolving career fields in Agriculture and Natural Resource Management. The AGNR department also provides educational pathways to assist students to move on to higher education.

The rapid evolution in the scope and type of these career opportunities are driven by some of the most stringent environmental laws and policy in the world. The implementation of these laws requires innovative thinking, long term planning and sustainable best practice. A new kind of educational approach is needed to prepare applicants with the necessary science, understanding of social/political frameworks, technical expertise and soft skills. It is essential that our society be taught a greater awareness of the need to conserve and wisely manage these resources. Careers in the public and private entities that manage and use these resources are expanding rapidly as the critical nature of these issues becomes more apparent.

Individuals that are trained in agricultural and natural sciences (a High School through University Educational Pathway is being designed in the area), technologies, practices, principles and issues are well positioned to take advantage of these exciting opportunities.

The department has designed its educational programs on the following premises:

1. A focus on the applied sciences (Animal, Soil, Plant and Environmental) that support the disciplines of agriculture and natural resource management.
2. Application of evolving technologies that are essential to manage the complex agriculture and natural resource issues that society faces today. Examples include: natural building, organic gardening, water and soils testing, drip irrigation, ecological restoration, plant propagation, animal ultrasound and artificial insemination, Geographic Information Systems (GIS) and Global Positioning Systems (GPS).
3. Students will become aware of the importance of political and other social sciences that support sustainable development, so that communities can seek an appropriate balance of the environmental, social and economic needs of their region.
4. Increased “hands-on” learning and field experiences. The skills needed to be successful in these areas are best taught through actual experience via laboratories, investigative field experiences, internships, field trips and local case studies.

The department currently focuses on training students in fields of Environmental Horticulture, Plant Science, Habitat Restoration, Landscape Irrigation, Floral Design, Natural Resource Management, Geographic Information Science, Water Resource Management, Equine and Animal Science, and Animal Health.

Career Opportunities

Agribusiness Managers, Economists, Statisticians, Analysts, Journalists, Agriculture and Conservation Extension Officer, Agricultural and Food Inspectors, Agriculture and Natural Resource Educators, Air Quality Monitoring Technicians, Arborists and Tree Pruning Technicians, Environmental and Natural Resource Planner, Farm, Ranch Hands and Managers, Field Biologists, Floral Design Technicians and Floral Shop Managers, Geographic Information System Technicians and Analysts, Golf Course and Turf Grass Managers, Horticulture, Irrigation and Fertilizer Industry Sales, Representatives, Irrigation Consultants and Specialists, Landscape Architects and Designers, Landscape Construction/Installation Contractors, Landscape Maintenance Technicians, Natural Resource Research Technicians, Nursery Technicians and Managers, Organic Practices Advisor, Park and Wildlife Managers, Pest Advisors, Plant Breeders, Propagators and Growers, Solid Waste and Recycling Technicians, Waste Water Technicians, Water Conservation Officers, Water Distribution Technicians, Water, Soils and Biotechnology Lab Technicians, Water Use, Education and Conservation Technicians, Wildlife, Fish and Conservation Biologist, Zoo, City, Country Club and Botanic Garden Horticulturists

Faculty

Neville Slade

Degrees and Certificates Awarded

Associate in Science, Environmental Horticulture
Animal Health Technician Certificate
Equine Science Specialist Certificate
Floral Design Technician Certificate
Horticulture Specialist Certificate
Landscape Specialist Certificate
Plant Science Technician Certificate

Agriculture and Natural Resources Career Exploration Certificate
Animal Science Specialist Certificate
Environmental Horticulture & Restoration Technician
Geospatial Technology Technician Certificate
Irrigation Design Technician Certificate
Natural Resource Management Technician Certificate
Water Resource Management Technician Certificate

Program Learning Outcomes

A student receiving a degree or certificate in this field will be able to:

- Evaluate and communicate analytically including synthesis, and research on the relationship between natural social and economic systems; principles and values that enhance leadership, personal/social responsibility, community involvement and respect for others and the practices that support sustainability.
- Apply complex problem-solving skills and critical thinking using technology, the scientific method, natural resource policy, sustainable practices to current/real-world Agriculture and Natural Resource Management issues.

Associate Degree

To earn an Associate in Science degree with a major in Environmental Horticulture, complete 18 units from any landscape certificates or horticulture coursework, and meet all Victor Valley College graduation requirements. **AGNR 138** (Cooperative Education) may be used as elective credit, but may not be used to fulfill major requirements.

Transfer

For the most up-to-date information on these programs and others, visit www.assist.org. Please stop by the Transfer Center in Building 55 or make an appointment with a counselor if you have questions.

- **University of California, Riverside College of Natural and Agricultural Sciences:**

- **University of California, Davis**

College of Agriculture and Environmental Science

- **California State University**

CSU campuses that offer majors or concentrations in Agricultural Science, Agriculture Business and Management, Environmental Horticulture, Plant Science, Natural Resource Management, Environmental Science, Animal Science include: CSU-Bakersfield, Chico, Fresno, Humboldt, Cal Poly Pomona and San Luis Obispo, San Bernardino, Stanislaus.

Agriculture and Natural Resource

AGRICULTURE AND NATURAL RESOURCES CAREER EXPLORATION CERTIFICATE OF CAREER PREPARATION

Students explore careers in natural resource management and related fields. An introduction to these emerging “Green” careers in: Conservation, Natural Resource Management, Environmental Horticulture, Renewable Energy, Alternative Fuel Systems, Geographical Information Systems, Sustainable Agriculture and Water Management.

