

vo ed #350

Agricultural Science and Technology Curriculum Outline



Guide to the New Millennium



State Division of Professional-Technical Education

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Idaho Division of Vocational Education

*"Committed to Excellence: Preparing Tomorrow's Workforce Through
Quality Leadership and Service"*

June 4, 1999

Dear Educator:

The agricultural industry, from production to marketing and distribution is the foundation for the quality of life enjoyed in Idaho and the United States. Rapid and revolutionary advances in agricultural sciences have required educators to continually modify curricula and teaching methods to provide students with the skills and knowledge they need to succeed. The addition of natural resources and the focus on transferable science competencies has also increased the need for curriculum modifications.

This guide was developed to provide an updated and comprehensive outline of agricultural science and technology courses that may be sequenced to make up an approved program. It is the product of significant effort by business people, teachers and teachers educators. Their efforts are noted and appreciated.

Preparing students with the scientific principles, employability and technical skills needed for careers in agriculture or natural resources is the purpose of Agricultural Science and Technology in Idaho's public schools. This guide is intended to facilitate the organization of this knowledge into appropriate courses within Agricultural Science and Technology programs. It is expected that local business and industry advisory committees will review and refine the specific content of these courses as well as help choose the appropriate mix of courses for a particular school and community.

As always, the key to successful delivery is a well-prepared and motivated teacher. You are to be commended for your commitment to improving the lives of those students in your programs. This guide is intended to help you in that enterprise.

Sincerely,

Mike Rush
State Administrator

FOREWORD

This compilation of competencies for our secondary Agricultural Science and Technology programs is an attempt to combine the competencies in such an order to provide a base document to those programs changing delivery systems from the conventional four-year program to a semester/trimester-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 two groups of Agriculture Instructors whose participation in this project has made it what it is. The following Instructors were responsible for writing and organizing the document.

Glenn Orthel, Twin Falls, Chairman
Jim Sorensen, Kimberly
Marc Beitia, Raft River
Shannan Lierman, Filer
Dave Krueger, Buhl

The following Instructors have reviewed the document and have given the document their stamp of approval.

Perry Robinson, Madison
Milt Osgood, Middleton
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Don Bird, West Jefferson
Jon Fabricius, Genesee

Also, thank you to L. DeVere Burg, State Supervisor of Agricultural Education, for your input and guidance.

Of course, this document would not exist without the skill and effort of Terry Olson and Marilyn Crumley, Agricultural and Extension Education, University of Idaho.

Lastly, we wish to thank the State Division of Vocational Education for continued financial support of this and other endeavors.

Lou E. Riesenberg
Associate Professor and Head
Agricultural and Extension Education

To Idaho Secondary Agriculture Educators

The Idaho Agricultural Science and Technology Curriculum Outline is completed and ready for your use. Many hours of research, discussion, writing, and reviewing have gone into this guide. The writing and reviewing team members who have incorporated a semesterized delivery system into their programs have experienced positive results. Their expertise and experiences have been invaluable in developing this guide, which outlines the competencies needed for applied biology/agriculture science courses to meet high school graduation requirements. Agricultural Business and Economics, Ag 660, has been added for future use in obtaining high school consumer economics graduation credit. A book list has been included to provide guidance in selecting text for these courses.

This guide will be of no value to improving secondary Agricultural Science and Technology programs in Idaho if it is not used. The challenge of implementing the contents of this guide into curriculum across the state will fall on each secondary agriculture instructor. The guide provides many opportunities for changing curriculum to meet the demands of today's agriculture. The guide lists courses for development of a curriculum enabling all of Idaho's secondary students to participate in the secondary Agricultural Science and Technology program.

It by the use of this guide, we can improve our programs and better educate students, our efforts will be worth all the work.

The challenge is yours!

Glenn Orthel, Chairman
Curriculum Guide Project

INTRODUCTION

As we prepare to reprint these agricultural science and technology curriculum outlines (vo ed #350), I am reminded of the tremendous changes in secondary agricultural education since the late 1980's. It was at that time the decision was made to significantly revise the way the Idaho curriculum was organized. The result (published as vo ed #240) was a sequence of semesterized courses that could be orchestrated for each program according to local community needs.

Since these changes were implemented in the fall of 1989, the last ten years have shown a tremendous change in agricultural science and technology instruction. Significantly more students are being served due to the greater accessibility of instruction and as a result program enrollments have grown statewide by nearly ninety percent since 1988. Individual programs, although still similar in many respects, began to modify and adapt instructional delivery based upon the dynamics of each school system's unique features and local resources.

The "one size fits all" vocational agriculture is largely gone, but the new curriculum strategies allow for increased benefit and accessibility. Granted, the new curriculum does bring with it a variety of challenges that must be addressed by the instructor. However with community based planning and support, agricultural science and technology programs have in large part prospered and students embarking on successful careers are the benefactors.

One of the primary strengths in the new curriculum is the way that instruction has been tied to practical science instruction and promoted as such. Dr. L. DeVere Burton in his 1989 introduction to the original curriculum outline work, made the following statement which is timely to repeat here: "Science plays an important role in agriculture. Most of the new agricultural technologies have come from attempts to apply scientific research to practical applications in farming. The new curriculum places greater emphasis on the science of agriculture. The slogan adopted by agricultural educators at the 1988 National AgriScience Conference is appropriate to the new curriculum *Today's Science - Tomorrow's Agriculture*."

The courses outlined in The Idaho Agricultural Science and Technology Curriculum have been identified by name and number. These courses are approved by the State Division of Vocational Education (SDVE) as appropriate courses for secondary agricultural education/agricultural science and technology (AST). Courses for which reimbursement is requested from SDVE must use these approved titles and numbers for state reports.

