

# MODULE CURRICULUM AND ASSESSMENT STANDARDS:

## SECTION F: ADVANCED LEVEL

The following pages define the curriculum and assessment standards for the advanced level of Agriculture.

Advanced level modules demand a higher level of expertise and help prepare students for entry into the workplace or a related post-secondary program.

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## MODULE AGR3010: ISSUES IN AGRICULTURE

**Level:** Advanced

**Theme:** Social and Cultural Perspectives

**Prerequisite:** None

**Module Description:** Students analyze a range of issues relevant to agriculture and food production, and they develop strategies for dealing with agriculture issues within a global context.

**Module Parameters:** Access to community and government agencies responsible for agriculture planning, research and sustainable resource management.

**Note:** This module may raise sensitive ethical concerns. Emphasis should be placed on a “process” for conflict analysis and not on particular positions that may be expressed.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>analyze a range of economic, environmental and social issues in agriculture</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>analyzing alternatives and consequences associated with each of five issues in agriculture. Alternatives and consequences to address relevant economic, environmental and social perspectives.</li> </ul> <p><i>Assessment Tool</i>  <i>Issue Analysis: Alternatives and Consequences, AGR3010–1</i>  <i>Sample Issues for Research, Analysis and Debate AGRSAM</i></p> <p><i>Standard</i>  <i>Analyze five issues to a standard of 3 on the rating scale</i></p>	25
<ul style="list-style-type: none"> <li>compare and contrast issues that involve agriculture in Alberta and Canada with similar issues at a global level</li> </ul>	<ul style="list-style-type: none"> <li>completing a research project that examines an agriculture issue of current significance in Alberta and/or Canada, and compares/relates that issue to similar issue(s) at the global level.</li> </ul> <p><i>Assessment Tool</i>  <i>Research Process: Local and Global Issues in Agriculture, AGR3010–2</i></p> <p><i>Standard</i>  <i>Complete all components of research to a standard of 3 on the rating scale</i></p>	25



**MODULE AGR3010: ISSUES IN AGRICULTURE** (continued)

Concept	Specific Learner Expectations	Notes
Issue Analysis (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• list and categorize concerns being expressed regarding a social, economic and environmental issue in agriculture; e.g.:               <ul style="list-style-type: none"> <li>– environmental impacts</li> <li>– nutritional or food safety concerns</li> <li>– social, political or economic factors</li> <li>– ethical concerns</li> </ul> </li> <li>• critically analyze a current issue in agriculture; e.g.:               <ul style="list-style-type: none"> <li>– identify conflicts among different stakeholder groups</li> <li>– gather information relevant to different sides of the issue</li> <li>– consider the implications of adopting different alternatives.</li> </ul> </li> </ul>	<p>Discuss and provide a definition for “ethics.” View <i>The Ethics Jungle</i> (a CTS video on ethics available from ACCESS).</p> <p>Remind students that it is the “process” for issue analysis that is important, not particular positions that may be adopted.</p>
The Global Context	<ul style="list-style-type: none"> <li>• relate a local social, economic or environmental issue in agriculture to a similar issue at the global level</li> <li>• compare statements made by scientists, different interest groups and the media regarding the issue</li> <li>• describe costs and benefits associated with different approaches for dealing with the issue at local and global levels.</li> </ul>	<p>For case studies and teaching activities on issues in agriculture, obtain <i>Issues: An Integrated Approach to Sensitive Science and Society Issues</i> (see Section I: Student Learning Guide).</p> <p>Consider positions taken by:</p> <ul style="list-style-type: none"> <li>• producer/processor</li> <li>• environmentalist</li> <li>• animal welfare advocate</li> <li>• consumer</li> <li>• scientist</li> <li>• politician</li> <li>• business person.</li> </ul> <p>Explore potential for compromise and/or consensus among stakeholder groups.</p>

**MODULE AGR3010: ISSUES IN AGRICULTURE** (continued)

Concept	Specific Learner Expectations	Notes
Action Plans	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• prepare a position paper on a complex issue in agriculture; e.g.:               <ul style="list-style-type: none"> <li>– clarify the issue and identify related perspectives</li> <li>– develop a position and provide a rationale</li> <li>– outline a personal plan of action</li> </ul> </li> <li>• participate in a debate of a complex issue in agriculture while assuming the role of one or more stakeholder groups; e.g.:               <ul style="list-style-type: none"> <li>– farmer</li> <li>– environmentalist</li> <li>– animal-welfare advocate</li> <li>– consumer</li> <li>– scientist.</li> </ul> </li> </ul>	<p>Remember to focus attention on the “process” used to develop a position, rather than particular positions that may be adopted.</p> <p>Invite community members to participate in the debates and/or serve as moderators.</p>

## MODULE AGR3030: FIELD CROPS 2 (MANAGEMENT TECHNIQUES)

**Level:** Advanced

**Theme:** Technology and Applications

**Prerequisite:** AGR2030 Field Crops 1 (Materials & Processes)

**Module Description:** Students demonstrate the techniques used to produce a field crop, focusing attention on industry trends, enterprise selection, genetics and reproduction, and production skills. Potential areas of specialization include the production of cereals, forage, oil seeds, pulse crops, mushrooms, spices/herbs, vegetables, fruits, medicinal plants and exotic plants.

**Module Parameters:** Access to a land laboratory.

Facilities and equipment should permit students to perform practical skills in **two** areas of plant production; e.g., soil preparation, seeding/propagation, cultivation, irrigation, fertilizing, pest and disease control.

Off-campus learning can support the development of practical skills in crop production; consultation with a work site supervisor ensures that relevant safety considerations are addressed and that student learning meets or exceeds the learner expectations in this module.

See the *Off-campus Education Guide for Administrators, Counsellors and Teachers* (Alberta Education, 1995) for further information regarding off-campus learning.

**Note:** This module can be combined with other modules from the Agriculture strand and/or from the Career Transitions strand to provide opportunities for students to develop technical competencies within the Alberta Green Certificate Training Program (Alberta Agriculture, Food and Rural Development). Opportunities may also exist for the completion of practical components of this module through projects undertaken with local youth groups; e.g., 4-H Clubs. See Section H (Linkages/Transitions) of this guide for further information.

**Supporting Module:** CTR2210 Workplace Safety (Practices) [Career Transitions Strand]

Because of the practical nature of this module, students need a general knowledge of accepted practices and potential hazards when performing tasks related to crop production. See Planning for Instruction in Section C for further information on student safety.

**MODULE AGR3030: FIELD CROPS 2 (MANAGEMENT TECHNIQUES) (continued)**

**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• identify trends in the production and use of new varieties of field crops</li>   <li>• describe principles of genetics and reproduction, and explain their application to field crop species</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• completing a research project on trends in the production and use of new and/or different species/varieties of field crops. Research to focus attention on two or more field crop species/varieties, and address:               <ul style="list-style-type: none"> <li>– production and consumption trends within Alberta, Canada and the global community</li> <li>– factors that determine viability of the production enterprise.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Research Process: Opportunities in Field Crop Production, AGR3030–1</i></p> <p><i>Standard</i>  <i>Conduct research to a standard of 3 on the rating scale.</i></p> <ul style="list-style-type: none"> <li>• identify major components of a strategy used to maintain/improve the quality and productivity of a field crop species. Strategy to address:               <ul style="list-style-type: none"> <li>– principles of heredity</li> <li>– desirable and undesirable plant traits</li> <li>– selection criteria and procedures</li> <li>– applications of hybridization</li> <li>– standards for grading</li> <li>– current and emerging technologies.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Criteria: Components of a Plant Breeding Strategy, AGR3030–2</i></p> <p><i>Standard</i>  <i>Identify and explain all components of the strategy to a standard of 3 on the rating scale.</i></p>	<p>20</p>         <p>30</p>



**MODULE AGR3030: FIELD CROPS 2 (MANAGEMENT TECHNIQUES) (continued)**

Concept	Specific Learner Expectations	Notes
<p>Industry Trends and Viability</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• research production and consumption patterns within Alberta, Canada and the global community</li> <li>• describe the impact of economic, environmental and social trends on production practices within the industry; e.g.:               <ul style="list-style-type: none"> <li>– international trade and global competition</li> <li>– trade liberalization</li> <li>– rural and urban populations</li> <li>– food safety and consumer confidence</li> <li>– consumer demands</li> <li>– support for research and development</li> <li>– environmental stewardship and sustainable development</li> </ul> </li> <li>• identify market factors that influence crop selection; e.g.:               <ul style="list-style-type: none"> <li>– market demands</li> <li>– market size, location and access</li> <li>– market competition</li> <li>– market trends</li> </ul> </li> <li>• describe financial opportunities related to crop production; e.g.:               <ul style="list-style-type: none"> <li>– fixed and variable costs</li> <li>– forecast of returns</li> <li>– risk factors</li> <li>– income stabilization programs</li> </ul> </li> <li>• describe land requirements, and the suitability of soil and water conditions to production operations</li> <li>• describe the suitability of Alberta’s climate to potential crops; e.g.:               <ul style="list-style-type: none"> <li>– growing days</li> <li>– frost-free days</li> <li>– ambient temperature</li> <li>– soil temperature</li> </ul> </li> <li>• describe ways in which government regulations, policies and guidelines may influence production</li> <li>• predict future production on the basis of current issues and trends.</li> </ul>	<p>Construct/interpret graphs indicating production/consumption patterns over a period of time.</p> <p>Consider the impacts of local, national and global trends on industry practices.</p> <p>Plan for individual/group research projects and presentations.</p> <p>Ask students to predict future production practices and give reasons for their predictions.</p> <p>Invite a rural development specialist to discuss enterprise selection.</p> <p>Research the role of advertising and promotion in accessing markets.</p> <p>Identify input costs and potential profits for a production venture.</p> <p>Identify determinants of regional commodity production.</p>

**MODULE AGR3030: FIELD CROPS 2 (MANAGEMENT TECHNIQUES) (continued)**

Concept	Specific Learner Expectations	Notes
Genetics and Reproduction	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• classify field plants; e.g.:               <ul style="list-style-type: none"> <li>– according to growth habit</li> <li>– according to taxonomy</li> </ul> </li> <li>• identify field plants, e.g.:               <ul style="list-style-type: none"> <li>– using common names</li> <li>– using botanical nomenclature</li> </ul> </li> <li>• research heredity principles and their application to plants that are grown; e.g.:               <ul style="list-style-type: none"> <li>– dominant and recessive traits</li> <li>– selection criteria and procedures</li> <li>– systems of breeding</li> </ul> </li> <li>• research reproduction technologies and their application to plants that are grown; e.g.:               <ul style="list-style-type: none"> <li>– propagation techniques</li> <li>– genetic engineering</li> </ul> </li> <li>• describe procedures used to maintain the quality of plants within the industry; e.g.:               <ul style="list-style-type: none"> <li>– selection criteria and regulations</li> <li>– showing and judging</li> <li>– grading systems and standards</li> <li>– record keeping and record systems.</li> </ul> </li> </ul>	<p>Gather, label and mount collections of plants.</p> <p>Use an identification key to identify previously unknown plants.</p> <p>Visit an agriculture research station.</p> <p>Compare “common” and “certified” seed systems.</p> <p>Conduct breeding experiments with cucumbers, squash, pumpkins and/or gourds.</p>
Production Skills	<ul style="list-style-type: none"> <li>• perform basic field crop production activities; e.g.:               <ul style="list-style-type: none"> <li>– soil preparation</li> <li>– seeding/propagation</li> <li>– crop cultivation</li> <li>– irrigation/fertilization</li> <li>– pest/weed/disease control</li> <li>– harvesting</li> </ul> </li> <li>• apply knowledge of plant management practices; e.g.:               <ul style="list-style-type: none"> <li>– characteristics of plant health and disorders</li> <li>– remedial strategies for plant disorders</li> <li>– disease and pest control</li> <li>– plant growth management</li> </ul> </li> </ul>	<p>Potential linkages exist with the Alberta Agriculture Green Certificate Training Program:</p> <ul style="list-style-type: none"> <li>• crop production</li> <li>• irrigated crop production.</li> </ul> <p>For further information, see Section H: Linkages/Transitions.</p>

**MODULE AGR3030: FIELD CROPS 2 (MANAGEMENT TECHNIQUES) (continued)**

Concept	Specific Learner Expectations	Notes
Production Skills (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• demonstrate techniques for maintaining sustainable use of natural resources; e.g.:               <ul style="list-style-type: none"> <li>– management practices related to soil fertility and conservation</li> <li>– management practices related to water quality and the hydrologic cycle</li> </ul> </li> <li>• explain concerns regarding plant management practices and sustainable production systems; e.g.:               <ul style="list-style-type: none"> <li>– soil, water and air quality</li> <li>– organic and inorganic amendments</li> <li>– biological and chemical control measures</li> <li>– effluent disposal and pollution</li> <li>– food safety and consumer confidence</li> </ul> </li> <li>• explain relevant legislation and policy through production management activities; e.g.:               <ul style="list-style-type: none"> <li>– environmental constraints</li> <li>– inspection, regulation and quality control.</li> </ul> </li> </ul>	<p>Consider strategies for managing a crop from seed to sale.</p> <p>Develop/implement a crop rotation plan.</p> <p>Plan for individual research regarding relevant issues.</p> <p>Keep a daily log that details production activities.</p> <p>Conduct research on biological control agents.</p>

## **MODULE AGR3040: LIVESTOCK/POULTRY 2 (MANAGEMENT TECHNIQUES)**

**Level:** Advanced

**Theme:** Technology and Applications

**Prerequisite:** AGR2040 Livestock/Poultry 1 (Materials & Processes)

**Module Description:** Students demonstrate the techniques used to manage production of livestock, poultry or other animal commodities, focusing attention on industry trends and opportunities, genetics and reproduction, rations and feeding, housing, animal handling and restraint, animal health and welfare, breeding operations and care for the young. Potential areas of specialization include the production of beef, dairy, poultry, swine, sheep, game, exotics and bees and/or the study of aquaculture.