Units Required: 12.0

Group I – All of the following must be completed

AGNR 170	Environmental Science and Sustainability	4.0
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Group II – Two of the following must be completed 5,6,7 or 8 units

AGNR 100	General Animal Science	3.0
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AGNR 105	Equine Health	3.0
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AGNR 120	Integrated Pest Management	3.0
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AGNR 106	Veterinary Terminology and Technology	3.0
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AGNR 141	Plant Materials and Usage II	3.0
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AGNR 152	Introduction to Irrigation and Water Management	3.0
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AGNR 138	Cooperative Education	2 or 3
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AGNR 171	Introduction to GIS in Natural Resources	4.0
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AGNR 172	Natural Resource Remote Sensing and GIS	3.0
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AGNR 173	Watershed Management and Restoration	3.0
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AGNR 175	Sustainable Agriculture, Environment and Society	3.0
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AGNR 177	Principles of Wildlife Management	3.0
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AGNR 178	Agriculture Economics	3.0
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AGNR 61	Natural Landscape Practices	4.0
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AUTO 89.2	Hybrid Vehicle Maintenance and Service	4.0
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CT 142	Renewable Energy Fundamentals	3.0
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ELECT 87	Industrial Control Sys. Devices and Ckts	3.0
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POLS 206	Introduction to Environmental Policy and Natural Resource Management	3.0
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GUID 100	Career and Life Planning	2.0
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Group III – Complete (3) 1-unit courses or AGNR 74 from the following list

AGNR 74	Honors Introduction to Statistics	6.0
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AGNR 74A	Sustainable Community Leadership	1.0
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AGNR 74B	Biodiversity Management and Technology	1.0
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AGNR 74C	Waste and Pollution Management	1.0
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AGNR 74D	Habitat Restoration	1.0
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AGNR 74E	Sustainable Agriculture Practices	1.0
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AGNR 74F	Sustainable Building and Energy Practices	1.0
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ANIMAL HEALTH TECHNICIAN CERTIFICATE OF CAREER PREPARATION

This specialized certificate prepares the student for employment in the animal care industry. There is strong demand for technicians that understand basic animal husbandry concepts and have the skills to implement emerging technologies, such as ultrasound and artificial insemination.

Upon completion of the certificate the student should be able to:

1. Apply the scientific concepts necessary to understand animal anatomy and physiology.
2. Compare and contrast animal health care practices and their role in disease processes and control.
3. Demonstrate safe handling and training of animals along with appropriate use of tools and equipment.

Units Required: 11.0 or 13.0

Group I – All of the following must be completed

AGNR 100	General Animal Science	3.0
AGNR 105	Equine Health	3.0
AGNR 106	Veterinary Terminology and Technology	3.0

Group II – One of the following must be completed:

AGNR 102	Equine Science	3.0
AGNR 101L	Livestock Feeding and Nutrition	3.0
AGNR 107	Livestock Selection and Evaluation	3.0
AGNR 123	Introduction to Plant Science	3.0
AGNR 131	Introduction to Soil Science	4.0
AGNR 138	Cooperative Education	2 or 3
AGNR 170	Environmental Science	4.0
AGNR 175	Sustainable Agriculture, Environment and Society	3.0
AGNR 177	Principles of Wildlife Management	3.0
AGNR 178	Agriculture Economics	3.0
CHEM 100	Introductory Chemistry	4.0
MATH 120	Introduction to Statistics	4.0

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ANIMAL SCIENCE SPECIALIST CERTIFICATE OF CAREER PREPARATION

Animal production is being asked to be sustainable, more economically, environmentally and socially responsible. In California, rapid housing development and new policies, such as Proposition 2 (the humane treatment of livestock) are encouraging new practices and technologies in all aspects of the industry, from managing animal waste to confined animal housing. A new breed of managers and technicians must adapt to these changes and have the skills to apply these new practices and technologies.

Upon completion of the certificate the student should be able to:

1. Apply the scientific concepts necessary to understand animal anatomy and physiology.
2. Compare and contrast animal health care practices and their role in disease processes and control.
3. Demonstrate safe handling and training of animals along with appropriate use of tools and equipment.

Units Required: 14.0 - 16.0

Group I – All of the following must be completed

AGNR 100	General Animal Science	3.0
AGNR 101L	Livestock Feeding and Nutrition	3.0
AGNR 106	Veterinary Terminology and Technology	3.0
AGNR 107	Livestock Selection and Evaluation	3.0

Group II – One of the following must be completed:

AGNR 102	Equine Science	4.0
AGNR 105	Equine Health	3.0
AGNR 123	Introduction to Plant Science	3.0
AGNR 131	Introduction to Soil Science	4.0
AGNR 138	Cooperative Education	2 or 3
AGNR 170	Environmental Science	4.0
AGNR 175	Sustainable Agriculture, Environment and Society	3.0
AGNR 177	Principles of Wildlife Management	3.0
AGNR 178	Agriculture Economics	3.0
CHEM 100	Introductory Chemistry	4.0
GUID 100	Career and Life Planning	2.0
MATH 120	Introduction to Statistics	4.0
MATH 120H	Honors Introduction to Statistics	4.0

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ENVIRONMENTAL HORTICULTURE AND RESTORATION TECHNICIAN CERTIFICATE OF CAREER PREPARATION

This certificate provides a broad overview of environmental horticulture techniques. Emerging technologies in integrated pest management (IPM), natural soil management, geographical information systems and ecological restoration are emphasized. This certificate prepares the student for entry-level positions within the nursery, recreational, restoration and landscaping industries and focuses on habitat enhancement for wildlife, and human use.

Upon completion of the certificate the student should be able to:

1. Apply the scientific concepts necessary to understand plant anatomy and physiology.
2. Implement the practices, and technological skills necessary to ensure the sustainability of plant agriculture and food production.
3. Demonstrate the safe and appropriate use of plant and horticulture technology tools and equipment.