Appropriate titles should also be used on student transcripts to ensure that proper credit is given when transcripts are evaluated for postsecondary purposes. Significant deviations from prescribed course content should be done with SDVE approval. Applied biology/agricultural science courses (500 series) may be appropriate for lab science credit where so oriented. Teachers must be properly endorsed before students may use credits to satisfy science credit requirements.

Dean Langley, State Program Manager

IDAHO AGRICULTURAL SCIENCE AND TECHNOLOGY CURRICULUM

Introduction to Agricultural Science and Technology

AG. 110	Introduction to Agricultural Education
AG. 120	Introduction to the Agricultural Industry
AG. 130	Introduction to Agricultural Mechanics
AG. 140	Introduction to the Livestock Industry
AG. 150	Introduction to the Agricultural Plant Industry

Agricultural Mechanics

AG. 210	Agricultural Welding
AG. 220	Agricultural Power Technology
AG. 221	Small Gasoline Engines
AG. 222	Agricultural Power Technology/Large Engines
AG. 225	Agricultural Systems/Electricity & Hydraulics
AG. 227	Agricultural Machinery
AG. 230	Agricultural Structures
AG. 240	Agricultural Fabrication

Applied Agricultural Management

AG. 310	Applied Livestock Management
AG. 320	Applied Crop Management
AG. 330	Landscape Design
AG. 335	Floral Design and Marketing
AG. 340	Applied Greenhouse and Nursery Management
AG. 350	Forestry and Wildlife Management

Agricultural Leadership and Management

AG. 410	Personal Skill Development
AG. 460	Agribusiness Management and Marketing
AG. 470	Agricultural Sales
AG. 9800	Occupational and Career Experience (Formally AG. 420) (COE and Land Laboratories)
AG. 9900	Cooperative Education (Formally AG.422) (SAE and Summer Programs)

IDAHO AGRICULTURAL SCIENCE AND TECHNOLOGY CURRICULUM

Curriculum continued.....

Applied Biology

AG. 510	Botany/Plant and Soil Science
AG. 512	Botany/Science of Plant Growth and Development
AG. 514	Botany/Horticultural Plant Science
AG. 516	Botany/Forestry Science
AG. 517	Botany/Advanced Forestry Science
AG. 518	Botany/Range Science
AG. 520	Ecology/Natural Resource Science
AG. 525	Ecology/Environmental Science
AG. 530	Zoology/Animal Science
AG. 532	Zoology/Science of Animal Nutrition
AG. 534	Zoology/Science of Animal Reproduction
AG. 536	Zoology/Fish and Wildlife Science
AG. 540	Agricultural Biotechnology
AG. 550	Food Science
AG. 560	Aquaculture Science
AG. 570	Equine Science

Consumer Economics

AG. 660	Agricultural Business and Economics
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IDAHO AGRICULTURAL SCIENCE AND TECHNOLOGY SPECIALIZED AREAS OF INSTRUCTION

The agricultural industry encompasses a diverse array of careers ranging from production to scientific research. The intent of this curriculum is two-fold:

1. Provide opportunities for students to explore the different agricultural careers which are available to them.
2. Provide opportunities for students to develop skills in selected agricultural careers.

The curriculum contains courses, which are adapted to semester/trimester length classes. During the years that students are involved in the program, most of the courses should rotate through the teaching schedule at least one time. This will allow students to focus upon courses which are related directly to their career interests. The following are suggested career tracks for six different career options.

GENERAL AGRICULTURE:

AG. 120	Introduction to the Agricultural Industry
AG. 140/530	Introduction to the Livestock Industry Zoology/Animal Science
AG. 150/510	Introduction to the Agricultural Plant Industry Botany/Plant and Soil Science
AG. 130	Introduction to Agricultural Mechanics
AG. 210	Agricultural Welding
AG. 220	Agricultural Power Technology
AG. 460/660	Agribusiness Management and Marketing Agricultural Business and Economics

Select two other elective courses if necessary

PLANT SCIENCE:

AG. 110	Introduction to Agricultural Education
AG. 120	Introduction to the Agricultural Industry
AG. 330	Landscape Design
AG. 340	Applied Greenhouse and Nursery Management
AG. 510	Botany/Plant and Soil Science
AG. 512/514	Botany/Science of Plant Growth and Development Botany/Horticultural Plant Science
AG. 460/660	Agribusiness Management and Marketing Agricultural Business and Economics
AG. 516/520	Botany/Forestry Science Ecology/Natural Resource Science
AG. 518	Botany/Range Science

Select two other elective courses if necessary

SPECIALIZED AREAS OF INSTRUCTION

Continued.....

ANIMAL SCIENCE:

AG. 110	Introduction to Agricultural Education
AG. 120	Introduction to the Agricultural Industry
AG. 140	Introduction to the Livestock Industry
AG. 230/240	Agricultural Structures Agricultural Fabrication
AG. 210	Agricultural Welding
AG. 310	Applied Livestock Management
AG. 460/660	Agribusiness Management and Marketing Agricultural Business and Economics
AG. 536	Zoology/Fish and Wildlife Science
AG. 530/532	Zoology/Animal Science Zoology/Science of Animal Nutrition
AG. 534	Zoology/Science of Animal Reproduction

Select one other elective course if necessary

AGRICULTURAL MECHANICS:

AG. 110	Introduction to Agricultural Education
AG. 120	Introduction to the Agricultural Industry
AG. 130	Introduction to Agricultural Mechanics
AG. 210	Agricultural Welding
AG. 220	Agricultural Power Technology
AG. 221	Small Gasoline Engines
AG. 230	Agricultural Structures
AG. 240	Agricultural Fabrication
AG. 460/660	Agribusiness Management and Marketing/Business and Economics

Select two other elective courses if necessary

SPECIALIZED AREAS OF INSTRUCTION

Continued.....