**Module Parameters:** Access to livestock, poultry or specialty animals and to appropriate animal housing and fencing structures.

Off-campus learning can support the development of practical skills in animal production; consultation with a work site supervisor ensures that relevant safety considerations are addressed and that student learning meets or exceeds the learner expectations in this module.

See the *Off-campus Education Guide for Administrators, Counsellors and Teachers* (Alberta Education, 1995) for further information regarding off-campus learning.

**Note:** This module can be combined with other modules from the Agriculture strand and/or from the Career Transitions strand to provide opportunities for students to develop technical competencies within the Alberta Green Certificate Training Program (Alberta Agriculture, Food and Rural Development). Opportunities may also exist for the completion of practical components of this module through projects undertaken with local youth groups; e.g., 4-H Clubs. See Section H (Linkages/Transitions) of this guide for further information.

**Supporting Module:** CTR2210 Workplace Safety (Practices)

Because of the practical nature of this module, students need a general knowledge of accepted practices and potential hazards when performing tasks related to animal production. See Planning for Instruction in Section C for further information on student safety.





**MODULE AGR3040: LIVESTOCK/POULTRY 2 (MANAGEMENT TECHNIQUES) (continued)**

Concept	Specific Learner Expectations	Notes
<p>Industry Trends and Viability</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• research production and consumption patterns within Alberta, Canada and the global community</li> <li>• explain the impact of economic, environmental and social trends on production practices within the industry; e.g.:               <ul style="list-style-type: none"> <li>– international trade and global competition</li> <li>– trade liberalization</li> <li>– rural and urban populations</li> <li>– food safety and consumer confidence</li> <li>– consumer preferences</li> <li>– support for research and development</li> <li>– environmental stewardship and sustainable development</li> </ul> </li> <li>• identify market factors that influence enterprise selection; e.g.:               <ul style="list-style-type: none"> <li>– market demands and trends</li> <li>– market size, location and access</li> <li>– market competition</li> </ul> </li> <li>• compare financial opportunities related to animal production; e.g.:               <ul style="list-style-type: none"> <li>– fixed and variable costs</li> <li>– forecast of returns</li> <li>– risk factors</li> <li>– income stabilization programs</li> </ul> </li> <li>• describe ways in which government regulations, policies and guidelines may influence production</li> <li>• describe land requirements, and the suitability of soil, water and climatic conditions to production operations</li> <li>• describe other needs relative to production activities; e.g.:               <ul style="list-style-type: none"> <li>– structures and equipment</li> <li>– labour</li> <li>– transportation</li> </ul> </li> <li>• predict future production on the basis of current issues and trends.</li> </ul>	<p>Attend local farm fairs and exhibitions.</p> <p>Construct/interpret graphs indicating production/consumption patterns over a period of time.</p> <p>Consider the impacts of local, national and global trends on industry practices.</p> <p>Plan for individual/group research projects and presentations.</p> <p>Ask students to make predictions regarding future production practices and give reasons for their predictions.</p> <p>Identify input costs and potential profits for a production venture.</p> <p>Invite a rural development specialist to discuss enterprise selection.</p> <p>Identify determinants of regional commodity production.</p>

**MODULE AGR3040: LIVESTOCK/POULTRY 2 (MANAGEMENT TECHNIQUES) (continued)**

Concept	Specific Learner Expectations	Notes
<p>Genetics and Reproduction</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• research heredity principles and their application to animals that are raised; e.g.:               <ul style="list-style-type: none"> <li>– dominant and recessive traits</li> <li>– selection criteria and procedures</li> <li>– systems of breeding</li> </ul> </li> <li>• apply knowledge of specific reproduction processes; e.g.:               <ul style="list-style-type: none"> <li>– estrous cycle</li> <li>– gestation period</li> <li>– natural service/artificial insemination</li> <li>– normal birth process</li> <li>– age criteria for breeding</li> </ul> </li> <li>• research reproduction technologies and their application to animals that are raised; e.g.:               <ul style="list-style-type: none"> <li>– embryo transfer</li> <li>– gender selection</li> </ul> </li> <li>• describe procedures used to manage the quality of animals within the industry; e.g.:               <ul style="list-style-type: none"> <li>– selection criteria and regulations</li> <li>– pedigrees and performance information</li> <li>– showing/judging systems and standards</li> <li>– registry and record systems.</li> </ul> </li> </ul>	<p>Identify desirable traits of specific animals and related heredity principles.</p> <p>Invite a local veterinarian to explain selection and breeding systems.</p> <p>Access the Western Breeder's A.I. truck.</p> <p>Discuss the importance of maintaining breeding records.</p> <p>Examine registration and transfer forms.</p> <p>Organize a judging competition on a specific animal breed.</p>
<p>Production Skills</p>	<ul style="list-style-type: none"> <li>• perform basic animal production activities; e.g.:               <ul style="list-style-type: none"> <li>– feeding</li> <li>– housing</li> <li>– handling and restraint</li> <li>– health and welfare</li> <li>– breeding operations</li> <li>– caring for young</li> </ul> </li> <li>• describe approved methods of marking or tagging animals for identification</li> </ul>	<p>Consider strategies for managing livestock from birth to market.</p> <p>Discuss growth and development patterns in relation to the age of an animal.</p> <p>Keep a daily log that details production activities.</p> <p>Research food sources and additives.</p> <p>Discuss animal stress in relation to animal confinement.</p> <p>Describe symptoms of common diseases.</p>

**MODULE AGR3040: LIVESTOCK/POULTRY 2 (MANAGEMENT TECHNIQUES) (continued)**

Concept	Specific Learner Expectations	Notes
<p>Production Skills (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify and apply appropriate strategies for maintaining sustainable use of natural resources; e.g.:               <ul style="list-style-type: none"> <li>– management practices related to soil fertility and conservation</li> <li>– management practices related to water quality and the hydrologic cycle</li> </ul> </li>   <li>• explain concerns regarding animal management and sustainable production systems; e.g.:               <ul style="list-style-type: none"> <li>– biotechnology</li> <li>– food safety</li> <li>– animal rights</li> <li>– pollution</li> </ul> </li>   <li>• explain relevant legislation and policy through production management activities; e.g.:               <ul style="list-style-type: none"> <li>– environmental health and safety</li> <li>– personal health and safety.</li> </ul> </li> </ul>	<p>Potential linkages exist with the Alberta Agriculture Green Certificate Farm Training Program:</p> <ul style="list-style-type: none"> <li>• beef</li> <li>• dairy</li> <li>• sheep</li> <li>• swine.</li> </ul> <p>For additional information, see Section H: Linkages/ Transitions.</p> <p>Plan for individual research regarding relevant issues.</p> <p>Research criteria for the Outstanding Environmental Stewardship Award; invite local nominees.</p> <p>Research legal considerations related to animal housing.</p>

## MODULE AGR3050: AGRIFOODS 2 (STANDARDS & REGULATION)

**Level:** Advanced

**Theme:** Technology and Applications

**Prerequisite:** AGR2050 Agrifoods 1 (Materials & Processes)

**Module Description:** Students demonstrate knowledge of the techniques used to manage the development of an agrifood product or related service, focusing attention on government regulation and control, economic principles, product quality and safety, environmental impact and industry trends. Potential areas of investigation include dairy, beef, pork, poultry, cereals, oil seeds, sugar beets, wine, fruits/vegetables and honey.

**Note:** It is recommended that this module provide further investigation of the agrifood industry examined in AGR2050 Agrifoods 1.

**Module Parameters:** Access to an agrifoods industry.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"><li>• identify government legislation and policies that regulate practices within an agrifood industry</li></ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"><li>• given a specific agrifood industry, identifying and describing:<ul style="list-style-type: none"><li>– the roles of federal, provincial and local government agencies responsible for product quality, worker safety and environmental impact within the industry</li><li>– examples of government policy and/or legislation relevant to the industry that regulate:<ul style="list-style-type: none"><li>• inspection of raw materials</li><li>• product grading, packaging and labelling</li><li>• sanitation standards</li><li>• worker safety</li><li>• environmental impact.</li></ul></li></ul></li></ul> <p><i>Assessment Tool</i> <i>Knowledge/Application Assessment: Government Policy and Legislation, AGR3050–1</i></p> <p><i>Standard</i> <i>Respond to a standard of 3 on the rating scale</i></p>	30

**MODULE AGR3050: AGRIFOODS 2 (STANDARDS & REGULATION) (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• describe techniques used to manage industry practices, including the application of economic principles, product quality and safety, and environmental impact</li> <li>• identify industry trends and opportunities for developing new agrifood products</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• preparing and presenting an oral, written and/or multi-media report describing specific management practices adopted by an agrifood industry to comply with government policy and regulation.</li> </ul> <p><i>Assessment Tool</i>  <i>Presentations/Reports: Management Practices in Agrifoods, AGR3050–2</i></p> <p><i>Standard</i>  <i>Prepare and present the report to a standard of 3 on the rating scale</i></p>	<p>30</p>
	<ul style="list-style-type: none"> <li>• completing a research project on trends and opportunities within an agrifood industry. Research to address: <ul style="list-style-type: none"> <li>– production and consumption patterns within Alberta, Canada and the global community</li> <li>– factors that determine the viability of a specific agrifood industry</li> <li>– opportunities for product research and development within the industry.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Research Process: Industry Trends in Agrifoods, AGR3050–3</i></p> <p><i>Standard</i>  <i>Complete all components of research to a standard of 3 on the rating scale</i></p>	<p>40</p>
	<ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

**MODULE AGR3050: AGRIFOODS 2 (STANDARDS & REGULATION) (continued)**

Concept	Specific Learner Expectations	Notes
<p>Government Regulations</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• explain the role of government legislation in maintaining product quality and safety within an agrifood industry; e.g.:               <ul style="list-style-type: none"> <li>– inspection of raw materials</li> <li>– product grading</li> <li>– packaging and labelling</li> <li>– sanitation standards</li> <li>– safety regulations</li> </ul> </li> <li>• describe the mandates of specific government agencies in maintaining product quality and safety; e.g.:               <ul style="list-style-type: none"> <li>– Agriculture Canada</li> <li>– Alberta Agriculture, Food and Rural Development</li> <li>– Consumer and Corporate Affairs</li> <li>– Health and Welfare Canada</li> </ul> </li> <li>• describe potential applications of the International Standards Organization (ISO) in regulating industry practices</li> <li>• describe the mandates of specific government agencies regarding industry use of land, water and air; e.g.:               <ul style="list-style-type: none"> <li>– Alberta Environmental Protection</li> <li>– Environment Canada.</li> </ul> </li> </ul>	<p>Discuss legal definitions and standards for the processed product.</p> <p>Investigate worker safety concerns and related legislation.</p>
<p>Management Functions</p>	<ul style="list-style-type: none"> <li>• apply knowledge of basic economic principles to management decisions within the industry; e.g.:               <ul style="list-style-type: none"> <li>– supply and demand</li> <li>– law of diminishing returns</li> <li>– comparative advantage</li> </ul> </li> <li>• identify criteria and techniques for assuring the quality of a commodity or value-added product through processing, transportation and storage; e.g.:               <ul style="list-style-type: none"> <li>– parameters of quality</li> <li>– inspection and grading</li> <li>– quality control systems</li> </ul> </li> </ul>	<p>Discuss quality control on incoming product/ materials.</p> <p>Research applications of “Hazard Analysis at Critical Control Points” (HACCP).</p> <p>Identify grading and labelling requirements.</p> <p>For information on quality control in cheese production, view the video entitled <i>On the Line</i> (see Section I: Learning Resource Guide).</p>