Units Required: 13.0 - 16.0

Group I – All of the following must be completed

AGNR 121	Equine Science	3.0
AGNR 140	Equine Health	3.0
AGNR 152	Veterinary Terminology and Technology	3.0
AGNR 173	Watershed Management and Restoration	3.0

Group II – One of the following must be completed:

AGNR 60	Horticulture Lab	2.0
AGNR 61	Natural Landscape Practices	4.0
AGNR 74*	Conservation & Sustainability Practices	3.0
AGNR 120	Integrated Pest Management	3.0
AGNR 122	Plant Propagation and Production	3.0
AGNR 123	Introduction to Plant Science	3.0
AGNR 131	Introduction to Soil Science	4.0
AGNR 138	Cooperative Education	2 or 3
AGNR 141	Plant Materials & Usage II	3.0
AGNR 150	Landscape Design	3.0
AGNR 170	Environmental Science	4.0
AGNR 171	Introduction to GIS in Natural Resources	3.0
AGNR 172	Geospatial Technology I	3.0
AGNR 176	Advanced Irrigation Technology	3.0

**Any three of the six, 1-unit modules in AGNR 74(AGNR 74A, B, C, D, E, F)*

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EQUINE SCIENCE SPECIALIST CERTIFICATE OF CAREER PREPARATION

This certificate focuses on basic husbandry, preventative care and veterinary technology in horses. The anatomy and physiology of the horse is studied in comparison to other farm animals to give the student a picture of the need for specialized animal husbandry in the horse.

Upon completion of the certificate the student should be able to:

1. Understand animal anatomy and physiology.
2. Compare and contrast the knowledge of sustainable animal practices, their role in disease processes and control; evaluate the role of preventative veterinary health programs.
3. Demonstrate safe handling and training of animals along with appropriate use of tools and equipment.

Units Required: 12.0

Group I – All of the following must be completed

AGNR 102	Equine Science	4.0
AGNR 105	Equine Health	3.0
AGNR 106	Veterinary Terminology and Technology	3.0

Group II – One of the following must be completed:

AGNR 100	General Animal Science	3.0
AGNR 101L	Livestock feeding and Nutrition	3.0
AGNR 107	Livestock Selection and Evaluation	3.0
AGNR 138	Cooperative Education	2 or 3
AGNR 175	Sustainable Agriculture, Environment and Society	3.0
AGNR 177	Principles of Wildlife Management	3.0
AGNR 178	Agriculture Economics	3.0

FLORAL DESIGN TECHNICIAN CERTIFICATE OF CAREER PREPARATION

This specialized certificate prepares the student for employment in a commercial flower shop as a designer or assistant to the manager. These classes are taught by professionals in the industry and opportunities for success as a florist are unlimited. Whether for fun or profit, floral design is rapidly becoming a growing industry.

Upon completion of the certificate the student should be able to:

1. Plan and prepare floral products for display or resale
2. Demonstrate an understanding of basic floral design theory and construct a minimum of five different floral arrangements and corsages
3. Demonstrate the safe and appropriate use of floral design and horticulture technology tools and equipment

Units Required: 11.0 - 12.0

Group I – All of the following must be completed

AGNR 121	Fundamentals of Environmental Horticulture	3.0
AGNR 160	Beginning Floral Design	3.0
AGNR 161	Advanced Floral Design	3.0

Group II – One of the following must be completed:

AGNR 120	Integrated Pest Management	3.0
AGNR 122	Plant Propagation and Production	3.0
AGNR 123	Introduction to Plant Science	3.0
AGNR 138	Cooperative Education	2 or 3
AGNR 140	Plant Materials & Usage I	3.0
AGNR 141	Plant Materials & Usage II	3.0
AGNR 150	Landscape Design	3.0
AGNR 152	Introduction to Irrigation	3.0
CMST 109	Public Speaking	3.0

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GEOSPATIAL TECHNICIAN CERTIFICATE

Geospatial Information Science (GIS) is one of the fastest growing industries in the world today. While the rest of the technology sector has been working to recover from economic hardships, the GIS industry has grown to a \$30 billion per year enterprise. The influence and utility of GIS is creating symbiotic relationships and integration throughout industry, business, and government. This certificate is designed to introduce the students to various scientific and theoretical aspects associated with this field. Includes a “hands on” focus where students are introduced to the highly sophisticated software packages through modeling real-world conservation projects with local agencies and businesses.

Upon completion of the certificate the student should be able to:

1. Demonstrate skills in collecting, assembling and converting natural resource digital data from one format to another
2. Evaluate geospatial data from multiple sources and apply to the design of a basic Geospatial Information System that may be used to answer natural resource management issues and questions
3. Demonstrate the safe and appropriate use of floral design and horticulture technology tools and equipment

Units Required: 18.0 - 22.0

Group I – All of the following must be completed

AGNR 170	Environmental Science	4.0
AGNR 171	Introduction to GIS in Natural Resources	3.0
AGNR 172	Natural Resource Remote Sensing and Geographic Information Systems (GIS)	3.0
GEOG 101	Introduction to Physical Geography	3.0

Group II – One of the following must be completed:

AGNR 74*	Conservation & Sustainability Practices	6.0
AGNR 123	Introduction to Plant Science	3.0
AGNR 131	Soil Science	4.0
AGNR 138	Cooperative Education	2.0
AGNR 141	Plant Materials & Usage II	3.0
AGNR 173	Watershed Management and Restoration	3.0
AGNR 175	Sustainable Agriculture, Environment And Society	3.0
AGNR 176	Advanced Irrigation Technology	3.0
AGNR 177	Principles of Wildlife Management	3.0
CIS 96A	Structured Query Language A Using MySQL	2.0
CIS 280	Fundamentals of Database Management Systems	3.0
CTPW 116A	Water Distribution Systems I	3.0
GEOL 103	California Geology	3.0
POLS 206	Introduction to Environmental Policy and Natural Resource Management	3.0

Group III - Complete three 1-unit courses or AGNR 74 from the following list:

AGNR 74	Honors Introduction to Statistics	6.0
AGNR 74A	Sustainable Community Leadership	1.0
AGNR 74B	Biodiversity Management and Technology	1.0
AGNR 74C	Waste and Pollution Management	1.0
AGNR 74D	Habitat Restoration	1.0
AGNR 74E	Sustainable Agriculture Practices	1.0
AGNR 74F	Sustainable Building and Energy Practices	1.0

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LANDSCAPE SPECIALIST CERTIFICATE OF CAREER PREPARATION

The Landscape Specialist Certificate prepares the student to design, install and maintain landscapes. Focuses on the special challenges of drought tolerant and cold hard landscapes.