NATURAL RESOURCES:

AG. 110	Introduction to Agricultural Education
AG. 120	Introduction to the Agricultural Industry
AG. 510	Botany/Plant and Soil Science
AG. 516/517	Botany/Forestry Science
	Botany/Advanced Forestry Science
AG. 518	Botany/Range Science
AG. 520/525	Ecology/Natural Resources
	Ecology/Environmental Science
AG. 536	Zoology/Fish and Wildlife Science
AG. 460/660	Agribusiness Management and Marketing/Business and Economics

Select two other elective courses if necessary

AGRICULTURAL BUSINESS:

AG. 110	Introduction to Agricultural Education
AG. 120	Introduction to the Agricultural Industry
AG. 310	Applied Livestock Management
AG. 320	Applied Crop Management
AG. 330	Landscape Design
AG. 350	Forestry and Wildlife Management
AG. 410/9800	Personal Skill Development/Occupational and Career Experience
AG. 9900	Cooperative Education
AG. 460/660	Agribusiness Management and Marketing/Business and Economics
AG. 470	Agricultural Sales

Select one other elective course if necessary

Secondary Agricultural Education Program Vision, Mission and Philosophy

A. Vision

For the 21st century, agricultural education will be a vital part of every person's education and will be viewed as an asset to the community.

B. Mission

The mission of Agricultural Education is to prepare and support individuals for careers, build awareness and develop leadership for the food, fiber and natural resource system.

C. Philosophy

Secondary Agricultural Science and Technology Education is a community-based, multi-year program. It is a sequential, semester-based program, which prepares students with competencies in the specialized areas of agricultural occupations. The program of instruction emphasizes applied academics with a hands-on practical instructional approach.

The curriculum consists of a core and includes units of instruction, which are systematically sequenced so as to build on learned competencies. Upon completion of the program, a student should be able to enter a career in the food, fiber, or natural resources industry. Many students will elect to further their education at the post-secondary level, either at a vocational technical school or a four-year degree granting institution.

It is expected that students enrolled in Agricultural Science and Technology will have an approved Supervised Agriculture Experience Program (SAEP). SAEP's in realistic settings provide students the opportunity to put into practice those skills and competencies acquired in the traditional school setting. All students with the help of their instructor and their parents shall select an appropriate program related to the student's resources and interests. All students will be expected to keep neat and accurate records of their program. The instructor shall provide onsite instruction and supervision periodically throughout the year.

All students enrolled are encouraged to become members of the local, state, and national FFA organization. FFA is an integral component of instruction in secondary agricultural education. Agricultural Science and Technology/FFA include instruction in leadership through many avenues such as: public speaking, parliamentary procedure, committee work, and community service activities. FFA career development events and other student participation and recognition activities are related to the Agricultural Science and Technology program.

Secondary Agricultural Education is a learning-by-doing concept. Meaningful SAE programs and FFA activities allow for application of classroom and laboratory knowledge and skills.

Program Vision, Mission and Philosophy continued.....

The program is a year-round educational concept, and extended service for instructors is a necessary requirement in order to meet the objectives of the program. The local program advisory committee is involved in local program operation, future planning and direction.

Program Goals That Impact Students










-  Develop competencies and the basic background knowledge to become successful in food, fiber and natural resources occupations.
-  Develop entrepreneurial, business, and management skills needed by students preparing to enter occupations in the food, fiber and natural resources system.
-  Develop an understanding of agriculture's relationship to the environment and our natural resources.
-  Develop the student's ability to think critically, solve problems, and function effectively in a competitive global society.
-  Develop an understanding of career opportunities and the preparation needed to select, enter, and advance in a food, fiber and natural resources occupation.
-  Develop career objectives, job seeking, employability, and job-retention skills including cooperative team member attitudes.
-  Develop the ability to advance in an occupation through a program of continuing education and life-long learning.
-  Develop communication skills and abilities, which are essential in any occupation.
-  Develop the abilities needed to exercise and follow effective leadership in fulfilling occupational, social, and civic responsibilities.

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Agricultural Leadership and Management

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Applied Biology

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AG. 512	Botany\Science of Plant Growth and Development	106
AG. 514	Botany\Horticulture Plant Science	110
AG. 516	Botany\Forestry Science	117
AG. 517	Botany\Advanced Forestry Science	122
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AG. 110 INTRODUCTION TO AGRICULTURAL EDUCATION

COURSE DESCRIPTION: A basic introductory course designed to introduce beginning students to Agricultural Education. This course includes agricultural career development, leadership, communications, and personal finance.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Importance of World Agriculture	235
Historical Significance of Agriculture	94
Agriculture and World Politics	94
Agriculture and the Environment	282
Food and Fiber System	235
Agricultural Research and Development	235
Career Exploration in Agriculture	470
Personal and Social Skill Development	235
Communication Skill Development	705
Leadership through the FFA	940
Financial Management through Record Keeping	470
SAE Programs	235
TOTAL MINUTES	4,230

AG. 110 INTRODUCTION TO AGRICULTURAL EDUCATION
UNITS OF INSTRUCTION AND OBJECTIVES

- A. Importance of World Agriculture
 - 1. Understand supply and demand of food and fiber
 - 2. Identify the availability of renewable and nonrenewable agricultural resources
 - 3. Understand the impact of agriculture on the world economy
 - 4. Describe the interdependency of agriculture and other segments of society

- B. Historical Significance of Agriculture
 - 1. Identify key developments shaping modern agriculture in the world
 - 2. Identify key developments shaping modern agriculture in the United States

- C. Agriculture and World Politics
 - 1. Identify factors affecting world trade
 - 2. Recognize the impact of agriculture as a political tool

- D. Agriculture and the Environment
 - 1. Identify environmental concerns in agriculture
 - 2. List methods of protecting the environment
 - 3. Recognize the impact of the environment on agriculture

- E. Food and Fiber System
 - 1. Explain the food chain - from production to consumption
 - 2. Explain the fiber chain - from production to usage

- F. Agricultural Research and Development
 - 1. Understand the impact of research and development and identify current developments in agricultural science and technology
 - 2. Apply research and development in the classroom and laboratory.