**MODULE AGR3050: AGRIFOODS 2 (STANDARDS & REGULATION) (continued)**

Concept	Specific Learner Expectations	Notes
<p>Management Functions (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify criteria and techniques for managing environmental impact; e.g.:               <ul style="list-style-type: none"> <li>– methods of effluent disposal</li> <li>– water treatment after use</li> <li>– soil conservation practices</li> <li>– use of biodegradable materials</li> </ul> </li> <li>• explain how relevant supply systems may influence industry management; e.g.:               <ul style="list-style-type: none"> <li>– supply of raw materials</li> <li>– production volumes</li> <li>– access to market</li> </ul> </li> <li>• describe current issues regarding food quality and sustainable processing systems; e.g.:               <ul style="list-style-type: none"> <li>– food additives, preservatives and irradiation</li> <li>– use of organic and inorganic materials</li> <li>– effluent disposal and pollution.</li> </ul> </li> </ul>	<p>Research impacts of:</p> <ul style="list-style-type: none"> <li>• milk board system</li> <li>• pork marketing board</li> <li>• egg/poultry marketing boards</li> <li>• Canadian Wheat Board</li> <li>• Honey Producers Cooperative.</li> </ul> <p>Plan for individual research regarding relevant issues.</p>
<p>Industry Trends</p>	<ul style="list-style-type: none"> <li>• describe production and consumption patterns within Alberta, Canada and the global community</li> <li>• describe the impact of economic, environmental and social trends on practices within the industry; e.g.:               <ul style="list-style-type: none"> <li>– international trade and global competition</li> <li>– trade liberalization</li> <li>– rural and urban populations</li> <li>– food safety and consumer confidence</li> <li>– consumer preferences</li> <li>– support for research and development</li> <li>– environmental stewardship and sustainable development</li> </ul> </li> <li>• describe opportunities for product research and development within the industry; e.g.:               <ul style="list-style-type: none"> <li>– altering existing products</li> <li>– developing new products</li> <li>– developing new markets</li> </ul> </li> <li>• predict future production on the basis of current trends and issues.</li> </ul>	<p>Construct/interpret graphs indicating production/consumption patterns over a period of time.</p> <p>Consider the impacts of local, national and global trends on industry practices.</p> <p>Plan for individual/group research projects and presentations.</p> <p>Ask students to predict future production techniques and products, giving reasons for their predictions.</p>

## **MODULE AGR3060: LANDSCAPE/TURF MANAGEMENT 2 (INSTALLATION & REPAIR)**

**Level:** Advanced

**Theme:** Technology and Applications

**Prerequisite:** AGR2060 Landscape/Turf Management 1 (Maintenance Practices)

**Module Description:** Students demonstrate the techniques used to provide landscape and turf management services, focusing attention on plant identification, effective maintenance practices, diagnosis and correction of problems, installation of specialty items, cost analysis and seasonal estimates. Potential areas of specialization include home landscapes, golf courses, recreational fields and parks, institutional/industrial grounds and roadside landscapes.

**Module Parameters:** Access to residential, recreational, institutional/industrial and/or roadside landscapes.

Facilities and equipment should permit students to perform practical tasks in landscape management, including the analysis of turfgrass problems and the planning/installation of specialty items.

Instructor training in first aid and in the use of pesticides is recommended; e.g., Standard First Aid, Pesticide Applicator/Dispenser Certificate.

Off-campus learning can support the development of practical skills in landscape/turf management; consultation with a work site supervisor ensures that relevant safety considerations are addressed and that student learning meets or exceeds the learner expectations in this module.

See the *Off-campus Education Guide for Administrators, Counsellors and Teachers* (Alberta Education, 1995) for further information regarding off-campus learning.

**Note:** This module can be combined with other modules from the Agriculture strand and/or from the Career Transitions strand to provide opportunities for students to develop technical competencies within the Landscape Gardener Apprenticeship Program (Alberta Advanced Education and Career Development). See Section H (Linkages/Transitions) of this guide for further information.

**Supporting Module:** CTR2210 Workplace Safety (Practices) [Career Transitions Strand]

Because of the practical nature of this module, students need a general knowledge of accepted practices and potential hazards when performing tasks related to landscape/turf management. See Planning for Instruction in Section C for further information on student safety.

**MODULE AGR3060: LANDSCAPE/TURF MANAGEMENT 2 (INSTALLATION & REPAIR)**  
(continued)

**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• identify plants suitable for use in Alberta landscapes</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• given access to on-site (or photographed) tree, shrub, ground cover, flower and turfgrass species/varieties used in Alberta landscapes, identifying selected specimens according to:               <ul style="list-style-type: none"> <li>– common and botanical names</li> <li>– general characteristics/growth habits</li> <li>– functional use in Alberta landscapes.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Identification Guide: Landscape Plants, AGRIDE–LDS</i>  <i>Information Sheet: Landscape Plants, AGRINF–LDS</i></p> <p><i>Standard</i>  <i>Identify 10 landscape plants (including tree, shrub, ground cover, flower and turfgrass specimens) in addition to those identified in AGR1070 and AGR2060</i></p> <ul style="list-style-type: none"> <li>• given access to on-site (or photographed) weed species found in Alberta landscapes and turfgrasses, identifying selected specimens according to:               <ul style="list-style-type: none"> <li>– common name</li> <li>– growth habit</li> <li>– management technique.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Identification Guide: Landscape/Turfgrass Weeds, AGRIDE–WED</i>  <i>Information Sheet: Landscape/Turfgrass Weeds, AGRINF–WED</i></p> <p><i>Standard</i>  <i>Identify 5 common weeds (found in Alberta landscapes and/or turfgrasses) in addition to those identified in AGR1070 and AGR2060</i></p>	<p>20</p>

**MODULE AGR3060: LANDSCAPE/TURF MANAGEMENT 2 (INSTALLATION & REPAIR)**  
(continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate practical skills in installing, maintaining and managing landscape plants and turfgrass</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>performing landscape/turfgrass installation and maintenance services within <u>each</u> of the following areas: <ul style="list-style-type: none"> <li>planting and transplanting</li> <li>turfgrass establishment</li> <li>analysis of turfgrass problems and corrective measures</li> <li>pruning of fruit trees, hedges and specialty plants</li> <li>fertilizer calculation and application to landscaped/turfed areas</li> <li>winterizing of trees, shrubs, perennials and turfgrasses.</li> </ul> </li> </ul> <p>Installation and maintenance services will involve the application of appropriate safety guidelines for using hand and power equipment.</p> <p><i>Assessment Tool</i>  <i>Task Checklist: Landscape/Turf Management 2, AGR3060-1</i>  <i>Lab Assessment: Landscape and Turf Care, AGRLAB-LDS</i></p> <p><i>Standard</i>  <i>Achieve a minimum performance rating of:</i>  – 2 in installation and maintenance services  – 3 in the use of hand and power equipment</p> <ul style="list-style-type: none"> <li>maintaining an anecdotal record of all landscape/turfgrass services performed</li> </ul> <p><i>Assessment Tool</i>  <i>Log/Record of Landscape/Turfgrass Services, AGRLOG-LDS</i></p> <p><i>Standard</i>  <i>Completing all sections of the log/record for each service performed</i></p>	<p>50</p>

**MODULE AGR3060: LANDSCAPE/TURF MANAGEMENT 2 (INSTALLATION & REPAIR)**  
(continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• develop and present a plan for the installation of a specialty item and/or system within an Alberta landscape</li> <li>• estimate the cost of providing seasonal landscape and/or turfgrass services</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• preparing a proposal for the installation of <u>one</u> specialty item and/or system within an Alberta landscape. The proposal will provide: <ul style="list-style-type: none"> <li>– an explanation of need</li> <li>– a description of component parts</li> <li>– a plan for installation</li> <li>– an estimated total cost.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Proposal: Installation of Specialty Items/Systems, AGR3060–2</i></p> <p><i>Standard</i> <i>Accurately complete the proposal to a standard of 3 on the rating scale</i></p> <ul style="list-style-type: none"> <li>• preparing a simple cost analysis and estimate for providing a “seasonal” landscape/ turfgrass service.</li> </ul> <p><i>Assessment Tool</i> <i>Landscaping Principles and Practices (Unit 25: Pricing Landscape Maintenance)</i></p> <p><i>Standard</i> <i>Accurately complete a cost analysis and estimate for providing one seasonal service</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>20</p> <p>10</p> <p>Integrated throughout</p>

**MODULE AGR3060: LANDSCAPE/TURF MANAGEMENT 2 (INSTALLATION & REPAIR)**  
(continued)

Concept	Specific Learner Expectations	Notes
Plant Identification	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe methods of classifying landscape plants; e.g.:               <ul style="list-style-type: none"> <li>– common and botanical names</li> <li>– general characteristics/growth habits</li> <li>– functional use</li> </ul> </li> <li>• describe methods of identifying landscape plants; e.g.:               <ul style="list-style-type: none"> <li>– using common names</li> <li>– using botanical nomenclature</li> </ul> </li> <li>• explain the use of taxonomy keys in plant identification</li> <li>• identify and select appropriate trees, shrubs and ground covers for given applications in Alberta landscapes; e.g.:               <ul style="list-style-type: none"> <li>– herbaceous and woody</li> <li>– evergreen and deciduous</li> </ul> </li> <li>• identify and select appropriate flowers for given applications in Alberta landscapes; e.g.:               <ul style="list-style-type: none"> <li>– annual, biennial and perennial</li> <li>– bulbs, tubers and rhizomes</li> </ul> </li> <li>• identify and select appropriate turfgrasses for given applications in Alberta landscapes; e.g.:               <ul style="list-style-type: none"> <li>– rhizome producing, stolon producing and bunch type</li> <li>– fine, medium and course leaf texture.</li> </ul> </li> </ul>	<p>Identify 10 or more landscape plants on-site (in addition to those identified in AGR1070 and AGR2060).</p> <p>Collect/mount a weed display.</p> <p>Use an identification key to identify previously unknown plants.</p> <p>Choose and plant bare root, ball and burlap, and container-grown stock.</p> <p>Identify specialty plants, including bulbs, corms, tubers and fleshy roots.</p> <p>Relate anatomy of turfgrass to appropriate management practices.</p> <p>Distinguish between single species turf plantings and grasses that are mixtures or blends.</p>

**MODULE AGR3060: LANDSCAPE/TURF MANAGEMENT 2 (INSTALLATION & REPAIR)**  
(continued)

Concept	Specific Learner Expectations	Notes
Installation/ Maintenance Tasks	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• demonstrate proper planting and/or transplanting techniques for landscape plants; e.g.:               <ul style="list-style-type: none"> <li>– handling of plant materials</li> <li>– preparing the growing media and seed bed</li> <li>– installing plants and turf</li> <li>– staking and guying the plants</li> </ul> </li> <li>• demonstrate proper techniques for preparing turfgrasses in the spring season; e.g.:               <ul style="list-style-type: none"> <li>– clean-up</li> <li>– dethatching</li> <li>– first cutting</li> <li>– patching the lawn</li> <li>– aeration and top dressing</li> <li>– fertilizing</li> </ul> </li> <li>• describe and correct turfgrass problems; e.g.:               <ul style="list-style-type: none"> <li>– fairy ring</li> <li>– scalping</li> <li>– ridging</li> <li>– compacting</li> <li>– insect, animal and disease problems</li> </ul> </li> <li>• demonstrate appropriate techniques for pruning fruit trees</li> <li>• demonstrate or describe appropriate practices for shaping trees and shrubs; e.g.:               <ul style="list-style-type: none"> <li>– hedge shearing</li> <li>– espalier</li> <li>– topiary</li> </ul> </li> <li>• identify types of winter damage to landscape plants and ways to recover from winter injury; e.g.:               <ul style="list-style-type: none"> <li>– windburn and sunscald</li> <li>– temperature extremes</li> <li>– ground heaving</li> <li>– damage owing to ice, snow and salt</li> <li>– snowplow and vehicle damage.</li> </ul> </li> </ul>	<p>Perform general landscape and turf maintenance services.</p> <p>Keep a daily log that details maintenance services performed.</p> <p>Demonstrate proper use of core aerator and power rake.</p> <p>Calculate basic fertilizer requirements for turfed areas.</p> <p>Potential linkages exist with various pesticide applicator/dispenser certificate courses (see Section H: Linkages/Transitions).</p> <p>Demonstrate corrective pruning on trees and shrubs:</p> <ul style="list-style-type: none"> <li>• thinning, heading back, jump cuts</li> <li>• hedge shearing</li> <li>• pruning conifers.</li> </ul> <p>Explain winterizing techniques for trees, shrubs and turf.</p>