Upon completion of the certificate the student should be able to:

1. Be prepared for an entry level career in the Agriculture and Natural Resource Management Industries and/or to transfer to an institute of higher education to further their preparation in one of the applied natural sciences or related disciplines
2. Apply complex problem-solving skills using technology, scientific knowledge/method, natural resource policy, sustainable practices, computer proficiency and industry standard equipment to current/real-world agriculture and natural resource management issues.

Units Required: 14.0-16.0 units

Group I – All of the following must be completed

AGNR 121	Fundamentals of Environmental Horticulture	3.0
AGNR 140	Plant Materials and Usage I	3.0
AGNR 150	Landscape Design	3.0
AGNR 152	Introduction to Irrigation	3.0

Group II – One of the following must be completed:

AGNR 60	Horticulture Lab	4.0
AGNR 120	Integrated Pest Management	3.0
AGNR 122	Plant Propagation and Production	3.0
AGNR 131	Soil Science	4.0
AGNR 138	Cooperative Education	2 or 3
AGNR 141	Plant Materials & Usage II	3.0
AGNR 170	Environmental Science and Sustainability	4.0
AGNR 171	Introduction to GIS in Natural Resources	3.0
CMST 109	Public Speaking	3.0
CT 107	Technical Math	3.0
CT 131	Microcomputers in Construction	4.0

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HORTICULTURE SPECIALIST CERTIFICATE OF ACHIEVEMENT (07532)

The Horticulture Specialist Certificate prepares the student with the basics of establishing and/or managing a horticulture business and a wholesale or retail nursery. This certificate serves as a good crossover for students wishing to enter a natural resource management career.

Upon completion of the certificate the student should be able to:

1. Apply complex problem-solving skills using technology, scientific knowledge/method, natural resource policy, sustainable practices, computer proficiency and industry standard equipment to current/real-world agriculture and natural resource management issues.

Units Required: 23.0- 27.0

Group I – All of the following must be completed

AGNR 120	Integrated Pest Management	3.0
AGNR 121	Fundamentals of Environmental Horticulture	3.0
AGNR 122	Plant Propagation and Greenhouse Production	3.0
AGNR 140	Plant Materials and Usage I	3.0
AGNR 131	Soil Science	4.0
AGNR 141	Plant Materials Usage II	3.0

Group II – Two of the following must be completed:

AGNR 160	Beginning Floral Design	3.0
AGNR 150	Landscape Design	3.0
AGNR 152	Irrigation and Water Management	3.0
AGNR 170	Environmental Science and Sustainability	4.0
AGNR 171	Introduction to GIS in Natural Resources	3.0
AGNR 60	Horticulture Lab	2.0
AGNR 138	Cooperative Education	3.0
CMST 109	Public Speaking	3.0
CT 107	Technical Math	3.0
CT 131	Microcomputers in Construction	4.0

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IRRIGATION DESIGN TECHNICIAN CERTIFICATE OF CAREER PREPARATION

This certificate prepares the student to design, install and maintain irrigation systems. In the face of water shortages in California, irrigation education has shifted to designing water conserving landscapes and the use of technologies that conserve water. The job market remains robust in the agriculture, horticulture, landscape and water conservation industries, given that outdoor water use comprises sixty to seventy-five percent of total water use in most communities.

Upon completion of the certificate the student should be able to:

1. Apply irrigation principles and concepts to create a complete water-efficient irrigation design
2. Demonstrate a thorough understanding and knowledge of irrigation system installation that ensures the sustainability of landscapes and food production
3. Demonstrate the safe and appropriate use of irrigation technology tools and equipment

Units Required: 11.0 - 13.0

Group I – All of the following must be completed

AGNR 121	Introduction to Environmental Horticulture	3.0
AGNR 152	Irrigation and Water Management	3.0
AGNR 176	Advanced Irrigation Technology	3.0

Group II – One of the following must be completed:

AGNR 60	Horticulture Lab	2.0
AGNR 61	Natural Landscape Practices	4.0
AGNR 122	Plant Propagation and Greenhouse Production	3.0
AGNR 123	Introduction to Plant Science	3.0
AGNR 131	Introduction to Soil Science	4.0
AGNR 138	Cooperative Education	2.0
AGNR 140	Plant Materials & Usage I	3.0
AGNR 141	Plant Materials and Usage II	3.0
AGNR 150	Landscape Design	3.0
AGNR 170	Environmental Science and Sustainability	4.0
AGNR 171	Introduction to GIS in Natural Resources	3.0
AGNR 173	Watershed Management and Restoration	3.0
AGNR 175	Sustainable Agriculture, Environment And Society	3.0
CTPW 116A	Water Distribution Systems I	3.0
CTPW 119	Wastewater Operations	3.0

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NATURAL RESOURCE MANAGEMENT TECHNICIAN CERTIFICATE OF CAREER PREPARATION

This certificate prepares students for the emerging “green” careers in industry and with natural resource management agencies such as: The Natural Resource Conservation Service, US Forestry Service, National Park Service, The Bureau of Land Management, and other air and water management agencies. Students will learn the scientific concepts and skills needed to become technicians in: water and soils conservation, habitat restoration, ecological field data collection and interpretation, geospatial technologies, biodiversity management, and sustainable agriculture practices.

