

NORTH DAKOTA
AGRICULTURE
EDUCATION
CURRICULUM

AUGUST, 1993,
Revised 2004

Acknowledgments

This compilation of course outlines for secondary Agricultural Science programs is an attempt to provide a base document to those programs changing delivery systems from the conventional four-year program to a menu based program.

It is our sincere wish that this document will give guidance to those who are changing delivery systems, and food for thought for those of us still using the traditional system.

We wish to acknowledge and thank the NDVATA Curriculum Committee whose participation in this project has made it what it is. The following instructors were responsible for writing, reviewing, and organizing the document.

Richard Debertin	Berthold	Jeff Hagel	Granville
Cameron Young	Rolla	Mark Schmidt	Walhalla
Myron Johs	Lisbon	Rick Vannett	Jamestown
Mark Wagner	Beulah	Brad Tews	NDSU Wahpeton
Myron Schweitzer	Mott	Curt Leslie	Kindred
Shane Laster	NDSU Bottineau	Paul Oehlke	NDSU Wahpeton
Allen Graner	Rugby	Keith Torgerson	NDSU Wahpeton

A special thank you to Joel Janke, State Supervisor of Agricultural education and Doug Vannurden, Assistant state Supervisor of Agricultural Education for your input and guidance. To Cindy Olson, Secretary, for the countless hours of typing and formatting without whose help this document may not exist. To Mary Bianco, North Dakota Vocational Curriculum Library, whose help in locating and securing various curriculum materials was invaluable.

A special thank you to Ron Mehrer, Coordinator Research & Curriculum, and CBVE Curriculum Management Team for the financial assistance without which this project would not have been reality.

Lastly, we wish to thank Dr. Michael K. Swan, North Dakota state University, Agricultural & Extension Education program for the assistance and guidance during the curriculum development process.

2004 Revisions were made to the course descriptions with input of a committee of instructors including:

Al Giese	Wahpeton	Duane Schmidt	Center
Tim Aichele	Beulah	Glen Huettl	Garrison
Doug Vannurden	Bismarck	Dr Anissa Wilehlm	NDSU
Steve Zimmerman	Bismarck		

INDEX

Title Page	1
Acknowledgments	2
Index	3
Agricultural Education for the 21st Century	6
Curriculum Use Statement	6
An Effective Agricultural Education Program	7
Agricultural Science Instructor Profile	8
Definition - Purpose - Mission	11
Name & Program Structure	12
Course Titles - Course Codes - Course Credits	13
Course Descriptions	15
Agricultural Core Curriculum	
A. Animal Science Technology	
B. SAE Opportunities/Entrepreneurship	
C. Leadership and Personal Development	
D. Agricultural Mechanics	
E. Plant Science Technology	
F. Soil Science	
G. Role of Agriculture in Your Life & World	
H. Natural Resources and Environment	
I. Horticulture	
J. Emerging Technologies	
K. Agricultural Business and Marketing	
Agriscience Technology I, II, III, IV	
A. Leadership	
B. Entrepreneurship	
C. Careers	
D. Technology in an Agricultural Setting	
E. The Twenty First Century and You	
F. Agriscience and the Information Age	
G. Natural Resources and Environment	
H. Plant Sciences	
I. Plant Science Practices	
J. Plant Science Technologies	
K. Animal Science	
L. Animal Science Practices	
M. Animal Science Technologies	
N. Food and Fiber Technology	
O. Biotechnology	
P. Energy and Power Technology	
World Agricultural Science & Technology	
A. Leadership	
B. Entrepreneurship	
C. Careers	
D. Recognize the Importance of Agricultural Science & Technology	
E. Explain the Historical Significance of Agriculture	

- F. Recognize the Interdependency of Agriculture & World Politics
- G. Explain the Food & Fiber System, Agriculture Economy
- H. North Dakota's Domestic Agricultural Trade
- I. Identify Research & Development in Agriculture
- J. Develop Personal & Social Skills
- K. Improve Communication Skills in Global Settings
- L. Develop Leadership Skills in Agricultural Science