**MODULE AGR3060: LANDSCAPE/TURF MANAGEMENT 2 (INSTALLATION & REPAIR)**  
(continued)

Concept	Specific Learner Expectations	Notes
Specialty Items and Systems	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify different types of specialty items and/or systems found in Alberta landscapes; e.g.:               <ul style="list-style-type: none"> <li>– underground sprinkling</li> <li>– hedging and screening</li> <li>– hillside planting</li> <li>– ponds</li> <li>– paving systems</li> <li>– retaining walls</li> <li>– landscape lighting</li> </ul> </li> <li>• explain local regulations that may influence the selection, design and/or installation of a specialty item or system; e.g.:               <ul style="list-style-type: none"> <li>– land planning and zoning</li> <li>– use of equipment or chemical</li> <li>– environmental constraints</li> </ul> </li> <li>• plan and cost one specialty item and/or system for an Alberta landscape; e.g.:               <ul style="list-style-type: none"> <li>– explanation of need</li> <li>– description of component parts</li> <li>– plan for installation</li> <li>– estimated total cost.</li> </ul> </li> </ul>	
Seasonal Estimates	<ul style="list-style-type: none"> <li>• identify factors that determine the seasonal cost of providing a landscape/turfgrass service; e.g.:               <ul style="list-style-type: none"> <li>– material costs</li> <li>– labour costs</li> <li>– equipment usage costs</li> <li>– overhead costs</li> </ul> </li> <li>• prepare seasonal cost analyses for basic landscape/turfgrass services.</li> </ul>	<p>Consider daily work ethic in assessing landscape services performed:</p> <ul style="list-style-type: none"> <li>• attendance</li> <li>• punctuality</li> <li>• use of time</li> <li>• group skills/attitudes</li> <li>• respect for property</li> <li>• clean-up.</li> </ul>



## **MODULE AGR3070: EQUINE 2 (MANAGEMENT TECHNIQUES)**

**Level:** Advanced

**Theme:** Technology and Applications

**Prerequisite:** AGR2070 Equine 1 (Materials & Processes)

**Module Description:** Students demonstrate practical skills and approved practices in providing for the daily care of a horse, focusing attention on the use of physical facilities, procedures for stall cleaning and bedding a horse, guidelines for turnout and shelter, reproductive fundamentals and techniques, and basic horsemanship.

**Module Parameters:** Access to a horse and appropriate equine housing/fencing structures.

Off-campus learning is required to support the development of practical skills in the care of horses and in horsemanship; consultation with a work site supervisor ensures that relevant safety considerations are addressed and that student learning meets or exceeds the learner expectations in this module.

It is recommended that students have a minimum of 50 hours of previous experience in horse handling and horse care prior to commencing the study of AGR2070 Equine 1 and AGR3070 Equine 2.

See the *Off-campus Education Guide for Administrators, Counsellors and Teachers* (Alberta Education, 1995) for further information regarding off-campus learning.

**Note:** Learner expectations in AGR2070 Equine 1 and AGR3070 Equine 2 are introductory to competencies developed in the two-year Equine Science Diploma Program at Olds College, Alberta. Opportunities for recognition of prior learning may be considered upon admission to this post-secondary program.

**Supporting Module:** CTR2210 Workplace Safety (Practices) [Career Transitions Strand]

Because of the practical nature of this module, students need a general knowledge of accepted practices and potential hazards when performing tasks related to the care of horses. See Planning for Instruction in Section C for further information on student safety.

**MODULE AGR3070: EQUINE 2 (MANAGEMENT TECHNIQUES)** (continued)

**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• identify factors to consider in selecting a stable and other physical facilities</li>   <li>• demonstrate practical skills and approved procedures for stall cleaning, bedding a horse, turnout and shelter</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• completing a research project that examines desirable features of a stable and other physical facilities. Research to address selection criteria for:               <ul style="list-style-type: none"> <li>– stalls</li> <li>– interior ancillary facilities</li> <li>– feeding and watering equipment</li> <li>– waste management systems</li> <li>– fencing structures.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Research Process: Selection Criteria for Stables and Physical Facilities, AGR3070-1</i></p> <p><i>Standard</i> <i>Complete all components of research to a standard of 3 on the rating scale</i></p> <ul style="list-style-type: none"> <li>• demonstrating practical skills and approved procedures within <u>each</u> of the following areas of daily horse care:               <ul style="list-style-type: none"> <li>– cleaning a stall</li> <li>– bedding a horse</li> <li>– turnout and shelter.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Task Checklist: Equine 2, AGR3070-2</i> <i>Lab Assessment: Animal Care, AGRLAB-ANM</i></p> <p><i>Standard</i> <i>Achieve a minimum performance rating of 2 in each area of task and lab assessment</i></p> <ul style="list-style-type: none"> <li>• maintaining an anecdotal record of daily horse care tasks performed.</li> </ul> <p><i>Assessment Tool</i> <i>Log/Record of Animal Care, AGRLOG-ANM</i></p> <p><i>Standard</i> <i>Complete all sections of the log/record for daily horse care tasks performed over a negotiated/contracted period of time</i></p>	<p>15</p>         <p>35</p>



**MODULE AGR3070: EQUINE 2 (MANAGEMENT TECHNIQUES) (continued)**

Concept	Specific Learner Expectations	Notes
Physical Facilities	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe the use of stables and other confinement structures used in caring for equine; e.g.:               <ul style="list-style-type: none"> <li>– fences and shelters</li> <li>– totally confined rearing structures</li> </ul> </li> <li>• describe criteria relevant to the selection and/or design of structures and equipment; e.g.:               <ul style="list-style-type: none"> <li>– function, operation and maintenance</li> <li>– safety and efficiency</li> <li>– ethical, legal and environmental factors</li> <li>– economics and cost</li> </ul> </li> <li>• identify specific factors to consider in selecting:               <ul style="list-style-type: none"> <li>– a stall</li> <li>– type of flooring</li> <li>– interior ancillary facilities</li> </ul> </li> <li>• describe selection criteria relevant to watering and feeding systems</li> <li>• describe approved waste management systems</li> <li>• describe factors to consider in selecting an appropriate type of fencing</li> <li>• identify policy, legislation and safe practices relevant to the use of physical structures and equipment.</li> </ul>	<p>Collect pictures of appropriate horse shelters for specific applications.</p> <p>Design/construct models of approved structures and equipment.</p> <p>Discuss watering and feeding equipment and efficient locations.</p> <p>Research and construct models of fences, gates, corrals, watering/feeding systems, etc., suited to equine.</p>
Stall Cleaning, Bedding, Turnout and Shelter	<ul style="list-style-type: none"> <li>• describe the characteristics of a healthful environment for horses; e.g.:               <ul style="list-style-type: none"> <li>– sanitation</li> <li>– housing</li> <li>– pest control</li> <li>– exercise</li> </ul> </li> <li>• identify agents and sources of stress for a horse, and their effects on general health</li> <li>• describe veterinary services that are available, and the protocol for accessing these services</li> </ul>	<p>Discuss health indicators for equine:</p> <ul style="list-style-type: none"> <li>• physical signs</li> <li>• normal vital signs</li> <li>• behaviour.</li> </ul> <p>Consider animal stress in relation to animal confinement.</p> <p>Research symptoms of common diseases requiring veterinary care.</p>

**MODULE AGR3070: EQUINE 2 (MANAGEMENT TECHNIQUES) (continued)**

Concept	Specific Learner Expectations	Notes
<p>Stall Cleaning, Bedding, Turnout and Shelter (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• demonstrate appropriate procedures for cleaning and disinfecting stalls</li> <li>• demonstrate appropriate procedures for bedding a horse</li> <li>• demonstrate appropriate procedures for turnout and shelter.</li> </ul>	<p>Establish task checklists and a chore log for stall cleaning and equine bedding routines.</p> <p>Plan and implement a daily equine exercise program.</p>
<p>Reproductive Cycle and Techniques</p>	<ul style="list-style-type: none"> <li>• explain reproductive processes characteristic of equine; e.g.:               <ul style="list-style-type: none"> <li>– estrus cycle</li> <li>– gestation period</li> <li>– natural service/artificial insemination</li> <li>– normal birth process</li> <li>– age criteria for breeding</li> </ul> </li> <li>• identify the signs of estrus in a mare</li> <li>• describe methods of preparing a mare and stallion for breeding; e.g.:               <ul style="list-style-type: none"> <li>– teasing protocol</li> <li>– hormone treatments</li> <li>– artificial light</li> </ul> </li> <li>• describe appropriate procedures for the care and handling of mare and stallion during the breeding season</li> <li>• explain reproductive technologies that are used in equine breeding; e.g.:               <ul style="list-style-type: none"> <li>– artificial insemination</li> <li>– embryo transfer</li> <li>– estrus manipulation</li> <li>– gender selection.</li> </ul> </li> </ul>	<p>Discuss reproductive anatomy of the mare and stallion.</p> <p>Consider different breeding systems:</p> <ul style="list-style-type: none"> <li>• pasture breeding</li> <li>• hand breeding</li> <li>• artificial insemination.</li> </ul> <p>Discuss variations in the estrus cycle and their management.</p> <p>Identify factors affecting response to teasing; e.g.:</p> <ul style="list-style-type: none"> <li>• age</li> <li>• temperament</li> <li>• handling procedures</li> <li>• weather</li> <li>• health.</li> </ul> <p>Invite/visit a local veterinarian to discuss selection and breeding systems.</p>

**MODULE AGR3070: EQUINE 2 (MANAGEMENT TECHNIQUES) (continued)**

Concept	Specific Learner Expectations	Notes
<p>Horsemanship Techniques</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• demonstrate active and passive use of hands in riding; e.g.:               <ul style="list-style-type: none"> <li>– acting</li> <li>– yielding</li> <li>– holding</li> <li>– following</li> </ul> </li> <li>• demonstrate active and passive use of the seat in riding; e.g.:               <ul style="list-style-type: none"> <li>– at the walk</li> <li>– at the trot</li> <li>– at the lope</li> </ul> </li> <li>• demonstrate active and passive use of legs in riding; e.g.:               <ul style="list-style-type: none"> <li>– acting</li> <li>– yielding</li> <li>– following leg</li> </ul> </li> <li>• demonstrate appropriate use of artificial aids in reinforcing natural riding aids; e.g.:               <ul style="list-style-type: none"> <li>– riding crop</li> <li>– spurs</li> </ul> </li> <li>• display stability and balance while riding by maintaining an independent seat</li> <li>• explain the use of psychology in achieving personal riding goals; e.g.:               <ul style="list-style-type: none"> <li>– focusing</li> <li>– imagery</li> <li>– self-talk</li> </ul> </li> <li>• demonstrate appropriate use of selected bits in communicating with a horse; e.g.:               <ul style="list-style-type: none"> <li>– snaffle bits</li> <li>– curb bits</li> </ul> </li> </ul>	<p>Refer to <i>The Complete Guide to Western Horsemanship</i> (J. P. Forget) for a comprehensive account of basic horsemanship techniques.</p> <p>Discuss the appropriate use of reins in negotiating various manoeuvres; e.g.:</p> <ul style="list-style-type: none"> <li>• open rein</li> <li>• direct rein of opposition</li> <li>• neck rein</li> <li>• indirect rein of opposition.</li> </ul> <p>Explain the effect of lateral seat aids.</p> <p>Discuss strategies for using the human voice as a natural training aid.</p> <p>Plan and implement an equine training program.</p> <p>Establish a personal training routine for developing an independent seat; e.g.:</p> <ul style="list-style-type: none"> <li>• exercises on horseback</li> <li>• physical conditioning.</li> </ul> <p>Discuss personal attributes of a successful rider.</p> <p>Establish short- and long-term performance goals, and a list of tasks that will assist in achieving each goal.</p> <p>Research the anatomy of a horse's mouth and the mechanics of bits and biting.</p>

**MODULE AGR3070: EQUINE 2 (MANAGEMENT TECHNIQUES) (continued)**

Concept	Specific Learner Expectations	Notes
<p>Horsemanship Techniques (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• explain applications of various biting devices in the training of horses; e.g.:               <ul style="list-style-type: none"> <li>– draw reins</li> <li>– German martingale</li> <li>– running martingale</li> <li>– standing martingale</li> <li>– cavesson.</li> </ul> </li> </ul>	<p>Discuss care of the horse's mouth and teeth as it relates to the prevention of biting problems.</p> <p>Discuss key principles for selecting bits and progressing from snaffles to curbs.</p>



## MODULE AGR3080: FLORAL DESIGN 2 (CREATIVE DESIGN & DISPLAY)

**Level:** Advanced

**Theme:** Technology and Applications

**Prerequisite:** AGR2080 Floral Design 1 (Projects for All Occasions)

**Module Description:** Students demonstrate knowledge of the practices involved in providing creative floral design services, focusing attention on plant and flower identification, more advanced design techniques, floral services for special occasions and promotional displays of floral services offered.