Upon completion of the certificate the student should be able to:

1. Evaluate the values and principles that enhance a community wide sustainability ethic
2. Apply scientific knowledge, natural resource policy, sustainable practices, and technology to balance the economic, social and environmental aspects of sustainable development
3. Demonstrate the safe and appropriate use of natural resource management technology, tools and equipment

Units Required: 16.0 - 21.0

Group I – All of the following must be completed

AGNR 170	Environmental Science and Sustainability	4.0
AGNR 172	Natural Resource Remote Sensing and GIS	3.0
AGNR 173	Watershed Management and Restoration	3.0
AGNR 170L	Environmental Science and Sustainability Laboratory	1.0

Group II – One of the following must be completed:

AGNR 74*	Conservation & Sustainability Practices	6.0
AGNR 100	General Animal Science	3.0
AGNR 122	Plant Propagation and Greenhouse Production	3.0
AGNR 123	Introduction to Plant Science	3.0
AGNR 131	Introduction to Soil Science	4.0
AGNR 138	Cooperative Education Agriculture	2 or 3
AGNR 141	Plant Materials and Usage II	3.0
AGNR 171	Introduction to GIS in Natural Resources	3.0
AGNR 173	Watershed Management and Restoration	3.0
AGNR 175	Sustainable Agriculture, Environment and Society	3.0
AGNR 176	Advanced Irrigation Technology	3.0
AGNR 177	Principles of Wildlife Management	3.0
AUTO 89.1	Introduction to Hybrid Vehicle Technology	4.0
BIOL 100	General Biology	4.0
CT 142	Renewable Energy	3.0
ELCT 87	Industrial Control Sys, Devices and Circuits	3.0
FIRE 109	Wildland Fire Control	3.0
POLS 206	Introduction to Environmental Policy and Natural Resource Management	3.0

**Note: Complete three 1-unit courses or AGNR 74 from the following list:*

AGNR 74	Honors Introduction to Statistics	6.0
AGNR 74A	Sustainable Community Leadership	1.0
AGNR 74B	Biodiversity Management and Technology	1.0
AGNR 74C	Waste and Pollution Management	1.0
AGNR 74D	Habitat Restoration	1.0
AGNR 74E	Sustainable Agriculture Practices	1.0
AGNR 74F	Sustainable Building and Energy Practices	1.0

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PLANT SCIENCE TECHNICIAN CERTIFICATE OF CAREER PREPARATION

This certificate is intended to give students a basic understanding of the proper structure and function of plant systems that underlie healthy ecosystems and provide a sustainable food supply. Students learn the scientific concepts of plant breeding, soil science, pest management, proper irrigation methods, ecological restoration practices, sustainable agriculture practices, poly-culture, and natural fertilizers.

Upon completion of the certificate the student should be able to:

1. Understand plant anatomy and physiology
2. Compare and contrast the knowledge of sustainable plant science practices, their role in disease control and integrated pest management programs
3. Demonstrate the safe and appropriate use of plant and horticulture technology tools and equipment

Units Required: 17.0-23.0

Group I – All of the following must be completed

AGNR 122	Plant Propagation and Greenhouse Production	3.0
AGNR 123	Introduction to Plant Science	3.0
AGNR 131	Introduction to Soil Science	4.0
AGNR 141	Plant Materials and Usage II	3.0

Group II – One of the following must be completed:

AGNR 60	Horticulture Laboratory	2.0
AGNR 61	Natural Landscape Practices	4.0
AGNR 74*	Conservation & Sustainability Practices	6.0
AGNR 100	General Animal Science	3.0
AGNR 120	Integrated Pest Management	3.0
AGNR 121	Introduction to Environmental Horticulture	3.0
AGNR 138	Cooperative Education Agriculture	2.0
AGNR 140	Plant Materials & Usage I	3.0
AGNR 150	Landscape Design	3.0
AGNR 152	Irrigation and Water Management	3.0
AGNR 170	Environmental Science and Sustainability	4.0
AGNR 171	Introduction to GIS in Natural Resources	3.0
AGNR 172	Natural Resource Remote Sensing and GIS	3.0
AGNR 175	Sustainable Agriculture, Environment And Society	3.0
AGNR 176	Advanced Irrigation Technology	3.0
AGNR 178	Agriculture Economics	3.0
BIOL 100	General Biology	4.0
CHEM 100	Introductory Chemistry	4.0
GUID 100	Career and Life Planning	2.0
MATH 120	Introduction to Statistics	4.0

**Note: Complete three 1-unit courses or AGNR 74 from the following list:*

AGNR 74	Honors Introduction to Statistics	6.0
AGNR 74A	Sustainable Community Leadership	1.0
AGNR 74B	Biodiversity Management and Technology	1.0
AGNR 74C	Waste and Pollution Management	1.0
AGNR 74D	Habitat Restoration	1.0
AGNR 74E	Sustainable Agriculture Practices	1.0
AGNR 74F	Sustainable Building and Energy Practices	1.0

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WATER RESOURCE MANAGEMENT CERTIFICATE OF CAREER PREPARATION

Focuses on water resource management in the Mojave Desert and makes appropriate linkages to the critical nature of water management in California and around the world. Students explore the economic, political, social and environmental pressures that must be balanced in providing sustainable water supplies. Students also learn the scientific principles and technologies that support watershed restoration, water distribution and management, soil erosion prevention, storm-water management, waste water treatment and water quality.

Upon completion of the certificate the student should be able to:

1. Evaluate the values and principles that enhance a sustainable water supply
2. Apply scientific knowledge, natural resource policy, sustainable practices, and technology to balance the economic, social and environmental aspects of sustainable development.