Agricultural Mechanics Technology I, II, III, IV

- A. Leadership
- B. Entrepreneurship
- C. Careers
- D. Leadership Development
- E. Computer Aided Drafting
- F. CNC Equipment (computer numerically controlled)
- G. Basic Electricity
- H. Ag Electronics
- I. Laser Technology
- J. Surveying
- K. Agricultural Structures
- L. Computer Technology
- M. Personal Safety
- N. Fusion of Metal and Non-Metals
- O. Cold Metal
- P. Power Carpentry and Power Tool Usage
- Q. Entrepreneurships and Management Mechanisms
- R. Applied Physical Science Applications in Agriculture
- S. Small Engines - Maintenance and Tune Up
- T. Agricultural Equipment Technology
- U. Electricity and Electronics
- V. Electrical Wiring
- W. Electric Motors

Agricultural Processing

- A. Leadership
- B. Entrepreneurship
- C. Careers
- D. Trends in Agricultural Food Products
- E. Safety Practices
- F. Poultry Products
- G. Dairy Products
- H. Fish and Fish Products
- I. Fruits & Vegetables
- J. Grain Products
- K. Packaging Agricultural Products
- L. Preserving Agricultural Products
- M. Specialized & Non-Food Agricultural Products
- N. Meat Products
- O. Red Meat Products

Botany/Horticultural Science I, II

- A. Leadership

- B. Entrepreneurship
- C. Careers
- D. Hydroponics
- E. Plant Taxonomy
- F. Greenhouse Management
- G. Structures
- H. Pest Management
- I. Plant Growth and Propagation
- J. Salesmanship and Marketing
- K. Ornamental Landscaping
- L. Tools and Equipment
- M. Floral Design
- N. Irrigation
- O. Growth Media
- P. Interior Landscaping
- Q. Horticultural Chemicals
- R. Olericulture/Pomology Production
- S. Arboriculture/Nursery
- T. Miscellaneous Horticulture Career Opportunities

Agricultural Sales & Service

- A. How an Agricultural - Business Functions
- B. Leadership Development
- C. Human Relations in an Agricultural Business
- D. Sales Procedures Used In Agricultural Business
- E. Agricultural Sales & Marketing
- F. Preparing Young Entrepreneurs
- G. Personal Management and Career Planning

Agricultural Business Management

- A. Setting Family and Business Goals
- B. Recordkeeping
- C. Basic Economic Principles & Marketing
- D. Depreciation and Tax Laws
- E. Agricultural Business Organization
- F. Agricultural Law
- G. Agricultural Credit
- H. Machinery and Equipment Management

Agricultural Education for the 21st Century

Charting the course for North Dakota's Agricultural Education

There is a need for a broadened curriculum in agricultural education because of the wide diversity of occupations within the agricultural industry and its increasing need for employees. Agricultural education programs must reach out to the student population as a whole if we are to meet the demand for qualified persons to fill future roles in the agricultural industry.

As in other industries, agriculture has felt the tremendous impact of technology and its constant change. The rapid rate of these technological changes requires that workers in agriculture frequently upgrade their skills. That will require all of us as educators to change our thinking toward our future agricultural programs if our programs are to survive.

In order to accomplish the monumental task of meeting the needs of future generations, several different avenues in the administration, instruction, and promotion of agricultural education must be developed.

The job starts with us. Agricultural education teachers, teacher educators, state supervisors, along with the people representing youth, business and industry, higher education and other agencies, must work together to move agricultural education into the 21st century.

We must educate the populace about agriculture if we are to get the support and respect we deserve. This can only be accomplished if our programs are up-to-date and are effectively meeting the needs of the communities. In order to get recognition by all citizenry, our programs must be strong, effective and futuristic in nature.

This is a difficult and time consuming effort which is needed. But with the help and cooperation of all of us working together a program in North Dakota can be developed which can serve as a model and inspiration for other states.

Curriculum Use Statement

The Agricultural Curriculum is intended to be used as a guideline for agricultural education instructor. It is the responsibility of the agricultural education instructor to select what is to be included in their curriculum to meet the specific needs of the local community and school. The units taught and the time frame will be left to the discretion of the agricultural education instructor, the local agricultural education advisory committee and local school administration main address will be in core curriculum.