**Module Parameters:** Access to a plant potting/flower arrangement room with refrigeration, a source of water, adequate storage facilities and workbenches/table surfaces for flower arranging.

Instructor training in floral design; e.g., Flowers Canada Accreditation Program, and/or relevant industry experience is an asset.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"><li>identify and explain the cultural requirements of cut flowers, foliage and interior plants</li></ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"><li>given access to on-site (or photographed) cut flowers, foliage and interior plants used in the floral industry, identifying selected specimens by:<ul style="list-style-type: none"><li>common and botanical names</li><li>basic characteristics and general use.</li></ul></li></ul> <p><i>Assessment Tool</i></p> <p><i>Identification Guide: Cut Flowers and Interior Plants, AGRIDE-FLO</i></p> <p><i>Information Sheet: Cut Flowers and Interior Plants, AGRINF-FLO</i></p> <p><i>Standard</i></p> <p><i>Identify 10 cut flowers and/or foliage specimens and 5 interior plants; species identified must be in addition to those identified in AGR1080 and AGR2080</i></p>	20

**MODULE AGR3080: FLORAL DESIGN 2 (CREATIVE DESIGN & DISPLAY) (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• construct fresh, dried and/or artificial floral arrangements for special occasions</li> <li>• calculate the cost and selling price of floral products and services</li> <li>• demonstrate techniques used to promote products and services within the floral industry</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• constructing six or more fresh, dried and/or artificial floral arrangements for special occasions as identified in <i>Task Checklist: Floral Design 2</i>. Each arrangement to illustrate the application of design principles outlined in <i>Product Assessment: Floral Design 2</i>.</li> </ul> <p><i>Assessment Tool</i>  <i>Developmental Framework: Floral Construction, AGRDEV-FLO</i>  <i>Task Checklist: Floral Design 2, AGR3080-1</i>  <i>Product Assessment: Floral Design 2, AGR3080-2</i>  <i>Lab Assessment: Floral Design, AGRLAB-FLO</i>  <i>Project Planning: Floral Design, AGRPLN-FLO</i></p> <p><i>Standard</i>  <i>Achieve a minimum rating of 3 in product assessment and 3 in lab assessment for each arrangement</i></p>	40
	<ul style="list-style-type: none"> <li>• calculating the cost and selling price for fresh, dried and/or artificial floral arrangements constructed.</li> </ul> <p><i>Assessment Tool</i>  <i>Pricing Worksheet: Floral Services, AGRPRI-FLO</i></p> <p><i>Standard</i>  <i>Accurately complete all sections of the pricing worksheet for each of six arrangements constructed</i></p>	10
	<ul style="list-style-type: none"> <li>• design, construct and maintain a promotional display for a seasonal product and/or service within the floral industry.</li> </ul> <p><i>Assessment Tool</i>  <i>Task Checklist: Promotional Displays, AGR3080-3</i></p> <p><i>Standard</i>  <i>Perform all tasks to a standard of 2 on the rating scale</i></p>	30

**MODULE AGR3080: FLORAL DESIGN 2 (CREATIVE DESIGN & DISPLAY) (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>observations of individual effort and interpersonal exploration during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

Concept	Specific Learner Expectations	Notes
<p>Plant and Flower Identification</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>identify cut flowers and greenery commonly used in floral design; e.g.:               <ul style="list-style-type: none"> <li>greenhouse/fieldgrown cut flowers</li> <li>imported cut flowers</li> <li>foliage and filler</li> </ul> </li> <li>identify interior plants and gift plants; e.g.:               <ul style="list-style-type: none"> <li>tropical flowering and foliage plants</li> <li>flowering bulbs</li> </ul> </li> <li>identify dried and artificial materials commonly used in floral design; e.g.:               <ul style="list-style-type: none"> <li>dried flowers and foliage</li> <li>silk and other fabric materials</li> </ul> </li> <li>relate different growth styles of flowers to their use in floral arrangements</li> <li>explain the advantage and disadvantages of using different types of floral materials</li> <li>explain ethnic and cultural influences on floral materials and practices.</li> </ul>	<p>Subscribe to the <i>Florists' Review</i> (a monthly periodical).</p> <p>Arrange a visit to a local florist shop.</p> <p>Flower and plant identification guides used by industry are available from:</p> <ul style="list-style-type: none"> <li>United Floral Growers (Burnaby)</li> <li>Holland Flower Council.</li> </ul> <p>Identify:</p> <ul style="list-style-type: none"> <li>10 or more different cut flowers and/or foliage specimens</li> <li>five or more interior plants and/or gift plants.</li> </ul> <p>Species identified should be in addition to those identified in AGR1080 and AGR2080.</p>

**MODULE AGR3080: FLORAL DESIGN 2 (CREATIVE DESIGN & DISPLAY) (continued)**

Concept	Specific Learner Expectations	Notes
<p>Design and Construction</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• explain and apply elements and principles of design; e.g.:               <ul style="list-style-type: none"> <li>– line, form, pattern and texture</li> <li>– colour, balance and rhythm</li> <li>– scale and proportion</li> <li>– harmony, contrast and repetition</li> </ul> </li>   <li>• apply the colour wheel and basic colour theory</li>   <li>• spray tint and/or dip dye fresh and dried floral products as necessary to achieve special effects</li>   <li>• demonstrate advanced design techniques; e.g.:               <ul style="list-style-type: none"> <li>– crescent</li> <li>– hogarth curve</li> <li>– T-shape</li> <li>– L-shape</li> </ul> </li>   <li>• design and construct fresh, dried and/or artificial floral arrangements for special purposes and occasions; e.g.:               <ul style="list-style-type: none"> <li>– calendar events</li> <li>– weddings</li> <li>– funerals</li> <li>– hospitals.</li> </ul> </li> </ul>	<p><b>CAUTION:</b>  <b>Review safety practices prior to practical activities.</b></p> <p>Industry resources produced by Redbook Floral Services and available through the Olds College Bookstore include:</p> <ul style="list-style-type: none"> <li>• Basic Floral Design</li> <li>• Advanced Floral Design</li> <li>• Care and Handling of Fresh Flowers and Foliages.</li> </ul> <p>Construct arrangements that illustrate principles of:</p> <ul style="list-style-type: none"> <li>• rhythm and harmony</li> <li>• depth and line</li> <li>• texture</li> <li>• focal emphasis.</li> </ul> <p>Discuss terms/techniques of design:</p> <ul style="list-style-type: none"> <li>• pave</li> <li>• binding</li> <li>• grouping</li> <li>• clustering</li> <li>• layering.</li> </ul> <p>Arrange for students to gain job/productivity skills through work experience. Students need to experience their perceived skills in a work setting.</p> <p>Contact your local Flowers Canada Accreditation Council regional liaison member for information on instructor workshops (see Section H: Linkages/Transitions).</p>

**MODULE AGR3080: FLORAL DESIGN 2 (CREATIVE DESIGN & DISPLAY) (continued)**

Concept	Specific Learner Expectations	Notes
<p>Cost and Selling Price</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify fixed and variable costs associated with floral services</li> <li>• explain and apply pricing formulas used in the floral industry</li> <li>• calculate the cost price and selling price of a floral arrangement</li> <li>• explain the importance of accountability for pricing practices used within the industry.</li> </ul>	<p>Distinguish between the concepts of wholesale and retail.</p> <p>Calculate the cost and selling price for a variety of floral products and services.</p>
<p>Promotional Techniques</p>	<ul style="list-style-type: none"> <li>• identify important components of promotional displays</li> <li>• establish a theme and goals for a floral display that promotes/advertises a seasonal product and/or service</li> <li>• design and construct a promotional floral display that promotes/advertises a seasonal product and/or service</li> <li>• design and maintain a promotional display for a specified period of time</li> <li>• disassemble and remove a promotional floral display.</li> </ul>	



**MODULE AGR3090: MARKETING 2 (CLOSED MARKETING STRUCTURES)**

**Level:** Advanced

**Theme:** Technology and Applications

**Prerequisite:** AGR2090 Marketing 1 (Open Marketing Structures)

**Module Description:** Students explain specialized applications of marketing within closed (supply managed) marketing structures, focusing attention on regulatory agencies/policies that influence the supply of a commodity, product or service.

**Module Parameters:** Access to an agriculture or horticulture industry.

**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>describe general characteristics and applications of marketing within a closed (supply managed) marketing structure</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>completing a research project on strategies used to market an agriculture commodity within a closed marketing structure. Research to address:               <ul style="list-style-type: none"> <li>social, economic and environmental factors that influence market trends</li> <li>a rationale for “supply management” within the industry</li> <li>specific marketing structures/agencies/policies that regulate commodity supply and exchange</li> <li>influence of government policies/legislation on marketing activities</li> <li>a comparison of approaches used to market the commodity in Canada with other nations</li> <li>forecasts regarding future exchange and marketing of the commodity.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Research Process: Specialized Applications of Marketing, AGR3090-1</i></p> <p><i>Standard</i>  <i>Complete all components of research to a standard of 3 on the rating scale</i></p>	<p>25</p>



**MODULE AGR3090: MARKETING 2 (CLOSED MARKETING STRUCTURES) (continued)**

Concept	Specific Learner Expectations	Notes
<p>Past and Present Trends</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe past and present trends in the regulated marketing of an agricultural commodity, product or service</li> <li>• describe factors that have affected marketing practices within the industry; e.g.:               <ul style="list-style-type: none"> <li>– consumer trends</li> <li>– trade liberalization</li> <li>– globalization of markets</li> <li>– environmental concerns</li> <li>– subsidy policies</li> </ul> </li> <li>• compare approaches used to market the commodity, product or service in Canada with approaches used in other nations; e.g.:               <ul style="list-style-type: none"> <li>– United States</li> <li>– nations of the Pacific Rim</li> <li>– Europe.</li> </ul> </li> </ul>	<p>This module will enable students to study the characteristics/functions of supply-managed marketing structures specifically designed for:</p> <ul style="list-style-type: none"> <li>• a primary commodity OR</li> <li>• a processed product OR</li> <li>• a related service.</li> </ul>
<p>Structures and Policies</p>	<ul style="list-style-type: none"> <li>• identify economic factors that affect marketing activities within the industry; e.g.:               <ul style="list-style-type: none"> <li>– law of supply and demand</li> <li>– price determination and the futures market</li> <li>– comparative advantage</li> </ul> </li> <li>• explain the concept of supply management, and differences between nonregulated (open) and regulated (closed) marketing systems</li> <li>• explain the role and impact of regulatory systems and strategies used in marketing the commodity, product or service; e.g.:               <ul style="list-style-type: none"> <li>– marketing boards and cooperatives</li> <li>– quota systems and monopolies</li> </ul> </li> <li>• identify marketing structures used to facilitate commodity exchange; e.g.:               <ul style="list-style-type: none"> <li>– Winnipeg Commodity Exchange</li> <li>– Omaha Market Exchange</li> <li>– Chicago Grain Exchange</li> </ul> </li> </ul>	<p>Research steps in “hedging.”</p>