Units Required: 13.0-17.0

Group I – All of the following must be completed

AGNR 170	Environmental Science and Sustainability	4.0
AGNR 170L	Environmental Science and Sustainability Laboratory	1.0
AGNR 173	Watershed Management and Restoration	3.0
AGNR 178	Agriculture Economics	3.0

Group II – One of the following must be completed:

AGNR 74*	Conservation and Sustainability Practices	6.0
AGNR 121	Fundamentals of Environmental Horticulture	3.0
AGNR 123	Introduction to Plant Science	3.0
AGNR 131	Introduction to Soil Science	4.0
AGNR 138	Cooperative Education	2.0
AGNR 140	Plant Materials & Usage I	3.0
AGNR 141	Plant Materials and Usage II	3.0
AGNR 152	Irrigation and Water Management	3.0
AGNR 171	Introduction to GIS in Natural Resources	3.0
AGNR 175	Sustainable Agriculture, Environment And Society	3.0
AGNR 176	Advanced Irrigation Technology	3.0
CTPW 116A	Water Distribution Systems I	3.0
CTPW 119	Wastewater Operations	3.0
ELCT 87	Industrial Control Systems, Devices and Circuits	3.0
GEOG 130	Introduction to Weather and Climate	3.0
POLS 206	Introduction to Environmental Policy & Natural Resource Management	3.0

**Any three of the six 1 unit modules (AGNR 74A, B, C, D, E, F)*

Agriculture and Natural Resources Courses

AGNR 60 ENVIRONMENTAL HORTICULTURE LABORATORY

Units: 1.0 - 4.0

48-54 hours laboratory per unit, per term.

(No prerequisites)

Horticulture laboratory setting for horticulture students to practice the skills gained from experience and traditional lecture/laboratory classes. This setting will further prepare students for employment in the horticulture industry.

AGNR 61 NATURAL LANDSCAPE PRACTICES

Units: 4.0

64-72 hours lecture.

(No prerequisites)

Introduction to the basics of landscape design; plant material selection; planting and care; composting; irrigation design and maintenance organic and natural methods; soil factors; landscape redesign and renovation; integrated pest management; creating a custom landscape. Emphasis is on the use of water-conserving and resource-efficient practices in establishing functional, attractive landscapes.

AGNR 61C RECYCLING AND THE ESSENTIALS OF COMPOSTING

Units: 0.5

8-9 hours lecture

(No prerequisites)

Students learn how to make productive use of unwanted yard waste and other biomass. Topics include: benefits of composting; the biological process of composting; materials that can and cannot be composted; composting methods; vermiculture; using the finished product as a soil conditioner or mulch, and using other solid waste such as straw and concrete in the landscape.

AGNR 74 CONSERVATION AND SUSTAINABILITY PRACTICES

Units: 6.0

96-108 hours lecture

(No prerequisites)

This course introduces students to the exciting and rapidly expanding practices in the conservation and sustainable use of our natural resources. Local case studies and emerging green technology is presented. Students explore the social, economic and environmental issues that underlie this new frontier in societal development. The Mojave Desert provides a wonderful natural laboratory where many of these sustainability issues can be explored.

AGNR 74A SUSTAINABLE COMMUNITY LEADERSHIP

Units: 1.0

16-18 hours lecture

(No prerequisites)

Students learn to plan, manage and implement sustainable development practices; development that meets the needs of the present generation without compromising the ability of future generations to meeting their own needs. Focus is on the principles of sustainable development that ensure effective leadership and a balance of environmental, social, and economic issues. Extensive use is made of case studies and practical on-site experiences in the Mojave Desert.

AGNR 74B BIODIVERSITY MANAGEMENT AND TECHNOLOGY

Units: 1.0

16-18 hours lecture

(No prerequisites)

The reduction of species diversity is a major indicator of the health of a complete ecosystem. This class explores the science, tools and practice of conserving species diversity. Students learn to implement the exciting tools of Geographic Information Systems (GIS), Global Positioning Systems (GPS), Satellite Imaging and Database Management, along with an understanding of the expanding career opportunities in these fields. Extensive use is made of local Mojave Desert case studies.

AGNR 74C WASTE AND POLLUTION MANAGEMENT

Units: 1.0

16-18 hours lecture

(No prerequisites)

Students study the use of our natural resources on the environmental, social and economic health of our planet. Focus is on emerging careers and technologies for solid waste, green waste and waste water treatment. The consequences of poor management on the quality of our water and air are explored using real-world examples in the Mojave watershed

Agriculture and Natural Resources Courses

AGNR 74D HABITAT RESTORATION

Units: 1.0 | 16-18 hours lecture

(No prerequisites)

Students study ecological restoration that effectively repairs the damage done by human activities to natural habitats. The methodologies appropriate to a particular situation are presented. Topics include: native seed banking, Mycorrhizal relationships, seed stratification and scarification, nutrient requirements, water requirements, transplanting protocols, watershed restoration, soil evaluation and rehabilitation. Case studies will include surface mine reclamation in the Mojave Desert.

AGNR 74E SUSTAINABLE AGRICULTURE PRACTICES

Units: 1.0 | 16-18 hours lecture

(No prerequisites)

Tremendous progress has been made towards farming with nature and restoring ranches to be part of the natural ecosystem. This “farming with the wild” is not only producing more food but enhancing the environment. Students study sustainable practices such as integrated pest management, rotational grazing, organic farming, hedgerows and natural pollination.

AGNR 74F SUSTAINABLE BUILDING AND ENERGY PRACTICES

Units: 1.0 | 16-18 hours lecture

(No prerequisites)

Introduction to renewable energy technology for home use and ecological design. Students study the latest technology to produce energy from the sun, wind, geothermal and biomass.

The sustainable building practices of straw-bale, Super Adobe, Cob, grey-water and solar radiant heating are explored.

AGNR 100 GENERAL ANIMAL SCIENCE

Units: 3.0 | **CSU, UC** | 48-54 hours lecture

(No prerequisites)

A scientific overview of livestock and poultry; highlights anatomy and physiology, reproduction, nutrition, behavior, health, and marketing pertinent environmental and social issues, to include animal welfare. Includes human opportunity to influence trait inheritance, population densities, productivity and sustainability of animal production industry. Focus on technologies that assure efficiency and viability of this industry.