An Effective Agricultural Education Program

1. Focuses on the new agricultural principles for a variety of careers.
2. Recognizes functions in the agricultural industry.
3. Prepares students for employment and advanced education.
4. Develops specialized agricultural skills.
5. Encourages experiential learning.
6. Develops leadership, communication, and personal skills.
7. Features problem solving and decision making.
8. Provides a global perspective.
9. Develops employability and entrepreneurship skills.
10. Infuses biotechnology and other high technology.
11. Uses available resources to enhance learning.
12. Applies basic math, science, and academic skills.
13. Combines scientific principles with applied skills.

**NORTH DAKOTA AGRICULTURAL SCIENCE INSTRUCTOR
PROFILE
Category, Skills and Tasks**

A. Program Planning, Development, and Evaluation

1. Prepare for a Community Survey
2. Conduct a Community Survey
3. Report the Findings of a Community Survey
4. Organize an Occupational Advisory Committee
5. Maintain an Occupational Advisory Committee
6. Develop Program Goals and Objectives
7. Conduct an Occupational Analysis
8. Develop a Course of Study
9. Develop Long-Range Program Plans
10. Conduct a Student Follow-Up Study
11. Evaluate Your Career & Technical Program

B. Instructional Planning

1. Determine Needs and Interests of Students
2. Develop Student Performance Objectives
3. Develop a Unit of Instruction
4. Develop a Lesson Plan
5. Select Student Instructional Materials
6. Prepare Teacher-Made Instructional Materials

C. Instructional Execution

1. Direct Field Trips
2. Conduct Group Discussions, Panel Discussions, and Symposiums
3. Employ Brainstorming, Buzz Group, and Question Box Techniques
4. Direct Students in Instructing Other Students
5. Employ Simulation Techniques
6. Guide Student Study
7. Direct Student Laboratory Experience
8. Direct Students In Applying Problem-Solving Techniques
9. Employ the Project Method
10. Introduce a Lesson
11. Summarize a Lesson
12. Employ Oral Questioning Techniques
13. Employ Reinforcement Techniques
14. Provide Instruction for Slower and More Capable Learners
15. Present an Illustrated Talk
16. Demonstrate a Manipulative Skill
17. Demonstrate a Concept or Principle
18. Individualize Instruction
19. Employ the Team Teaching Approach
20. Use Subject Matter Experts to Present Information

21. Prepare Bulletin Boards and Exhibits
22. Present Information with Models, Real Objects, and Flannel Boards
23. Present Information with Overhead and Opaque Materials
24. Present Information with Filmstrips and Slides
25. Present Information with Films
26. Present Information with Audio Recordings
27. Present Information with Televised and Videotaped Materials
28. Employ Programmed Instruction
29. Present Information with the Chalkboard and Flip Chart

D. Instructional Evaluation

1. Establish Student Performance Criteria
2. Assess Student Performance: Knowledge
3. Assess Student Performance: Attitudes
4. Assess Student Performance: Skills
5. Determine Student Grades
6. Evaluate Your Instructional Effectiveness

E. Instructional Management

1. Project Instructional Resource Needs
2. Manage Your Budgeting and Reporting Responsibilities
3. Arrange for Improvement of Your Facilities
4. Maintain a Filing System
5. Provide for Student Safety
6. Provide for the First Aid Needs of Students
7. Assist Students in Developing Self-Discipline
8. Organize the Career & Technical Laboratory
9. Manage the Career & Technical Laboratory
10. Combat Problems of Student Chemical Use

F. Guidance

1. Gather Student Data Using Formal Data-Collection Techniques
2. Gather Student through Personal Contacts
3. Use Conferences to Help Meet Student Needs
4. Provide Information on Educational and Career Opportunities
5. Assist Students in Applying for Employment or Further Education

G. School-Community Relations

1. Develop a School-Community Relations Plan for Your Career & Technical Program
2. Give Presentations to Promote Your Career & Technical Program
3. Develop Brochures to Promote Your Career & Technical Program
4. Prepare Displays to Promote Your Career & Technical Program
5. Prepare News Releases and Articles Concerning Your Career & Technical Program
6. Arrange for Television and Radio Presentations Concerning Your Career