- G. Career Exploration in Agriculture
 - 1. Conduct a career self-analysis
 - 2. Recognize the career decision-making process
 - 3. Develop job seeking skills
 - 4. Identify full-time career opportunities in agriculture
 - 5. Identify part-time career opportunities in agriculture
 - 6. Identify avocational opportunities in agriculture

AG. 110 INTRODUCTION TO AGRICULTURAL EDUCATION
UNITS OF INSTRUCTION AND OBJECTIVES

H. Personal and Social Skill Development

1. Develop professionalism and ethics
2. Use proper etiquette and behavior
3. Explore personal relations
4. Practice good grooming and health habits

I. Communication Skill Development

1. Understand the importance of effective communication: speaking
2. Understand the importance of effective communication: writing
3. Improve communication skills through organized activities
4. Utilize the media for effective communication

J. Leadership Through the FFA

1. Develop life skills for effective leadership
2. Explore opportunities for leadership development through the FFA
3. Use Democratic principles in conducting effective meetings
4. Understand the FFA Organization

K. Financial Management Through Record Keeping

1. Discuss the importance and procedures of keeping accurate records
2. Describe the importance and use of budgeting
3. Describe the importance and procedures of personal finance

L. SAE Programs

1. Identify various types of Supervised Agricultural Experience programs
2. Describe the characteristics of successful Supervised Agricultural Experience programs
3. Select and plan individual Supervised Agricultural Experience programs

AG. 120 INTRODUCTION TO THE AGRICULTURAL INDUSTRY

COURSE DESCRIPTION: A basic applied course designed to enhance students' perception of agriculture, its applications and career opportunities.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Soil Formations	94
Properties of Soils	376
Basic Plant Science	705
Basic Animal Science	940
Exploring Agricultural Mechanics	1,175
Environmental Protection	235
Energy and Water Conservation	94
Career Exploration in Applied Agricultural Science	141
SAE	235
Leadership through Agricultural Education	235
TOTAL MINUTES	4,230

AG. 120 INTRODUCTION TO THE AGRICULTURAL INDUSTRY
UNITS OF INSTRUCTION AND OBJECTIVES

- A. Soil Formations
 - 1. Recognize the importance and formation of soils
 - 2. Identify soil formations

- B. Properties of Soils
 - 1. Identify components and properties of soils
 - 2. Recognize soil classification systems

- C. Basic Plant Science
 - 1. Describe plant structure and functions of plant parts
 - 2. Discuss plant growth and development: seed germination
 - 3. Discuss plant growth and development: production, storage, and use of food in plants
 - 4. Outline plant genetics
 - 5. Outline plant reproduction
 - 6. Discuss plant breeding
 - 7. Identify specific plant and seed samples

- D. Basic Animal Science
 - 1. Explain animal growth and development
 - 2. Describe the anatomy and physiology of animals
 - 3. Identify the breeds and classes of livestock and poultry important to the local economy
 - 4. Discuss the importance of animal selection
 - 5. Outline animal reproduction
 - 6. Outline animal genetics
 - 7. Discuss animal breeding

- E. Exploring Agricultural Mechanics
 - 1. Identify the major areas of agricultural mechanics
 - 2. Identify proper safety and laboratory procedures
 - 3. Perform basic skills in agricultural construction
 - 4. Identify lumber and compute bill of materials
 - 5. Identify and use fasteners properly

- F. Environmental Protection
 - 1. Determine the effect of agricultural chemicals to the environment
 - 2. Identify the requirements for the proper use of agricultural chemicals
 - 3. Identify methods of protecting the environment

AG. 120 INTRODUCTION TO THE AGRICULTURAL INDUSTRY
UNITS OF INSTRUCTION AND OBJECTIVES

G. Energy and Water Conservation

1. Determine alternative energy sources for agricultural use
2. Identify methods of conserving electrical energy and combustible fuels
3. Explain methods of conserving water

H. SAE

1. Identify the various types of Supervised Agricultural Experience Programs
2. Planning and implementing the SAE program
 - a. Identify and discuss the purpose and characteristics of an SAE plan
 - b. Plan enterprises for the SAE program
 - c. List some of the sources for financing productive enterprises
 - d. Identify the steps involved in obtaining a loan from a credit source
 - e. Develop a long-range SAE plan
 - f. Establish criteria for evaluating SAE program
3. Using the Idaho SAE planning and accounting book
 - a. Record all transactions and activities pertinent to the SAEP and FFA
 - b. Summarize and analyze records for use in making management decisions
 - c. Use records when filling out applications for FFA proficiency awards, scholarships, and Chapter, State, and American FFA Degrees
 - d. Use an electronic record keeping system for SAEP
4. Extended individualized instructional program
 - a. Demonstrate the skills related to the individual student's SAEP
 - b. Demonstrate selection, appraisal and judging skills
 - c. Identify and demonstrate skills in fitting and exhibiting SAEP projects
 - d. Demonstrate leadership goals and skills

I. Leadership Through Agricultural Education

1. Develop life skills for effective leadership
2. Practice leadership skills for agricultural education
3. List and describe appropriate FFA awards
4. Identify applicable FFA contests
5. Identify sources of district, state, and national information
6. List and describe skills necessary to become a chapter leader