**MODULE AGR3090: MARKETING 2 (CLOSED MARKETING STRUCTURES) (continued)**

Concept	Specific Learner Expectations	Notes
Structures and Policies (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe the impact of government policies and legislation on marketing activities within the industry; e.g.:               <ul style="list-style-type: none"> <li>– federal, provincial and international trade agreements</li> <li>– transportation policies</li> <li>– non-trade (health and safety) standards</li> </ul> </li> <li>• explain the function of income stabilization programs, and their effect on long- and short-term market trends.</li> </ul>	<p>Research influences of:</p> <ul style="list-style-type: none"> <li>• GATT (General Agreement on Tariffs and Trade)</li> <li>• NAFTA (North American Free Trade Agreement).</li> </ul> <p>Research influences of:</p> <ul style="list-style-type: none"> <li>• FIDP (Farm Income Disaster Program)</li> <li>• NISA (Net Income Stabilization Account).</li> </ul>
Marketing Decisions	<ul style="list-style-type: none"> <li>• identify factors that influence decisions to market the commodity, product or service; e.g.:               <ul style="list-style-type: none"> <li>– commodity supply, quality and pricing</li> <li>– financial constraints, including capital, credit and cash flow</li> <li>– time constraints on perishable products</li> <li>– transportation requirements</li> </ul> </li> <li>• identify ways in which relevant trade policies and regulations may influence marketing decisions; e.g.:               <ul style="list-style-type: none"> <li>– international and domestic trade rules</li> <li>– transportation policies</li> <li>– income support programs and subsidies</li> </ul> </li> <li>• describe strategies for gathering current market information; e.g.:               <ul style="list-style-type: none"> <li>– publications and journals</li> <li>– private consultation</li> <li>– radio and television</li> <li>– data base</li> </ul> </li> <li>• identify and assess viable alternatives for marketing the commodity, product or service; e.g.:               <ul style="list-style-type: none"> <li>– marketing board</li> <li>– cooperative</li> <li>– direct sale.</li> </ul> </li> </ul>	<p>Contact the Alberta Wheat Pool (Farm Information Services) regarding marketing simulation programs.</p> <p>Contact Alberta Agriculture, Food and Rural Development (Farm Business Management Branch) regarding bulletin board systems.</p> <p>Research strategic alliances developed among industry partners to increase market share in the global economy (e.g., Canada Beef Export Federation).</p>

## MODULE AGR3100: BIOTECHNOLOGY

**Level:** Advanced

**Theme:** Technology and Applications

**Prerequisite:** None

**Module Description:** Students present the results of research on applications of biotechnology in agriculture and food production.

**Module Parameters:** Access to resources on current applications of biotechnology in agriculture and food production.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>describe the history and development of biotechnology</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>a teacher-prepared assessment in which the student demonstrates knowledge of:               <ul style="list-style-type: none"> <li>the nature of biotechnology and basic genetic terms</li> <li>basic methods used to alter plant and animal characteristics</li> <li>moral and ethical issues associated with developments in biotechnology.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> Agriscience and Technology, <i>Section I: Biotechnology</i></p> <p><i>Standard</i> <i>Response indicating 60% mastery</i></p>	25
<ul style="list-style-type: none"> <li>identify the benefits and costs associated with applications of biotechnology in agriculture and food production</li> </ul>	<ul style="list-style-type: none"> <li>a presentation or report on the benefits and costs associated with one or more applications of biotechnology in each of the following areas:               <ul style="list-style-type: none"> <li>product and market development</li> <li>industry diversification</li> <li>production efficiency</li> <li>disease and pest control.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Presentations/Reports: Advanced Level, AGRPRE-3</i></p> <p><i>Standard</i> <i>Complete the presentation or report to a standard of 3 on the rating scale</i></p>	25



**MODULE AGR3100: BIOTECHNOLOGY** (continued)

Concept	Specific Learner Expectations	Notes
Nature and History (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe basic vocabulary and techniques used in genetic engineering; e.g.:               <ul style="list-style-type: none"> <li>– chromosome</li> <li>– gene</li> <li>– gene mapping</li> <li>– gene splicing</li> <li>– cloning</li> </ul> </li> <li>• outline present and emerging applications of biotechnology in major sectors of Alberta’s economy; e.g.:               <ul style="list-style-type: none"> <li>– agriculture</li> <li>– health care</li> <li>– mining</li> <li>– forestry</li> <li>– energy</li> <li>– tourism.</li> </ul> </li> </ul>	<p>Discuss applications of genetic engineering in selecting and breeding desirable characteristics.</p>
Applications	<ul style="list-style-type: none"> <li>• describe specific applications of biotechnology in agriculture and food production; e.g.:               <ul style="list-style-type: none"> <li>– product and market development</li> <li>– industry diversification</li> <li>– production efficiency</li> <li>– disease and pest control</li> </ul> </li> <li>• describe environmental, economic and ethical issues related to developments in biotechnology; e.g.:               <ul style="list-style-type: none"> <li>– use of natural resources</li> <li>– control and patenting of life forms</li> <li>– impact of genetically altered organisms</li> <li>– food quality and safety</li> <li>– world food supply</li> </ul> </li> <li>• predict possible effects of new biotechnologies on producers, processors, consumers and governments</li> <li>• explain the role of legislation in regulating developments in biotechnology.</li> </ul>	<p>View the video entitled <i>Guess What’s Coming to Dinner</i> for an interesting account of applications of biotechnology (see Section I: Learning Resource Guide).</p> <p>Research applications of:</p> <ul style="list-style-type: none"> <li>• artificial insemination</li> <li>• embryo transplant</li> <li>• hormones</li> <li>• growth supplements.</li> </ul> <p>Discuss the risks and benefits.</p>

**MODULE AGR3100: BIOTECHNOLOGY** (continued)

Concept	Specific Learner Expectations	Notes
Research Project	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify a specific problem in agriculture and food production recently addressed through biotechnology; e.g.:               <ul style="list-style-type: none"> <li>– production costs</li> <li>– product quality</li> <li>– market supply</li> <li>– environmental impact</li> </ul> </li> <li>• identify key stakeholder groups affected by the problem</li> <li>• describe funding and partnerships that were established to address the problem</li> <li>• explain applications of biotechnology in dealing with the problem; e.g.:               <ul style="list-style-type: none"> <li>– principles of genetic engineering</li> <li>– scientific design</li> <li>– experimental outcomes</li> </ul> </li> <li>• describe the social, economic and environmental consequences of experimental outcomes</li> <li>• make recommendations regarding the use of biotechnology and practical solutions to the problem; e.g.:               <ul style="list-style-type: none"> <li>– management actions</li> <li>– further research.</li> </ul> </li> </ul>	Keep research projects relevant to personal needs and living experiences.

## MODULE AGR3110: WATER MANAGEMENT

**Level:** Advanced

**Theme:** Management and Conservation

**Prerequisite:** None

**Module Description:** Students explain principles of water management and establish appropriate water management practices for an agriculture or horticulture enterprise.

**Module Parameters:** Access to community and government agencies responsible for sustainable agriculture development.

**Supporting Module:** AGR1110 Resource Management

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>describe the hydrologic cycle</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>a presentation or report that provides:               <ul style="list-style-type: none"> <li>an illustration of the hydrologic cycle depicting precipitation, evaporation, transpiration, condensation and groundwater flow</li> <li>an explanation of changes that occur to water as it is recycled in the natural environment.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Presentations/Reports: Advanced Level, AGRPRE-3</i></p> <p><i>Standard</i>  <i>Complete the presentation or report to a standard of 3 on the rating scale</i></p>	10
<ul style="list-style-type: none"> <li>identify water sources important to agriculture in Alberta</li> </ul>	<ul style="list-style-type: none"> <li>given an outline map of Alberta, locating and naming all major sources of surface water in the province.</li> </ul> <p><i>Assessment Tool</i>  <i>Task Checklist for Mapping, AGRMAP</i></p> <p><i>Standard</i>  <i>Complete mapping to a standard of 3 on the rating scale</i></p>	10

**MODULE AGR3110: WATER MANAGEMENT** (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• explain how agriculture affects water resources at local and global levels</li>   <li>• identify water quality factors and techniques used to manage water for the benefit of agriculture and the environment</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• constructing diagrams/models of two or more on-site systems used to collect and distribute water for agriculture in Alberta.</li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Criteria: Diagrams and Technical Drawings, AGRDRA</i></p> <p><i>Standard</i>  <i>Complete diagrams/models to a standard of 3 on the rating scale</i></p> <ul style="list-style-type: none"> <li>• given an issue that involves the impact of one or more agriculture practices on the water resource:               <ul style="list-style-type: none"> <li>– negotiating and debating the issue while assuming the role of one or more interest groups</li> <li>– preparing and presenting a position paper on the issue that outlines a responsible course of action.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Negotiation and Debate: Advanced Level, AGRNEG-3</i>  <i>Position Paper: Managing the Water Resource, AGR3110-1</i></p> <p><i>Standard</i>  <i>Address criteria in negotiation/debate and the position paper to a standard of 3 on the rating scale</i></p>	<p>30</p>
	<ul style="list-style-type: none"> <li>• conducting laboratory investigations that permit the student to:               <ul style="list-style-type: none"> <li>– identify physical, chemical and biological characteristics of water important in plant and animal production</li> <li>– interpret water test results for a specific use in agriculture</li> <li>– prescribe water treatments based on the results of water tests.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Lab Investigations: Water Quality, AGR3110-2</i></p> <p><i>Standard</i>  <i>Complete laboratory investigations to a standard of 3 on the rating scale</i></p>	

**MODULE AGR3110: WATER MANAGEMENT** (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• conducting field-based investigations of three or more technologies used in agriculture to:               <ul style="list-style-type: none"> <li>– manage limited and/or excess water supplies (e.g., irrigation, storage, diversion, drainage)</li> <li>– maintain water quality (e.g., cropping rotations, conservation tillage, management systems for animal waste, pesticide management).</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Observation Checklist for Field-based Investigations, AGROBS</i></p> <p><i>Standard</i>  <i>Complete all sections of the checklist as they apply to objectives of the field investigation</i></p> <ul style="list-style-type: none"> <li>• developing a water management plan for an agriculture venture. Management plan to address:               <ul style="list-style-type: none"> <li>– available surface and groundwater supplies</li> <li>– water requirements according to estimates of consumption</li> <li>– water treatments to ensure its suitability for use</li> <li>– management practices to compensate for water deficiencies and/or environmental concerns.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Criteria: A Water Management Plan, AGR3110–3</i></p> <p><i>Standard</i>  <i>Complete the water management plan to a standard of 3 on the rating scale</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal exploration during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>Integrated throughout</p>

**MODULE AGR3110: WATER MANAGEMENT** (continued)

Concept	Specific Learner Expectations	Notes
Hydrologic Cycle	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• define and illustrate the water cycle</li> <li>• describe the roles of evaporation, precipitation, run-off and infiltration in the water cycle</li> <li>• explain physical, chemical and biological changes in water as it is cycled in the natural environment.</li> </ul>	<p>Explain the role of the hydrologic cycle in replenishing water supplies.</p>
Water Sources and Quality	<ul style="list-style-type: none"> <li>• describe the main sources of water for agriculture; e.g.:               <ul style="list-style-type: none"> <li>– ground water</li> <li>– surface water</li> <li>– precipitation</li> </ul> </li> <li>• describe on-site systems used to collect and distribute water for agriculture</li> <li>• describe and give examples of physical, chemical and biological characteristics of water important to plants and animals; e.g.:               <ul style="list-style-type: none"> <li>– turbidity, temperature, odour and taste</li> <li>– dissolved oxygen, pH, mineral content</li> <li>– bacteria, viruses, algae and plankton</li> </ul> </li> <li>• perform tests to determine the characteristics of water and its suitability for an agricultural use.</li> </ul>	<p>Investigate:</p> <ul style="list-style-type: none"> <li>• groundwater reserves</li> <li>• major surface water resources</li> <li>• precipitation patterns.</li> </ul> <p>If possible, organize a well-watching demonstration.</p> <p>Interpret water test results for specific uses in agriculture.</p> <p>Perform a test for water hardness.</p> <p>Analyze local water supplies through the local health unit.</p> <p>Determine water quality requirements for a plant/animal production enterprise.</p>
Agriculture Effects	<ul style="list-style-type: none"> <li>• explain how agricultural practices may affect the water resource at local and global levels; e.g.:               <ul style="list-style-type: none"> <li>– land clearing</li> <li>– soil cultivation</li> <li>– use of chemical fertilizers and pesticides</li> <li>– irrigation and draining practices</li> <li>– overgrazing/animal wastes</li> </ul> </li> <li>• describe the effects of erosion and siltation on water quality</li> <li>• relate specific agricultural practices to physical, chemical and biological changes that occur in the water resource</li> <li>• debate a global issue regarding the impact of agriculture on water supply and/or water quality.</li> </ul>	<p>Consider impacts of limited/excess water supplies on:</p> <ul style="list-style-type: none"> <li>• humans</li> <li>• livestock</li> <li>• crops</li> <li>• wildlife</li> <li>• ecosystems.</li> </ul> <p>Investigate on-site collection systems.</p> <p>Invite a rural development specialist to discuss impacts of intensive agriculture on water quality.</p> <p>Explain “static level” and “drawdown” in relation to a farm well.</p>