- & Technical Program
- 7. Conduct an Open House
- 8. Work with Members of the Community
- 9. Work with State and Local Educators
- 10. Obtain Feedback about Your Career & Technical Program

H. Career & Technical Student Organization

- 1. Develop a Personal Philosophy Concerning Career & Technical Student Organizations
- 2. Establish a Career & Technical Student Organization
- 3. Prepare Career & Technical Student Organization Members for Leadership Roles
- 4. Assist Career & Technical Student Org. Members in Developing and Financing a Yearly Program of Activities
- 5. Supervise Activities of the Career & Technical Student Organization
- 6. Guide Participation in Career & Technical Student Organization Contests

I. Professional Role and Development

- 1. Keep Up-to-Date Professionally
- 2. Serve Your Teaching Profession
- 3. Develop an Active Personal Philosophy of Education
- 4. Serve the School and Community
- 5. Obtain a Suitable Teaching Position
- 6. Provide Laboratory Experiences for Prospective Teachers
- 7. Plan the Student Teaching Experience
- 8. Supervise Student Teachers

J. Coordination of Cooperative Education

- 1. Establish Guidelines for Your Cooperative Career & Technical Program
- 2. Manage the Attendance, Transfers, and Terminations of Co-Op Students
- 3. Enroll Students in Your Co-Op Program
- 4. Secure Training Stations for Your Co-Op Program
- 5. Place Co-Op Students on the Job
- 6. Develop the Training Ability of On-the-Job Instructors
- 7. Coordinate On-the-Job Instruction
- 8. Evaluate Co-Op Students' On-the-Job Performance
- 9. Prepare for Students' Related Instruction
- 10. Supervise an Employer-Employee Appreciation Event

K. Implementing Competency-Based Education (CBE)

- 1. Prepare Yourself for CBE
- 2. Organize the Content for a CBE Program
- 3. Organize Your Class and Lab to Install CBE
- 4. Provide Instructional Materials for CBE
- 5. Manage the Daily Routines of Your CBE Program
- 6. Guide your students through the CBE Program

L. Serving Students with Special/Exceptional Needs

1. Prepare Yourself to Serve Exceptional Students
2. Identify and Diagnose Exceptional Students
3. Plan Instruction for Exceptional Students
4. Provide Appropriate Instructional Materials for Exceptional Students
5. Modify the Learning Environment for Exceptional Students
6. Promote Peer Acceptance of Exceptional Students
7. Use Instructional Techniques to Meet the Needs of Exceptional Students
8. Improve Communication Skills
9. Assess the Progress of Exceptional Students
10. Counsel Exceptional Students with Personal-Social Problems
11. Assist Exceptional Students in Developing Career Planning Skills
12. Prepare Exceptional Students for Employability
13. Promote Your Career & Technical Program with Exceptional Students

M. Assisting Students in Improving Their Basic Skills

1. Assist Students in Achieving Basic Reading Skills
2. Assist Students in Developing Technical Reading Skills
3. Assist Students in Improving Their Writing Skills
4. Assist Students in Improving Their Oral Communication Skills
5. Assist Students in Improving Their Math Skills
6. Assist Students in Improving Their Survival Skills

N. Teaching Adults

1. Prepare to Work with Adult Learners
2. Market the Adult Education Program
3. Determine Individual Training Needs
4. Plan Instruction for Adults
5. Manage the Instructional Process
6. Evaluate the Performance of Adults

DEFINITION - PURPOSE - MISSION

I. DEFINITION

To prepare students with knowledge, skills and attitudes necessary for success in Agricultural Education and to provide a foundation for post-secondary and continued education.