AGNR 101L LIVESTOCK FEEDING AND NUTRITION

Units: 3.0 | **CSU, UC** | 32-36 hours lecture 48-54 hours laboratory

(No prerequisites)

The science of animal nutrition including the fundamentals of digestion and absorption in both ruminants and non-ruminants. Anatomy of large animal digestive systems will be discussed along with feed requirements. Students will formulate rations for a variety of livestock for maximum performance and growth. Laboratory required.

AGNR 102 EQUINE SCIENCE

Units: 4.0 | **CSU, UC** | 48-54 hours lecture

(No prerequisites)

Survey of the equine industry, encompassing the evolution and role of the equine species throughout history, breed selection and development, nutrition, disease, preventative health, reproductive management, basic horsemanship, stabling alternatives and career opportunities. Laboratory required.

AGNR 105 EQUINE HEALTH (Formerly AGNR 50)

Units: 3.0 | **CSU** | 48-54 hours lecture

(No prerequisites. Grade Option)

Students learn the basics of proper veterinary care of the horse, including what to do before the veterinarian is called. Course introduces the diseases and lameness associated with the musculoskeletal system, as well as diseases of the respiratory, digestive, neurological, and reproductive systems. Emphasis is on preventive maintenance and managerial practices needed to keep the equine athlete, broodmare or family horse in good health in the High Desert Region of California.

Agriculture and Natural Resources Courses

AGNR 106 VETERINARY TERMINOLOGY AND TECHNOLOGY (Formerly AGNR 51)

Units: 3.0 **CSU** | 48-54 hours lecture

(No prerequisites)

An introduction to the terminology for drugs, disease and dissection in dogs, cats, horses, ruminants, swine and birds. Basic terminology and function of the skeletal, muscular, digestive, urinary, cardiovascular, respiratory, endocrine, reproductive and nervous systems. Overview of the available technology for animal testing and diagnostic evaluation.

AGNR 107 LIVESTOCK SELECTION AND EVALUATION (Formerly AGNR 55)

Units: 3.0 **CSU** | 48-54 hours lecture

(No prerequisites)

Detailed analysis of various visual and physical methods of appraising beef, sheep, swine and horses concerning functional and economic value. Written and oral summaries of evaluation will be learned. Specific reference will be made to performance data, preparing animals for market and show.

AGNR 120 INTEGRATED PEST MANAGEMENT

Units: 3.0 **CSU** | 32-36 hours lecture 48-54 hours laboratory

(No prerequisites)

Students will learn to employ the principles and concepts of managing insects, diseases and weeds in the landscape and nursery industry. The class will focus on pest identification and the emerging practices of Integrated Pest Management. Effective use of pesticides and weedicides under the existing laws and regulations will be emphasized.

AGNR 121 INTRODUCTION TO ENVIRONMENTAL HORTICULTURE

Units: 3.0 **CSU** | 32-36 hours lecture and 48-54 hours laboratory

(No prerequisites)

Introduction to environmental horticulture with an emphasis on nursery operations, landscaping, turf management, floral design and ecological restoration. Topics include basic plant structure, cultural practices, propagation, landscape structures and layout, seed management, soil analysis, pest management, plant identification, turf grass care and survey of career opportunities.

AGNR 122 PLANT PROPAGATION AND GREENHOUSE PRODUCTION

Units: 3.0 **CSU** | 32-36 hours lecture and 48-54 hours laboratory

(No prerequisites)

Students will explore the challenges of propagation and production of native and drought tolerant plants that are adapted to the extreme climate of the High Desert using techniques commonly used in a professional greenhouse environment. Topics include sexual and asexual propagation techniques. The nursery operations of growing structures, site layout, and preparation of planting media are emphasized.

AGNR 123 INTRODUCTION TO PLANT SCIENCE

Units: 3.0 **CSU** | 32-36 hours lecture and 48-54 hours laboratory

(No prerequisites)

This course provides an introduction to plant science with topics in plant structure and function and the environmental factors involved in plant growth and development. Students will learn: plant physiology, plant reproduction and propagation, effects of soil, water, and climate, use of plants to meet human needs, sustainable horticultural practices, integrated pest management, the role of new technologies in contemporary plant science.

AGNR 131 INTRODUCTION TO SOIL SCIENCE

Units: 4.0 **CSU, UC** | 48-54 hours lecture and 48-54 hours laboratory

(No prerequisites)

The study of soil derivation, classification and characteristics. Soil use and management including erosion, moisture retention, structure, cultivation, organic matter and microbiology. Laboratory topics include soil type, classification, soil reaction, soil fertility and physical properties of soil.

Agriculture and Natural Resources Courses

AGNR 138 COOPERATIVE EDUCATION

See Cooperative Education listing (1-8 units). [CSU](#)

AGNR 140 PLANT MATERIALS AND USAGE I

Units: 3.0 [CSU](#) | 32-36 hours lecture and 48-54 hours laboratory

(No prerequisites)

Students will learn how to identify and use the fascinating array of plants that are appropriate to desert landscapes. Includes identification, growth habits, and cultural requirements of plants common to the California landscape. Trees, shrubs, vines, ground covers, annuals, perennials, and tropical foliage will be covered. Drought tolerant plants will be stressed.

AGNR 141 PLANT MATERIALS AND USAGE II

Units: 3.0 [CSU, UC](#) | 32-36 hours lecture and 48-54 hours laboratory

(No prerequisites)

Identification, growth habits, culture and ornamental use of landscape and indoor plants adapted to climates of California. Plants emphasized will come from the current California Association of Nurseries & Garden Centers (CANGC) and Professional Land care Network (PLANET) Certification Tests Plant Lists. Covers those plants best observed and studied in the fall of the year. Plant materials from local regions will also be included. Laboratory required.

AGNR 150 LANDSCAPE DESIGN

Units: 3.0 [CSU](#) | 32-36 hours lecture and 48-54 hours laboratory

(No prerequisites)

Fundamentals and history of landscape design. Studies of color, texture, form and use of landscape material. Consideration will also be given to proper site layout with regard to existing elevations and conservation management. Emphasis will be on selection and placement of plant material, walks, patios, decks, and other structures for landscape use. Students design and draft actual landscape projects.