**MODULE AGR3110: WATER MANAGEMENT** (continued)

Concept	Specific Learner Expectations	Notes
<p>Water Management Practices</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe and assess techniques used to manage limited and excess water supplies in agriculture; e.g.:               <ul style="list-style-type: none"> <li>– irrigation, storage, recycling</li> <li>– diversion, drainage, flood control</li> </ul> </li>   <li>• identify and apply treatments for enhancing water quality both before and after use in agriculture</li>   <li>• research forms of water ownership and legal aspects of water control; e.g.:               <ul style="list-style-type: none"> <li>– public, private and deeded ownership</li> <li>– government controls on pollution</li> </ul> </li>   <li>• describe and assess agriculture practices aimed at maintaining water quality; e.g.:               <ul style="list-style-type: none"> <li>– cropping rotations</li> <li>– management of animal wastes</li> <li>– conservation tillage</li> <li>– optimal fertilizer and pesticide management</li> </ul> </li>   <li>• explain how the maintenance of wetlands contributes to water management</li>   <li>• describe strategic alliances developed among municipal, environmental and user groups to address environmental impacts.</li> </ul>	<p>Discuss the significance of:</p> <ul style="list-style-type: none"> <li>• cropping rotations</li> <li>• animal waste management</li> <li>• wetlands management.</li> </ul> <p>Assess the potential of existing water supplies to meet projected water requirements for a specific agriculture venture.</p> <p>Explain how agriculture can assist in treating municipal wastes.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• water rights</li> <li>• control of effluent disposal and pollution</li> <li>• diversion of natural waterways.</li> </ul> <p>Compare agriculture practices in two locales having significant variance in their water resources.</p> <p>Obtain the “Wetland Environments” kit (available from Ducks Unlimited).</p>



## MODULE AGR3120: SOILS MANAGEMENT 2 (SOIL TESTING & AMENDING)

**Level:** Advanced

**Theme:** Management and Conservation

**Prerequisite:** AGR2120 Soils Management 1 (Soil Properties/Classification)

**Module Description:** Students demonstrate knowledge of appropriate soil testing and amending techniques, and they interpret soil survey maps and reports.

**Module Parameters:** Access to a science laboratory and land laboratory.

**Note:** Specific learner expectations in AGR2120 Soils Management 1 and AGR3120 Soils Management 2 are consistent with Soils Investigations (SOIL 100–35) at Olds College, Alberta. Teachers should contact the Registrar’s Office, Olds College, regarding transfer of credit for competencies developed in this module and AGR3120 Soils Management 2.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"><li>select appropriate fertilization techniques based on an analysis of the nutrient requirements of plants</li></ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"><li>a theory test in which the student demonstrates knowledge of the nutrient requirements of plants and soil fertility.</li></ul> <p><i>Assessment Tool</i> <i>Sample Test Items: Nutrient Requirements of Plants, Soils Investigations Facilitator’s Manual</i></p> <p><i>Standard</i> <i>Response indicating 75% mastery</i><ul style="list-style-type: none"><li>given soil characteristics and plant nutrient requirements, calculating an appropriate blend of fertilizer.</li></ul><p><i>Assessment Tool</i> <i>Soils Investigations II Assignment Book (LRDC)</i></p><p><i>Standard</i> <i>Complete all related exercises in the assignment book</i></p></p>	40

**MODULE AGR3120: SOILS MANAGEMENT 2 (SOIL TESTING & AMENDING) (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>demonstrate appropriate soil sampling techniques, and interpret soil test reports</li> <li>describe the legal location of a parcel of land, using the Western Grid Survey System</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>a theory test in which the student demonstrates knowledge of soil sampling and testing. <i>Assessment Tool</i> <i>Sample Test Items: Soil Sampling and Testing, Soils Investigations Facilitator's Manual</i> <i>Standard</i> <i>Response indicating 75% mastery</i></li> <li>given a soil test report, interpret and elaborate on soil and cropping information and fertilizer recommendations. <i>Assessment Tool</i> <i>Presentation/Reports: Advanced Level, AGRPRE-3</i> <i>Soils Investigations II Assignment Book</i> <i>Soils Investigations Materials Kit</i> <i>Standard</i> <i>Interpret information on soil, cropping and fertilizers to a standard of 3 on the rating scale</i></li> <li>a theory test in which the student demonstrates knowledge of the Western Grid Survey System. <i>Assessment Tool</i> <i>Sample Test Items: Western Grid Survey System, Soils Investigations Facilitator's Manual</i> <i>Standard</i> <i>Response indicating 75% mastery</i></li> <li>given the legal description of a parcel of land, locate the parcel of land on a map. <i>Assessment Tool</i> <i>Soils Investigations I Assignment Book</i> <i>Standard</i> <i>Complete all related exercises in the assignment book</i></li> </ul>	<p>20</p> <p>10</p>



**MODULE AGR3120: SOILS MANAGEMENT 2 (SOIL TESTING & AMENDING) (continued)**

Concept	Specific Learner Expectations	Notes
Soil Fertility	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• list the names and sources of essential nutrients and macronutrients for plants</li> <li>• describe soil colloids and their role in storing and releasing plant nutrients</li> <li>• identify major fertilizer nutrients and describe their benefits to plant growth</li> <li>• distinguish between natural and synthetic fertilizers, and explain the advantages and disadvantages of each</li> <li>• define fertilizer grade and give examples of commonly used grades</li> <li>• describe the pros and cons of specialty fertilizer products</li> <li>• describe common methods of fertilizer application</li> <li>• calculate an appropriate amount and blend of fertilizer based upon plant nutrient requirements.</li> </ul>	<p>Grow plants under hydroponic conditions to observe macro nutrient deficiencies.</p> <p>Contact Department of Instructional Design, Olds College, for additional support materials.</p> <p>Invite a soils specialist from government, industry or post-secondary to discuss nutrient requirements of plants and fertilization techniques.</p>
Soil Testing	<ul style="list-style-type: none"> <li>• identify reasons for soil testing</li> <li>• identify major soil nutrients and soil quality factors evaluated through a soil test</li> <li>• describe the steps involved in conducting a soil test; e.g.:               <ul style="list-style-type: none"> <li>– soil sampling</li> <li>– laboratory analysis</li> <li>– interpretation of results</li> </ul> </li> <li>• demonstrate accurate soil sampling techniques</li> <li>• describe the major elements of a soil test report; e.g.:               <ul style="list-style-type: none"> <li>– soil and cropping information</li> <li>– fertilizer recommendations</li> <li>– soil analysis results</li> <li>– yield increase data</li> </ul> </li> <li>• interpret a soil test report.</li> </ul>	<p>Collect soil samples in local area and obtain laboratory analysis. Interpret laboratory report and apply to production methods.</p>

**MODULE AGR3120: SOILS MANAGEMENT 2 (SOIL TESTING & AMENDING) (continued)**

Concept	Specific Learner Expectations	Notes
Western Grid Survey System	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify and describe components of the Western Grid Survey System; e.g.:               <ul style="list-style-type: none"> <li>– lines of latitude and longitude</li> <li>– townships and ranges</li> <li>– sections and legal subdivisions</li> <li>– roads</li> </ul> </li> <li>• identify the area of a parcel of land based upon information provided through its legal land description</li> <li>• describe and provide reasons for correction lines, partial sections and acreage anomalies</li> <li>• locate a specific parcel of land on a soil map by applying knowledge of its legal land description.</li> </ul>	<p>Obtain survey maps of the local area from government agencies. Locate known reference points on the maps.</p>
Soil Survey Maps and Reports	<ul style="list-style-type: none"> <li>• describe key components of the Canada Land Inventory (CLI) system; e.g.:               <ul style="list-style-type: none"> <li>– soil classes and subclasses</li> <li>– climatic subregions</li> </ul> </li> <li>• describe the agricultural capacity of a given piece of land by interpreting a CLI Soil Capability for Agriculture map</li> <li>• describe the strengths and limitations of information provided through CLI maps in establishing agriculture management and conservation practices</li> <li>• describe the nature and purpose of information conveyed through a soil survey map and report; e.g.:               <ul style="list-style-type: none"> <li>– overview of natural environment</li> <li>– classification of soils</li> <li>– potential land use</li> </ul> </li> <li>• identify and explain components of a soil survey map; e.g.:               <ul style="list-style-type: none"> <li>– map units</li> <li>– map legend</li> <li>– map symbols</li> <li>– reference section</li> <li>– key map</li> </ul> </li> <li>• interpret a soil survey map and report.</li> </ul>	<p>Read and interpret local soil survey maps and reports.</p> <p>Invite a rural development specialist as a resource person.</p>



## MODULE AGR3130: SUSTAINABLE AGRICULTURE SYSTEMS

**Level:** Advanced

**Theme:** Management and Conservation

**Prerequisite:** None

**Module Description:** Students examine the impact of a range of agriculture practices on the environment, and they propose strategies for ensuring the sustainable use of natural resources.

**Module Parameters:** Access to community and government agencies responsible for sustainable agriculture management.

**Note:** This is a summative module requiring prior knowledge of the principles of sustainable resource development. It should be the last module studied in a series of Agriculture modules.

### Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"><li>describe the structure and functioning of ecosystems</li></ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"><li>a teacher-prepared assessment in which the student demonstrates knowledge of interrelationships among living and non-living ecosystem components.</li></ul> <p><i>Assessment to address:</i></p> <ul style="list-style-type: none"><li>the relationship of soil, water and air characteristics to plant and animal health/distribution</li><li>interactions and dependencies among living organisms</li><li>natural recycling processes that involve soil, water and air.</li></ul> <p><i>Assessment Tool</i> Ecosystems (<i>Teacher Resource Book</i>)</p> <p><i>Standard</i> Response indicating 60% mastery</p>	20

**MODULE AGR3130: SUSTAINABLE AGRICULTURE SYSTEMS (continued)**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• explain potential impacts of agriculture systems on the environment</li> <li>• develop and present strategies for ensuring the sustainable use of natural resources</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• given access to information on two or more agricultural systems (e.g., field crop production, greenhouse production, feedlot production, range grazing, food processing), completing a research project on the potential impacts of each on land, water, air and wildlife.</li> </ul> <p><i>Assessment Tool</i>  <i>Research Process: Environmental Impacts of Agriculture, AGR3130-1</i></p> <p><i>Standard</i>  <i>Complete all components of research to a standard of 3 on the rating scale</i></p> <ul style="list-style-type: none"> <li>• developing and presenting plans for an agriculture venture that demonstrate principles of sustainable development. Venture plan to address:               <ul style="list-style-type: none"> <li>– background information regarding conservation, preservation and sustainable development</li> <li>– a strategy for multiple land use</li> <li>– a strategy for soil fertility and conservation</li> <li>– a strategy for water management practices</li> <li>– interrelationships and dependencies among domestic and non-domestic plant and animal species</li> <li>– legislated environmental regulation and constraints.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Assessment Criteria: Venture Plan for Sustainable Production, AGR3130-2</i></p> <p><i>Standard</i>  <i>Complete the venture plan to a standard of 3 on the rating scale</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal exploration during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>30</p> <p>50</p> <p>Integrated throughout</p>