II. MISSION STATEMENT

The mission of education in Agricultural Education is to teach knowledge, skills and attitudes which are necessary for individuals to secure, be productive, and advance in an affiliated occupation. The curriculum will place a strong emphasis on intellectual processes, academic concepts, and the acquisition of applied and practical skills. Supervised Agricultural Experience (SAE), leadership development, and which may include:

- Exploring Agriculture
- Introduction to Agriculture
- Foundations of Agriculture
- Agriscience Technology I, II, III, IV
- Agriculture Sales & Service
- Agricultural Business Management
- Agricultural Mechanics Technology I, II, III, IV
- Botany/Horticultural Science I, II
- Natural / Environmental Resources
- Agricultural Processing
- World Agricultural Science & Tech.
- Agriculture III
- Agriculture IV
- Supervised Agricultural Experience
- Individual Agricultural Studies
- Cooperative Work Experience
- Community Development

NAME AND PROGRAM STRUCTURE CHANGE

I. NAME: AGRICULTURAL SCIENCE

Philosophy - Agricultural Science is an organized program of instruction designed to offer career exploration, self-fulfillment, and career preparation. The Agricultural Science program is an integral part of the total education program in the community for students, K-12 and adult. Agricultural Science includes: Exploring Agriculture, Introduction to Agriculture, Foundations of Agriculture, Agriscience Technology I, II, III, Agriculture Sales & Service, Agricultural Business Management, Agricultural Mechanics Technology I, II, III, Botany/Horticultural Science I, II, Natural / Environmental Resources, Agricultural Processing, World Agricultural Science & Technology, Agriculture III, Agriculture IV, Supervised Agricultural Experience, Individual Agricultural Studies, Cooperative Work Experience, and Community Development.

II. PROGRAM STRUCTURE

1. Encourage Jr. High (7/8) programs as feasible, possible course Exploring Agriculture.
2. Introduction to Agriculture and Foundations of Agriculture Courses can be taught as a 1/2, 1 or 2 year sequence course.
3. Menu of courses (Semester courses or years long courses --Advanced/Specialized Modules) as identified by Department of Public Instruction manual of Course Codes and Descriptions should be used to design a comprehensive program in agricultural education. The list is intended to encompass the needs of North Dakota agricultural education programs and to provide enough flexibility to meet specific community needs and wants. Back to back sequential semester offerings should be used to keep the full year conception in place. It is suggested that agricultural education instructors start with the Idaho curriculum guides as a foundation and incorporate curriculums from Illinois, Washington, Michigan, California and Texas as need to develop a complete comprehensive curriculum.
4. Encourage 2+2+2 Program Participation/Development - have agricultural education instructors assess their programs in terms of 2+2+2 feasibility with local post-secondary colleges and adult programs. Adjust as necessary, gain approval and initiate program.
5. Gain approval for students completing applied agriscience courses which are science based to receive science credit toward high school graduation and university entrance. This should not be in place of biology but in addition to Biology.

Program Introduction / Foundation

The program introduction / foundation includes only content of the core curriculum and therefore is limited in scope. Students who complete the core program will acquire a foundation of agricultural knowledge. They will not be as well prepared for immediate employment or for advanced education and training in agriculture as students who complete a comprehensive program.

- Introduction to Agriculture
- Foundations of Agriculture

Comprehensive Program

This program comes closer than either the core or the specialized program to duplication of the traditional agricultural education program. It is a two-level program beginning with an introduction and foundations of agriculture courses that is broad in scope and that sets the stage for advanced level courses, with more specific study in any one of the advanced areas. Students in a comprehensive program will first complete the agricultural education introduction to agriculture and foundations of agriculture curriculum then proceed to complete one or more of the advanced courses.

The comprehensive program is the preferred form for the person who seeks to become an "agriculturist" in the broad sense of the term. Upon completion, students will be prepared to enter immediately into challenging, progressive, agricultural employment and/or to begin further study at the post-secondary or university level.

- Year 1 - Introduction to Agriculture
- Year 2 - Foundations of Agriculture
- Year 3 - Advanced Courses (semester, year or sequence courses)
- Year 4 - Advanced Courses (semester, year or sequence courses)

SUPERVISED AGRICULTURAL EXPERIENCE STRUCTURE

1. SAE's will be supervised throughout the calendar year by the Agricultural Education Instructor.
2. Combine the concept of SAE with SAEP, with emphasis on experience.
3. Component of SAE, such as setting minimum criteria/requirements for inside/outside assignments per class/unit.

* SAE will be a required component of curriculum for current unit of instruction.