AGNR 152 IRRIGATION AND WATER MANAGEMENT

Units: 3.0 [CSU](#) | 32-36 hours lecture and 48-54 hours laboratory

(No prerequisites)

Prepares students to design, install and maintain a water efficient landscape irrigation system. Topics include water supply, basic hydraulics, component identification and terminology, system layout, pipe sizing; types of heads, valves, controllers. Students will gain appreciation for water conservation and quality issues. Students will also learn to troubleshoot irrigation design and electrical problems.

AGNR 160 BEGINNING FLORAL DESIGN

Units: 3.0 [CSU](#) | 32-36 hours lecture and 48-54 hours laboratory

(No prerequisites)

An introduction to the fundamental theories, techniques and skills currently practiced in the floral industry. Includes applied art principles, cut flower care, handling practices, proper use of florist tools and materials, pricing of floral products and use of current floral business technology. Students construct corsages, floral arrangements, and foliage plant items which meet floral industry standards.

AGNR 161 ADVANCED FLORAL DESIGN

Units: 3.0 [CSU](#) | 32-36 hours lecture and 48-54 hours laboratory

(No prerequisites)

Contemporary design theory emphasizing creativity, self-expression, and professional design situations. Students learn the skills and techniques of the floral industry, including wedding, sympathy, party, holiday, high style and advanced floral designs and displays. Other techniques include working with the customers, consultations, pricing and the use of computers.

Agriculture and Natural Resources Courses

AGNR 170 ENVIRONMENTAL SCIENCE AND SUSTAINABILITY

Units: 4.0 **CSU,UC** | 64-72 hours lecture

(No prerequisites)

A study of the applied natural sciences that support the sustainable use and conservation of the world's natural resources including: soil, water, forests, minerals, plant and animal life. Focused on implementing sustainability principles to balance environmental policy, economic stability and social equity to manage modern problems in resource use and global environmental issues. Emphasis on the citizen's role in conservation with particular attention to California conditions.

AGNR 170L ENVIRONMENTAL SCIENCE AND SUSTAINABILITY LABORATORY

Units: 1.0-4.0 **CSU,UC** | 48 -54 hours laboratory per unit

(No prerequisites)

Students gain hands-on experience with the concepts and technology that supports environmental science and conservation. Students will learn about the diverse agencies that manage our resources along with their history and philosophies. Each of the major natural resources such as water, air, sustainable building, renewable energy, forests, wildlife, agriculture, and soils will be covered and the environmental policies that govern the use of these resources.

AGNR 171 INTRODUCTION TO GIS IN NATURAL RESOURCES

Units: 3.0 **CSU** | 32-36 hours lecture and 48-54 hours laboratory

(No prerequisites)

Focus on electronic methods of cartography following a presentation of mapping concepts and methods in agriculture and natural resources applications. This course covers the history, structure and uses of the basic operations of Geographic Information Systems (GIS), including hardware and software requirements used in agriculture and natural resources. Examination of the role of other spatial technologies: aerial photography, remote sensing, and Global Positioning Systems (GPS).

AGNR 172 NATURAL RESOURCE REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEMS (GIS) (Formerly AGNR 72)

Units: 3.0 **CSU** | 32-36 hours lecture and 48-54 hours laboratory

(No prerequisites)

This course examines geographic information systems (GIS) in an interdisciplinary approach for analysis and decision making in diverse natural resource industries. Aerial photographs, global positioning systems (GPS) and satellite imagery will be used to interpret, recognize and delineate vegetation types, land management practices, wildlife habitat, water resource management and other significant environmental parameters.

AGNR 173 WATERSHED MANAGEMENT AND RESTORATION (Formerly AGNR 73)

Units: 3.0 **CSU** | 48-54 hours lecture

(No prerequisites)

An introduction to the methods, techniques, and tools used to restore and enhance watershed health. This class focuses on water resource management in the West Mojave Desert and makes appropriate linkages to the critical nature of water management in California and around the world. Students explore the economic, political, social, and environmental pressures that must be balanced in providing sustainable water supplies. Students learn the scientific principles that support habitat restoration, groundwater management, soil erosion prevention, and water quality.

AGNR 175 SUSTAINABLE AGRICULTURE, ENVIRONMENT, AND SOCIETY

Units: 3.0 **CSU, UC** | 48-54 hours lecture

(No prerequisites)

This course explores how society is moving away from an industrialized to a sustainable agricultural model. Emphasis on sustainable agriculture's use of technology and the corresponding improvement of the health of the environment, economy, and society.

Agriculture and Natural Resources Courses

AGNR 176 ADVANCED IRRIGATION TECHNOLOGY (Formerly AGNR 76)

Units: 3.0 CSU | 48-54 hours lecture

(No prerequisites)

Students will be introduced to the proper steps to design an irrigation system. They will learn about equipment, water management techniques and water quality technology that supports better management of our limited water supply. Exciting new technology in domestic water conservation and water quality will be introduced.

AGNR 177 PRINCIPLES OF WILDLIFE MANAGEMENT

Units: 3.0 CSU | 48-54 hours lecture

(No prerequisites)

The study of plant and animal ecology in relation to principles of wildlife management with an emphasis on identification, sexing and aging criteria, wildlife population dynamics, wildlife habitat, and a review of trapping and marking techniques. Students will be introduced to the principles of biodiversity management and the emerging technology of geographic information systems to monitor wildlife populations.

AGNR 178 AGRICULTURE ECONOMICS

Units: 3.0 CSU | 48-54 hours lecture

(No prerequisites)

The place of agriculture and farming in the economic system; basic economic concepts, and problems of agriculture; pricing and marketing problems, factors of production; and state and federal farm programs affecting the farmer's economic position.