**MODULE AGR3130: SUSTAINABLE AGRICULTURE SYSTEMS (continued)**

Concept	Specific Learner Expectations	Notes
<p>Dynamic Ecosystems</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify major living and non-living ecosystem components; e.g.:               <ul style="list-style-type: none"> <li>– soil, water and air</li> <li>– domestic/non-domestic plant and animal species</li> <li>– climate and temperature</li> </ul> </li> <li>• describe interrelationships among ecosystem components; e.g.:               <ul style="list-style-type: none"> <li>– relationship of soil, water and air characteristics to plant and animal distribution/health</li> <li>– interactions and dependencies among living organisms</li> </ul> </li> <li>• explain natural recycling processes that involve soil, water and air; e.g.:               <ul style="list-style-type: none"> <li>– exchange of gases</li> <li>– water cycle</li> <li>– nutrient cycles.</li> </ul> </li> </ul>	<p>Obtain the “Wetland Environments” kit (available from Ducks Unlimited). See Section I: Learning Resource Guide.</p>
<p>Environmental Impacts</p>	<ul style="list-style-type: none"> <li>• explain the impact of deforestation, land clearing and cultivation practices on ecosystems</li> <li>• describe ways in which water diversion and irrigation projects have changed the environment</li> <li>• describe potential impacts of chemical and solid wastes on soil, water and air characteristics</li> <li>• explain potential impacts of selective breeding and genetic engineering on biodiversity of plant and animal populations</li> <li>• identify environmental pollutants resulting from large-scale and specialized production and/or processing practices.</li> </ul>	

**MODULE AGR3130: SUSTAINABLE AGRICULTURE SYSTEMS (continued)**

Concept	Specific Learner Expectations	Notes
Environmental Management	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• define conservation, preservation and sustainable development</li> <li>• identify a rationale for the retention of land as a natural habitat</li> <li>• explain applications of multiple land use in an agriculture enterprise</li> <li>• explain the benefits and costs of wetlands in an agriculture system</li> <li>• describe soil management practices relevant to an agriculture system; e.g.:               <ul style="list-style-type: none"> <li>– soil fertility</li> <li>– soil conservation</li> </ul> </li> <li>• describe water management practices relevant to an agriculture system; e.g.:               <ul style="list-style-type: none"> <li>– water quality</li> <li>– hydrologic cycle</li> </ul> </li> <li>• identify government policies and regulations that support sustainable development; e.g.:               <ul style="list-style-type: none"> <li>– environmental constraints</li> <li>– inspection and regulation</li> </ul> </li> <li>• explain potential impacts of agricultural systems on ecosystem dynamics</li> <li>• describe the benefits and costs of specific management practices in maximizing sustainable development and minimizing environmental impacts within an agriculture system</li> <li>• identify potential careers in environmental management; e.g.:               <ul style="list-style-type: none"> <li>– environmental assessment</li> <li>– environmental regulation.</li> </ul> </li> </ul>	<p>Consider using computer simulations.</p> <p>Invite resource persons from environmental <u>and</u> industry organizations to discuss achievements and challenges related to sustainable agriculture systems.</p>

## **MODULE AGR3140: NURSERY/GREENHOUSE CROPS 2 (MANAGEMENT TECHNIQUES)**

**Level:** Advanced

**Theme:** Technology and Applications

**Prerequisite:** AGR2140 Nursery/Greenhouse Crops 1 (Materials & Processes)

**Module Description:** Students demonstrate techniques used to produce a nursery or greenhouse crop, focusing attention on enterprise selection, plant identification, genetics and reproduction, production skills and venture analysis.

**Module Parameters:** Access to a land laboratory and/or controlled growing environment.

Facilities and equipment should permit students to perform practical skills of plant production, as is required to produce a nursery or greenhouse crop; e.g., soil preparation, propagation, transplanting, cultivation, watering and fertilizing, pest and disease control.

Instructor training in the use of pesticides is recommended; e.g., Pesticide Applicator/Dispenser Certificate.

Off-campus learning can support the development of practical skills in crop production; consultation with a work site supervisor ensures that relevant safety considerations are addressed and that student learning meets or exceeds the learner expectations in this module.

See the *Off-campus Education Guide for Administrators, Counsellors and Teachers* (Alberta Education, 1995) for further information regarding off-campus learning.

**Note:** This module can be combined with other modules from the Agriculture strand and/or from the Career Transitions strand to provide opportunities for students to develop technical competencies within the Landscape Gardener Apprenticeship Program (Alberta Advanced Education and Career Development). See Section H (Linkages/Transitions) of this guide for further information.

**Supporting Module:** CTR2210 Workplace Safety (Practices)

Because of the practical nature of this module, students need a general knowledge of accepted practices and potential hazards when performing tasks related to crop production. See Planning for Instruction in Section C for further information on student safety.



**MODULE AGR3140: NURSERY/GREENHOUSE CROPS 2 (MANAGEMENT TECHNIQUES)**  
(continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• demonstrate practical skills in producing a nursery or greenhouse crop</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• completing a research project on applications of heredity principles and reproductive technology relevant to one nursery/greenhouse crop variety. Research to address:               <ul style="list-style-type: none"> <li>– desirable and undesirable plant traits</li> <li>– selection criteria</li> <li>– applications of hybridization.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Research Process: Heredity Principles and Reproductive Technology, AGR3140–2</i></p> <p><i>Standard</i> <i>Conduct research to a standard of 3 on the rating scale</i></p> <ul style="list-style-type: none"> <li>• demonstrating practical skills as required to produce a nursery or greenhouse crop. Practical skills will involve:               <ul style="list-style-type: none"> <li>– preparing the growing medium/seed bed</li> <li>– propagation and transplanting</li> <li>– appropriate use of growing space</li> <li>– cultivating, watering and fertilizing the crop</li> <li>– controlling plant pests and diseases</li> <li>– packaging plant material</li> <li>– utilizing soil and water conservation practices.</li> </ul> </li> </ul> <p>Production tasks will involve the application of appropriate safety guidelines for using equipment and supplies.</p> <p><i>Assessment Tool</i> <i>Task Checklist: Nursery/Greenhouse Crops 2, AGR3140–3</i> <i>Lab Assessment: Plant Production, AGRLAB–PLT</i></p> <p><i>Standard</i> <i>Achieve a minimum performance rating of:</i></p> <ul style="list-style-type: none"> <li>– 2 in applicable areas of crop production</li> <li>– 3 in the safe use of equipment and supplies</li> </ul>	<p>60</p>

**MODULE AGR3140: NURSERY/GREENHOUSE CROPS 2 (MANAGEMENT TECHNIQUES)**  
(continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• develop and present a plan for future nursery or greenhouse crop production, based on the outcomes of current production practices</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• maintaining an anecdotal record of all production tasks completed.</li> </ul> <p><i>Assessment Tool</i> <i>Log/Record of Production Tasks: Plants, AGRLOG–PLT</i></p> <p><i>Standard</i> <i>Completing all sections of the log/record for each production task performed</i></p> <ul style="list-style-type: none"> <li>• a brief report on the results of nursery or greenhouse crop production, and recommendations regarding future production ventures. Report to address: <ul style="list-style-type: none"> <li>– product quality and saleability</li> <li>– variables affecting production outcomes</li> <li>– new skills/learnings that were applied</li> <li>– recommendations regarding future production based on current accomplishments and challenges.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Presentations/Reports: Advanced Level, AGRPRE–3</i></p> <p><i>Standard</i> <i>Complete report to a standard of 3 on the rating scale</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>10</p> <p>Integrated throughout</p>

**MODULE AGR3140: NURSERY/GREENHOUSE CROPS 2 (MANAGEMENT TECHNIQUES)**  
(continued)

Concept	Specific Learner Expectations	Notes
Enterprise Selection	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• explain how personal needs may influence crop selection; e.g.:               <ul style="list-style-type: none"> <li>– food for personal consumption</li> <li>– economic goals</li> <li>– interest in aesthetics</li> <li>– personal motivation and aptitude</li> </ul> </li> <li>• identify market factors that influence crop selection; e.g.:               <ul style="list-style-type: none"> <li>– market demands</li> <li>– market size, location and access</li> <li>– market competition</li> <li>– market trends</li> </ul> </li> <li>• describe financial opportunities related to crop production; e.g.:               <ul style="list-style-type: none"> <li>– fixed and variable costs</li> <li>– forecast of returns</li> <li>– risk factors</li> </ul> </li> <li>• describe land requirements and/or the suitability of soil and water conditions to production operations</li> <li>• describe the suitability of Alberta’s climate to potential crops; e.g.:               <ul style="list-style-type: none"> <li>– growing days</li> <li>– frost-free days</li> <li>– ambient temperature</li> <li>– soil temperature</li> </ul> </li> <li>• describe equipment needs at different stages of production; e.g.:               <ul style="list-style-type: none"> <li>– seeding/planting</li> <li>– cultivation</li> <li>– harvesting</li> </ul> </li> <li>• describe labour and transportation needs within the industry; e.g.:               <ul style="list-style-type: none"> <li>– availability</li> <li>– cost.</li> </ul> </li> </ul>	<p>Potential linkages exist with the Alberta Agriculture Green Certificate Farm Training Program:</p> <ul style="list-style-type: none"> <li>• crop production</li> <li>• irrigated crop production.</li> </ul> <p>For additional information, see Section H: Linkages/Transitions.</p> <p>Identify input costs and potential profits for a production venture.</p> <p>Invite a rural development specialist to discuss factors in enterprise selection.</p> <p>Consider advertising and promotional technologies used to access greenhouse and nursery markets.</p> <p>Identify determinants of regional commodity production.</p>

**MODULE AGR3140: NURSERY/GREENHOUSE CROPS 2 (MANAGEMENT TECHNIQUES)**  
(continued)

Concept	Specific Learner Expectations	Notes
Taxonomy and Genetics	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• classify nursery or greenhouse plants; e.g.:               <ul style="list-style-type: none"> <li>– according to growth habit</li> <li>– according to taxonomy</li> </ul> </li> <li>• identify nursery or greenhouse plants, e.g.:               <ul style="list-style-type: none"> <li>– using common names</li> <li>– using botanical nomenclature</li> </ul> </li> <li>• research heredity principles and their application to plants that are grown; e.g.:               <ul style="list-style-type: none"> <li>– dominant and recessive traits</li> <li>– selection criteria and procedures</li> <li>– systems of breeding</li> </ul> </li> <li>• research reproduction technologies and their application to plants that are grown; e.g.:               <ul style="list-style-type: none"> <li>– propagation techniques</li> <li>– hybridization</li> </ul> </li> <li>• describe procedures used to maintain the quality of plants within the industry; e.g.:               <ul style="list-style-type: none"> <li>– selection criteria</li> <li>– applications of hybridization</li> <li>– showing and judging.</li> </ul> </li> </ul>	<p>Gather, label and mount plant collections.</p> <p>Use an identification key to identify previously unknown plants.</p> <p>Conduct breeding experiments with cucumbers, squash, pumpkins and/or gourds.</p>
Production Skills	<ul style="list-style-type: none"> <li>• apply knowledge of plant management practices in production activities; e.g.:               <ul style="list-style-type: none"> <li>– characteristics of plant health and disorders</li> <li>– remedial strategies for plant disorders</li> <li>– disease and pest control</li> </ul> </li> <li>• use appropriate techniques to propagate nursery or greenhouse plants</li> <li>• apply principles of nutrition to production practices; e.g.:               <ul style="list-style-type: none"> <li>– essential nutrients</li> <li>– fertilizer formulation</li> </ul> </li> <li>• demonstrate techniques for maintaining a sustainable production system; e.g.:               <ul style="list-style-type: none"> <li>– water and soil quality</li> <li>– organic and inorganic amendments</li> <li>– biological and chemical control measures</li> <li>– waste disposal.</li> </ul> </li> </ul>	<p>Consider strategies for managing a crop from seed to sale.</p> <p>Potential linkages exist with various pesticide applicator certificate courses (see Section H: Linkages/Transitions).</p> <p>Plan for individual research regarding relevant issues.</p> <p>Keep a daily log that details production activities.</p> <p>Discuss biological control agents.</p>

**MODULE AGR3140: NURSERY/GREENHOUSE CROPS 2 (MANAGEMENT TECHNIQUES)**  
(continued)

Concept	Specific Learner Expectations	Notes
Production Analysis	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• describe production venture outcomes based on:               <ul style="list-style-type: none"> <li>– product quality</li> <li>– product saleability</li> <li>– application of new skills/learnings</li> </ul> </li> <li>• describe the impact of economic, environmental and/or social factors on production practices and outcomes</li> <li>• make recommendations regarding future production ventures on the basis of current accomplishments and challenges in plant production.</li> </ul>	<p>Consider the impacts of local, national and global trends on venture outcomes.</p> <p>Plan for individual/group reports and presentations.</p>