- * Inside assignments to be students responsibility.
 - * Outside assignments to be part of instruction not necessarily occupational in nature but emphasis on agricultural experiences.
4. Students that have SAEs that operate throughout the summer could receive up to one semester unit of credit provided they meet minimum "school determined hours" of supervised instruction. Class will be Agricultural Education, Occupational Experience, or "independent study."
 5. SAE is an integral part of the total Agricultural Education program.

Agricultural Education: A Definition

Agricultural Education refers to the processes of education applied to the body of knowledge generally defined as agriculture. It includes such subjects as: needs assessment, formal and informal teaching approaches, curriculum and program development, instructional and program delivery approaches, applications of educational technology, program and instructional evaluation, appropriateness of education, policy issues related to education in agriculture, instructional organization, and management of agricultural institutions in domestic and international settings.

AGRICULTURAL EDUCATION COURSE TITLES - COURSE CODES - COURSE CREDITS

<u>Agriculture Education Curriculum</u>	<u>#</u>	<u>Credits</u>
Exploring Agriculture	01005	*
Natural/Environmental Resources	01006	*
Introduction to Agriculture	01011	1/2, 1
Foundations of Agriculture	01012	1/2, 1
Agriscience Technology I	01021	1/2, 1
Agriscience Technology II	01022	1/2, 1
Agriscience Technology III	01023	1/2, 1
Agriscience Technology IV	01025	1/2, 1
Agriculture Sales & Service	01034	1/2, 1
Agricultural Business Management	01035	1/2, 1
Agricultural Mechanics Technology I	01043	1/2, 1
Agricultural Mechanics Technology II	01044	1/2, 1
Agricultural Mechanics Technology III	01045	1/2, 1
Agricultural Mechanics Technology IV	01046	1/2, 1
Botany/Horticultural Science I	01053	1/2, 1
Botany/Horticultural Science II	01054	1/2, 1
Natural/Environmental Resources	01063	1/2, 1
Agricultural Processing	01068	1/2, 1
World Agricultural Science & Technology	01069	1/2, 1
Agriculture III	01073	1/2, 1
Agriculture IV	01074	1/2, 1
Individual Agricultural Studies	01990	1/2, 1
Community Development	01993	1/4, 1/2, 1
Supervised Agricultural Experience Prog	01995	1/4, 1/2, 1
Cooperative Work Experience	01999	1/4, 1/2, 1

*Junior High Classes

Agricultural Education

Course Descriptions

EXPLORING AGRICULTURE 01005

Level: 7, 8

Content: An introductory exploration of agriculture. Learning experiences involving agricultural activities such as experimenting, designing, constructing, evaluating and using tools, machines, materials and other processes that provide opportunities for creativity, problem solving, and leadership development.

NATURAL/ENVIRONMENTAL RESOURCES 01006

Level: 7,8

Content To provide an opportunity for students to increase awareness of the close ties among living organisms. This course covers natural and environmental concerns with the interrelationships of living organisms and the world around us.

INTRODUCTION TO AGRICULTURE 01011

Level: 9, 10, 11, 12

Credit: 1/2, 1

Content: This applied course is designed to introduce student's to agriculture, its applications, and leadership development as the core foundation of the Agriculture Education program. Individual units will familiarize the student with: basic mechanical theory and skills - emphasis will be placed on safety and proper use of tools and equipment; principles of evaluation and selection of beef, swine, sheep, horse, and dairy animals; soil and plant relationships that affect the production of food and fiber. Topics may include: soils, irrigation, land judging, plants, crop and weed identification, range management, horticulture, nursery, diseases, insects, and chemicals.

This applied course introduces students to agricultural sciences with emphasis on technical skills, entrepreneurship, and occupational opportunities. Units may also include agricultural construction, food and fiber science, SAE, and leadership development.

Agricultural mechanics units are designed to develop skills in selection, operation, and maintenance of engines, hydraulics, and agricultural machinery and tractors. Skills in operation and maintenance of equipment, determining a bill of materials, construction techniques, metal fabrication, and joining processes of metals and alloys will be included.

Emphasis is on problem solving and scientific reasoning applied to real world problems integrating knowledge from the life and earth sciences.