AG. 130 INTRODUCTION TO AGRICULTURAL MECHANICS

COURSE DESCRIPTION: A course designed to familiarize the student with the basic mechanical theory and skills. Students will develop skills in the following areas of Carpentry, Electricity, Plumbing, Fencing, Painting, Metal Working, and Welding processes. Emphasis will be placed on safety and proper use of tools and equipment.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Safety	470
Hot Metal Working	470
Cold Metal Working	470
Tool Reconditioning and Maintenance	470
Plumbing	235
Rope Work	141
Fence Construction	141
Painting	188
Basic Electricity	470
Tool Identification	235
Basics of Welding	940
TOTAL MINUTES	4,230

AG. 130 INTRODUCTION TO AGRICULTURAL MECHANICS
UNITS OF INSTRUCTION AND OBJECTIVES

A. Safety

1. Define safety procedures for laboratory equipment
2. Describe the safe use of laboratory tools
3. Identify rules of basic laboratory safety
4. Apply safety while working in the laboratory

B. Hot Metal Working

1. Identify the procedure for shaping, hardening, and tempering common tools
2. Select soldering equipment and tools
3. Prepare metals for soldering
4. Solder sheet metal joints, seams, and electrical connections

C. Cold Metal Working

1. Identify hand metal working tools by type and use
2. Read metal working plans
3. Identify safe practices for metal striking and machine tools
4. Determine tap drill sizes
5. Use files and saw blades
6. Join metal by riveting
7. Cut threads with tap and die
8. Layout holes and drill holes using a twist drill
9. Operate power tools
10. Bend sheet and strap metal to angles and/or shapes

D. Tool Reconditioning and Maintenance

1. Select abrasives for use in grinding and sharpening
2. Prepare grinding and sharpening equipment
3. Identify appropriate shapes and angles of cutting edges for wood and metal cutting tools
4. Identify safe practices for using keen edge tools and grinding equipment
5. Sharpen common hand tools

E. Plumbing

1. Identify pipe fittings by type
2. Select pipe threading and cutting tools
3. Select types of pipe and tubing for specific jobs
4. Calculate length of pipe required to complete a project
5. Assemble plastic pipe
6. Thread steel pipe
7. Connect flare and compression fittings
8. Sweat solder copper fittings

AG. 130 INTRODUCTION TO AGRICULTURAL MECHANICS
UNITS OF INSTRUCTION AND OBJECTIVES

F. Rope Work

1. List the uses of rope
2. Demonstrate how to tie basic knots
3. Construct a rope halter

G. Fence Construction

1. Design and lay out fences
2. Identify types of fencing
3. Discuss construction principles of fences
4. Demonstrate proper procedure in maintaining and repairing fences

H. Painting

1. Select types of paints and painting equipment
2. Prepare surfaces to be painted
3. Apply paint properly
4. Demonstrate safety, maintenance and clean-up procedures

I. Basic Electricity

1. Understand the National Electrical Code requirements for wiring; especially for harsh environments found in Agricultural processing, livestock and poultry confinement areas
2. Describe the relationship of volts, amp, and ohms in terms of Ohm's Law
3. Plan an electrical circuit
4. Determine electrical power requirements
5. Read the kilowatt hour meter
6. Identify the function of overcurrent and ground fault protection
7. Measure electrical circuits for voltage, current flow, resistance and wattage
8. Install electrical circuits
9. Trouble-shoot electrical circuits

J. Tool Identification

1. Properly identify and safely use common hand tools
2. Properly identify and safely use common power tools

AG. 130 INTRODUCTION TO AGRICULTURAL MECHANICS
UNITS OF INSTRUCTION AND OBJECTIVES

K. Basics of Welding

1. Identify and follow safe practices in arc welding
2. Evaluation of arc welding machines
3. Select various sizes and types of electrodes
4. Prepare equipment and materials for arc welding
5. Demonstrate ability to weld with a n arc welding machine
6. Identify and follow safe practices used in gas welding
7. Properly assemble gas welding and cutting equipment
8. Light and adjust the torch flame for specific welding and/or cutting operations
9. Demonstrate ability to oxy-acetylene weld and cut

AG. 140 INTRODUCTION TO THE LIVESTOCK INDUSTRY

COURSE DESCRIPTION: A course that includes principles of evaluation and selection of beef, swine, sheep, horse and dairy animals.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Introduction to the Livestock Industry	470
Beef Evaluation and Selection	705
Dairy Cattle Selection and Evaluation	705
Swine Evaluation and Selection	705
Sheep Evaluation and Selection	705
Horses and Horsemanship	705
SAE - Record Keeping	235
TOTAL MINUTES	4,230

AG. 140 INTRODUCTION TO THE LIVESTOCK INDUSTRY
UNITS OF INSTRUCTION AND OBJECTIVES

A. Introduction to the Livestock Industry

1. Be familiar with current employment information available in the livestock industry
2. Name the types of livestock
3. Name products and services livestock provide
4. Identify the sources of United States and Idaho cash farm receipts
5. Describe reasons for and against using livestock as a food source
6. Conduct a community survey on the types of livestock raised in the area

B. Beef Evaluation and Selection

1. Identify the main types of cattle operations in Idaho
2. Describe the major breeds of beef cattle, including origin and characteristics
3. Distinguish between desirable and undesirable beef animals based on production records and visual characteristics
4. Describe the indicators of finish and muscling in market animals
5. Evaluate live market animals for quality and yield grade
6. Evaluate, place and give oral reasons for different classes of beef animals

C. Dairy Cattle Selection and Evaluation

1. Describe the advantages and disadvantages of dairy farming
2. Describe the five major breeds of dairy cattle with respect to origin, characteristics and average production
3. Distinguish between desirable and undesirable general appearance, body capacity, mammary systems and dairy characteristics
4. Describe the comparative merits of the five methods of selecting dairy cattle
5. Describe the advantages of a good culling program
6. Place and give reasons on a class of four dairy animals
7. Select the bulls best suited to improve either milk or butter fat production given a list of bulls from a sire summary list

D. Swine Evaluation and Selection

1. Describe the major breeds of swine, including origins and characteristics
2. List factors to consider when selecting a breed of swine
3. Describe the desirable and undesirable characteristics of breeding swine
4. Describe selection factors and their reasons for use when choosing quality breeding stock
5. Describe the indicators of finish and muscling in market swine
6. Evaluate, place and give reasons on a market and breeding class of swine

AG. 140 INTRODUCTION TO THE LIVESTOCK INDUSTRY
UNITS OF INSTRUCTION AND OBJECTIVES

E. Sheep Evaluation and Selection

1. List the advantages and disadvantages of sheep production
2. Describe the major breeds of sheep including origin and characteristics
3. Describe the desirable and undesirable characteristics of breeding sheep
4. Distinguish between indicators of finish and muscling
5. List the factors used to evaluate wool quality
6. Identify the age of a sheep by its teeth
7. Determine quality and yield grades for lambs
8. Evaluate, place, and give oral reasons for classes of market and breeding sheep
9. Describe the difficulty in selecting both for fleece characteristics and growth characteristics

F. Horses and Horsemanship

1. Describe major breeds of horses, including breed associations, origin, color, characteristics and uses
2. List common items of tack and equipment and describe their care
3. Describe procedures for determining common measurements pertinent to a horse
4. List safety factors to consider when around horses
5. Determine the age of a horse by its teeth
6. Describe a system of examination and characteristics for horse judging

G. SAE - Record Keeping (See AG. 120)

1. Review the role of SAE programs
2. Review types of SAE programs
3. Review planning and implementing the SAE program
4. Review the use of the SAE record book
5. Plan individualized instructional programs in agriculture

AG. 150 INTRODUCTION TO THE AGRICULTURAL PLANT INDUSTRY

COURSE DESCRIPTION: A course designed to examine soil and plant relationships that affect the production of food and fiber. Topics include soils, irrigation, land judging, plants, crop and weed identification, diseases, insects and chemicals.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Elementary Study of Soils	470
Soil Fertility	375
Irrigation	470
Land Preparation	235
Soil Conservation	235
Land Evaluation and Use Classification	141
Introduction to Crop Science	94
Basic Plant Processes	235
Plant Growth and Development	376
Crop and Weed Identification	376
Insect Pests of Crops	235
Plant Disease Identification and Control	235
Crop Chemicals	235
Seed Selection	235
Sprayer and Planting Calibration	235
TOTAL MINUTES	4,230

AG. 150 INTRODUCTION TO THE AGRICULTURAL PLANT INDUSTRY
UNITS OF INSTRUCTION AND OBJECTIVES

A. Elementary Study of Soils

1. Identify reasons why soils are important
2. Discuss the function of soil as related to plant growth, development, and maintenance
3. Select factors that affect soil formation
4. List the four physical properties of soil
5. Identify soil particles according to size, and discuss methods used to determine soil texture
6. Identify five kinds of soil structure
7. Match terms indicating soil color and depth with their correct descriptions
8. Label an illustration showing the different layers of a soil profile
9. Discuss acidity and alkalinity and methods of correcting problems associated with each

B. Soil Fertility

1. Match primary and secondary nutrients with their correct function for plant growth
2. Match nutrients with correct deficiency symptoms
3. Select factors that influence the use of fertilizers
4. List four sources of nutrients
5. Match dry, liquid, and gaseous fertilizers with their correct description and use
6. Calculate problems comparing fertilizer cost by comparing cost per pound of nutrients
7. Discuss methods and procedures involved in collecting a representative soil sample
8. Complete a soils test report form, and make fertilizer recommendations
9. Identify and discuss methods of fertilizer application

C. Irrigation

1. List reasons for irrigating
2. Select from a list factors that affect water intake rates
3. Calculate the water holding capacity of a soil
4. List methods of estimating soil moisture in crop root zone
5. Calculate irrigation frequency
6. Name and properly convert units of water measurement
7. Name four types of irrigation systems
8. Select factors that affect the selection of irrigation systems
9. Match the basic parts of a surface irrigation system with the correct description
10. Match the basic parts of a sprinkler irrigation system with the correct description
11. Identify resource management practices with the appropriate water law
12. Calculate costs associated with irrigation

AG. 150 INTRODUCTION TO THE AGRICULTURAL PLANT INDUSTRY
UNITS OF INSTRUCTION AND OBJECTIVES

D. Land Preparation

1. Identify reasons for tillage
2. List characteristics of a good seedbed
3. Discuss cultural practices involved in seedbed preparation
4. Select from a list factors that determine the time to plow
5. List advantages of fall plowing and spring plowing
6. Discuss advantages of turning under crop residue
7. List reasons for stubble mulching
8. Discuss summer fallowing
9. List reasons to use minimum tillage
10. Identify equipment used in land preparation
11. Describe herbicides used for sterilization, clean-up, and weed control

E. Soil Conservation

1. List four types of erosion
2. List factors that influence soil erosion
3. Describe the four categories of water erosion
4. List conservation practices for reducing erosion
5. List mechanical and cropping practices used to reduce water erosion
6. List factors that determine cropping systems
7. List three organizations involved with soil conservation