FOUNDATIONS OF AGRICULTURE 01012

Level: 9, 10, 11, 12

Credit: 1/2, 1

Content: This applied course is designed to enhance student's perception of agriculture, its applications, and leadership development as the core foundation of the Agriculture Education program. Individual units will familiarize the student with: basic mechanical theory and skills - emphasis will be placed on safety and proper use of tools and equipment; principles of evaluation and selection of beef, swine, sheep, horse, and dairy animals; soil and plant relationships that affect the production of food and fiber. Topics may include: soils, irrigation, land judging, plants, crop and weed identification, range management, horticulture, nursery, diseases, insects, and chemicals.

This applied course introduces students to agricultural sciences with emphasis on technical skills, entrepreneurship, and occupational opportunities. Units may also include agricultural construction, food and fiber science, SAE, and leadership development.

Agricultural mechanics units are designed to further develop skills in selection, operation, and maintenance of engines, hydraulics, and agricultural machinery and tractors. Skills in operation and maintenance of equipment, determining a bill of materials, construction techniques, metal fabrication, and joining processes of metals and alloys will be included.

Emphasis is on problem solving and scientific reasoning applied to real world problems integrating knowledge from the life and earth sciences. Foundations of Agriculture can be a continuation of Introduction of Agriculture or can be offered in alternating years with Introduction to Agriculture.

AGRISCIENCE TECHNOLOGY I 01021

AGRISCIENCE TECHNOLOGY II 01022

AGRISCIENCE TECHNOLOGY III 01023

AGRISCIENCE TECHNOLOGY IV 01025

Level: 9, 10, 11, 12

Credit: 1/2, 1

Content: Agriscience Technology courses integrate biological and technological concepts with principles of agriculture. Courses are designed in sequences to provide experiences in the subject matter. Units are selected to develop knowledge and skills pertaining to nutrition, reproduction, diseases, breeding, genetics, anatomy, and physiology in animals and plants. Genetic engineering, biotechnology, plant propagation techniques, agricultural production technologies, marketing technologies, aquaculture, animal health, and small animal care are examples of

units that may be taught.

These courses integrate leadership and SAE programs. Career opportunities and educational preparation are examined. Learning activities are varied with classroom, laboratory, and field experiences.

AGRICULTURE SALES & SERVICE 01034

Level: 11, 12

Credit: 1/2, 1

Content: To provide students with skills necessary for entry into employment or furthering education in agriculture sales and service. The course deals with business organizations, business structures, job responsibilities, job applications, and interviewing, human relations, marketing, selling, displaying, using business machines, business accounting, and management skills. Learning activities are varied with classroom, laboratory, and field experiences. Leadership development and supervised agricultural experience programs are an integral part of this course.

AGRICULTURAL BUSINESS MANAGEMENT 01035

Level: 11, 12

Credit: 1/2, 1

Content: A course designed to introduce the students to agribusiness management in the free enterprise system. It includes a study of economic principles, budgeting, record keeping, finance, risk management, business law, marketing, and careers in agribusiness. Leadership development and supervised agricultural experience programs are an integral part of this course.

AGRICULTURAL MECHANICS TECHNOLOGY I 01043

AGRICULTURAL MECHANICS TECHNOLOGY II 01044

AGRICULTURAL MECHANICS TECHNOLOGY III 01045

AGRICULTURAL MECHANICS TECHNOLOGY IV 01046

Level: 9, 10, 11, 12

Credit: 1/2, 1

Content: Agricultural Mechanics courses are designed to reinforce and extend students' understanding of applied mechanical applications by associating scientific principles and concepts with relevant applications in fields associated with mechanics. Students will be exposed to mechanical, fluid, electrical, and thermal power that are associated with the field of agriculture. Course sequence is designed to provide students with applied activities which may include: metal fusion (welding), structures, surveying, electrical wiring principles, agricultural power & equipment, plumbing, electric motors and controls, CNC, robotics, CADD, Lasers, GIS & GPS systems. Leadership development and supervised agricultural experiences are integral to these courses.