F. Land Evaluation and Use Classification

1. List reasons for evaluating land
2. List factors used in determining land capability class
3. Select, when given land factors, the best land class possible for the specified field
4. Discuss methods of determining soil texture
5. Match the different variations of permeability, depth, slope, erosion, surface runoff, drainage and climate with the identifying characteristics of each
6. Select the recommended vegetative and mechanical land treatments when given the land capability class
7. Name the proper fertilizer and soil amendments needed from soil test information provided
8. List factors considered in homesite evaluation
9. Match the variations of permeability, slope, erosion, runoff, shrink-swell, water table, and flooding with the identifying characteristics of each for homesite evaluation
10. Select, when given land factors, the degree of limitation for foundation without basement; lawns, shrubs, and gardens; septic systems, and lagoon sewage systems
11. Demonstrate ability to complete land judging and homesite evaluation score card when given the characteristics of the site

AG. 150 INTRODUCTION TO THE AGRICULTURAL PLANT INDUSTRY
UNITS OF INSTRUCTION AND OBJECTIVES

G. Introduction to Crop Science

1. List the necessities for animal life that are furnished by plants
2. List major crops grown in the U.S.
3. List the major crops of Idaho by rank in production in the U.S.
4. Classify plants as cereal, root crop, tree crop, pulse oil seed, or forage crop
5. Match the common crops of Idaho with their average yields
6. List the limiting factors relating to crop production
7. Discuss the purpose of the Crop Reporting Service and the Idaho Crop Improvement Association

H. Basic Plant Processes

1. List the important plant processes in food manufacture and growth
2. Explain why photosynthesis is an important process
3. Explain the chemical process of photosynthesis
4. List factors that affect photosynthetic rate
5. Explain the chemical process of respiration
6. Distinguish between characteristics of photosynthesis and respiration
7. Explain transpiration and list factors that affect transpiration rate
8. Explain osmosis and the process of absorption by plant roots
9. Label the parts of a common plant cell

I. Plant Growth and Development

1. List the stages of plant growth and development
2. List requirements for good seed germination
3. List factors that cause poor seed germination
4. List the primary parts and functions of a plant
5. Identify two types of root systems
6. Correctly label a drawing showing the parts of a plant stem
7. Match stem modifications with the correct descriptive term
8. List conditions affecting the vegetative growth of crop plants
9. Discuss asexual and sexual reproduction in plants
10. Label a drawing showing the parts of a complete flower
11. Match types of flowers to the correct description
12. List methods of pollination

AG. 150 INTRODUCTION TO THE AGRICULTURAL PLANT INDUSTRY
UNITS OF INSTRUCTION AND OBJECTIVES

J. Crop and Weed Identification

1. Discuss the system of plant classification
2. Identify the parts of simple and compound leaves
3. Name the types of leaf arrangement, venation and margins
4. Identify the types of leaf attachment to the stem
5. Identify the parts of a stem
6. Match stem modifications with their correct description
7. Identify the parts of a perfect flower
8. Identify the types of inflorescences
9. Identify weed plants and common crop plants of economic impact to Idaho
10. Discuss weed competition and losses caused by weeds
11. Discuss how weeds spread
12. Discuss methods of cultural, mechanical, chemical and biological weed control

K. Insect Pests of Crops

1. List ways that insects cause losses in plants
2. List beneficial effects of insects
3. Identify the three regions of an insect body
4. Match the way an insect feeds on plants with the correct description
5. Label a drawing showing the life cycle of an insect
6. Discuss the importance of economics in relation to plant insect control
7. List cultural, biological, and chemical control practices for insects
8. Match classifications of insecticides to their correct description
9. Identify the insects having an economic impact on Idaho agriculture

L. Plant Disease Identification and Control

1. Identify symptoms, names of diseases and causal agents of diseases of common economic impact to Idaho crops
2. Describe the life cycles of diseases
3. Describe ways and means diseases are spread
4. Describe growing conditions and cultural practices favorable to common diseases
5. Describe preventative measures for diseases
6. Describe cultural and chemical control measures for diseases

AG. 150 INTRODUCTION TO THE AGRICULTURAL PLANT INDUSTRY
UNITS OF INSTRUCTION AND OBJECTIVES

M. Crop Chemicals

1. Discuss the economic importance of pesticide use
2. List ways improper use of pesticides can harm the environment
3. List information contained on a pesticide label
4. Discuss advantages, disadvantages, and principal uses of various types of formulations
5. List in proper sequence procedure for mixing wettable powders and emulsifiable concentrates
6. Calculate problems determining amounts of wettable powder or emulsifiable concentrate to use
7. Identify the parts of a field sprayer
8. Discuss the climatic and other factors affecting pesticide application
9. Discuss the types of protective clothing and equipment needed for pesticide applications
10. Name the steps to follow in case of pesticide poisoning
11. Discuss regulations/laws governing the use and disposal of pesticides
12. List reasons for keeping records of pesticide use
13. Describe the purpose of pesticides
14. Demonstrate safe application and storage of pesticides
15. Discuss classification of herbicides by selectivity, mode of action, and time of application

N. Seed Selection

1. List factors to consider for selecting high quality seed
2. Discuss conditions that may exist when good seed is not selected
3. List and describe the certifiable seed classes
4. List information required on certified seed tags
5. Discuss types and purposes of seed treatments
6. Discuss procedures to follow in handling and storing seed
7. Calculate the value of pure live seed

AG. 210 AGRICULTURAL WELDING

COURSE DESCRIPTION: A course designed to develop skills in Arc and Oxy-Acetylene welding and the processes that deal with the joining of metal for use in the agricultural industry.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Principles of Welding	705
Arc Welding	1,410
Oxy-Acetylene Welding and Cutting	1,410
MIG Welding	235
TIG Welding	235
Hard Surfacing	235
TOTAL MINUTES	4,230