BOTANY / HORTICULTURAL SCIENCE I 01053

BOTANY / HORTICULTURAL SCIENCE II 01054

Level: 9, 10, 11, 12

Credit: 1/2, 1

Content: These courses prepare students to produce greenhouse/nursery plants and to maintain plant growth and propagation structures. Topics to be covered include: soils, plants, plant identification, and plant entomology. Courses examine the importance of plant cell structures, functions of cells, plant processes, nonvascular plants, vascular plants, roots, stems, leaves, flowers, and reproduction of plants. Students may be introduced to the biological, environmental, conservation, and ecological concepts encountered in our environment. Landscape design units prepare students to design, construct, and maintain planted areas and devices for the beautification of home grounds and other areas of human habitation and recreation. These courses will reinforce and extend students' understanding of science by associating basic scientific principles and concepts with relevant applications in agriculture. Leadership development and supervised agricultural experience programs are also an integral part of this course.

NATURAL/ENVIRONMENTAL RESOURCES 01063

Level: 9, 10, 11, 12

Credit: 1/2, 1

Content: This course provides an opportunity for students to increase awareness of the close ties among living organisms. Natural and environmental concerns with the interrelationships of living organisms and the world around us. Leadership development and supervised agricultural experience programs are also an integral part of this course.

AGRICULTURAL PROCESSING 01068

Level: 11, 12

Credit: 1/2, 1

Content: This course is designed to introduce students to the processing of agricultural products. The course will include the processing of food, fiber, and material product processing for the global economy will be emphasized. Personal communication skills, human relation skills, leadership development skills, and supervised agricultural experiences will be emphasized.

WORLD AGRICULTURAL SCIENCE & TECHNOLOGY 01069

Level: 11, 12

Credit: 1/2, 1

Content: A course designed to introduce students to global agriculture. This course also includes agricultural career development, leadership, communications, and

personal finance.

AGRICULTURE III 01073

Level: 11, 12

Credit: 1/2, 1

Content: This course develops agricultural skills necessary for employment, entrepreneurship, or further education in agriculture and agricultural occupations. Units may include; crop and livestock production, farm business management, agribusiness, horticulture, natural resources, agricultural mechanics, aquaculture, water management. Leadership development and supervised agricultural experiences will also be emphasized.

AGRICULTURE IV 01074

Level: 11, 12

Credit: 1/2, 1

Content: This course develops agricultural skills necessary for employment, entrepreneurship, or further education in agriculture and agricultural occupations. Units may include: crop and livestock production, farm business management, agribusiness, horticulture, natural resources, agricultural mechanics, aquaculture, water management. Leadership development, and supervised agricultural experiences will also be emphasized. This course can be a continuation of Agriculture III or can be offered in alternating years with Agriculture III.

INDIVIDUAL AGRICULTURAL STUDIES 01990

Level: 9, 10, 11, 12

Credit: 1/2, 1

Content: This course provides students in agriculture an opportunity to expand and explore the fields of agriculture, leadership, and personal development on an individual basis.

COMMUNITY DEVELOPMENT 01993

Level: 9, 10, 11, 12

Credit: 1/4, 1/2, 1

Content: This course provides students in agriculture an opportunity to understand the principles and fundamentals of the community development process, select, plan and implement a community development project or projects, and to acquire knowledge and skills in community leadership for present and future uses.

SUPERVISED AGRICULTURAL EXPERIENCE PROGRAM 01995

Level: 9, 10, 11, 12

Credit: 1/4, 1/2, 1

Content: This course provides credit for student agricultural experience exploration. Fulfillment of the standards outlined in the Policy Statement for Supervised Agricultural Experience Programs in agricultural education in North Dakota. All students are required to complete a minimum program of supervised agricultural experience; those who wish to exceed the minimum may earn 1/4, 1/2, or 1 credit each year.

COOPERATIVE WORK EXPERIENCE 01999

Level: 11, 12

Credit: 1/4, 1/2, 1

Content: This course provides students with a regularly scheduled, supervised employment opportunity related to agriculture occupations in order to develop and improve work skills. The employment must be preceded by, or concurrent with, classroom instruction related to the work experience, consistent with the students' occupational goals, and related to the agricultural education program area. There shall be a training agreement among all partners to the work experience (school, employer, student and parents/guardians) outlining the expectations of each party. The instructor shall also develop a specific training plan for the employer for each student placed. The training plan shall include provisions for assessment of student progress and for on-site visits by the instructor during the student's placement. Students may be paid a wage by the employer.