AG. 210 AGRICULTURAL WELDING
UNITS OF INSTRUCTION AND OBJECTIVES

A. Principles of Welding

1. Identify and follow safe practices in arc welding
2. Identify and follow safe practices in gas welding
3. Select various sizes and types of electrodes
4. Evaluate different types of arc welding machines
5. Select gas welding and cutting equipment
6. Properly assemble gas welding and cutting equipment
7. Properly secure and shut down arc and gas welding equipment
8. Select welding rods and fluxes
9. Prepare equipment and materials for welding
10. Read drawings and welding symbols
11. Identify metal

B. Arc Welding

1. Demonstrate bead welding
2. Demonstrate fillet welds for the five types of joints in the flat horizontal position using AC or DC equipment
3. Demonstrate vertical welding
4. Demonstrate overhead welding
5. Test welds for quality and strength of joint
6. Apply distortion control in arc welding

C. Oxy-Acetylene Welding and Cutting

1. Demonstrate bead welding
2. Demonstrate fillet welds for the five types of joints in flat horizontal position
3. Demonstrate vertical welding
4. Braze weld mild steel and cast iron
5. Light and adjust torch flame for specific welding and/or cutting operations
6. Apply special applications of gas welding

D. MIG Welding

1. Describe theory of Metal Inert Gas welding
2. Demonstrate ability to flat weld
3. Demonstrate ability to vertical and overhead weld
4. Apply special applications of arc welding

AG. 210 AGRICULTURAL WELDING
UNITS OF INSTRUCTION AND OBJECTIVES

E. TIG Welding

1. Describe theory of Tungsten Inert Gas welding
2. Demonstrate ability to aluminum weld
3. Demonstrate ability to weld stainless steel

F. Hard Surfacing

1. Apply hard surfacing through procedures in arc welding
2. Apply hard surfacing through procedures in oxy-acetylene welding
3. Apply hard surfacing through procedures in forging

AG. 220 AGRICULTURAL POWER TECHNOLOGY

COURSE DESCRIPTION: A course designed to develop skills in selection, operation and maintenance of small air-cooled engines, multi-cylinder engines, hydraulics, electric motors, and agricultural machinery and tractors.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Safety	235
Small Gasoline Engines	1,880
Electric Motors	235
Electrical Controls and Sensing Devices	235
Agricultural Tractors	940
Agricultural Machinery	470
Hydraulics	235
TOTAL MINUTES	4,230

AG. 220 AGRICULTURAL POWER TECHNOLOGY
UNITS OF INSTRUCTION AND OBJECTIVES

A. Safety

1. Identify safety equipment necessary for agricultural power technology
2. Apply basic laboratory safety practices
3. Describe safety practices necessary when using electrical equipment
4. Apply safety practices when using tractors, machinery or hydraulics

B. Small Gasoline Engines

1. Identify the operating principles of the two-stroke and four-stroke cycle engine
2. Explain the function and operating principles of the fuel, lubrication, governor, and ignition systems
3. Select engine repair parts from manufacturer's parts catalog
4. Locate data in manufacturer's mechanics manual
5. Identify the use and function of engine repair tools
6. Select, safely store and use fuels and lubricants
7. Use engine overhaul equipment
8. Use engine measuring and testing tools and equipment
9. Assemble and adjust the fuel and ignition systems
10. Properly operate, adjust, check the ignition timing, engine speed, and carburetor adjustments of a small engine
11. Trouble-shoot and replace items such as piston rings, valves, needle valves, gaskets and ignition parts
12. Service and repair accessory equipment

C. Electric Motors

1. Select motors based on type of application
2. Interpret motor nameplate data
3. Interpret motor wiring connection diagrams
4. Identify motor parts
5. Service the electric motor
6. Connect motor drives
7. Identify methods of providing motor protection
8. Select proper overcurrent protection
9. Trouble-shoot electric motor circuits
10. Wire a dual voltage motor to power source
11. Change the direction of motor rotation
12. Check running amperage and voltage of an electric motor

AG. 220 AGRICULTURAL POWER TECHNOLOGY
UNITS OF INSTRUCTION AND OBJECTIVES

D. Electrical Controls and Sensing Devices

1. Identify types of controls by nomenclature and use, including thermostats, humidostats, photoelectric cells, magnetic relays, timers, pressure switches, and time delay equipment
2. Set controls, such as timers and switches, for the desired performance
3. Use low voltage electrical control equipment
4. Interpret wiring diagrams
5. Select controls for electric motors from supply catalogs
6. Connect, start, and stop magnetic motor controllers
7. Install a timer circuit
8. Install a thermal delay relay control
9. Install a low voltage motor control system
10. Install switch control for starting 115 & 230 volt motors
11. Install a sensing device such as thermostat, humidostat, photoelectric cell, etc.

E. Agricultural Tractors

1. Identify and describe the operating principles of internal combustion engines--both spark ignition and diesel
2. Identify the daily service and care operations from the operator's manual
3. Identify the safe tractor operation practices for field and highway conditions
4. Identify the operating principles of the air cleaning, fuel and oil filtering and engine cleaning systems
5. Select, safely store and use fuels and lubricants for gasoline, LPG and diesel tractors
6. Identify the function and operating principles of tractor clutches, transmission, control systems, including brakes
7. Interpret the circuit diagram of the electrical and fuel injection systems of a diesel tractor
8. Interpret Nebraska Tractor Test information
9. Conduct pre-operation inspection of a farm tractor
10. Start, operate and stop the tractor engine properly
11. Use ignition test equipment including dwell meters, tachometers, and timing devices
12. Test and service the battery and battery circuit
13. Adjust drive belts
14. Service the cooling system
15. Test and service the charging and cranking systems
16. Install diesel fuel filters and bleed the fuel system
17. Adjust control linkages including brakes, clutches, and safety disconnects
18. Properly pack front wheel bearings

AG. 220 AGRICULTURAL POWER TECHNOLOGY
UNITS OF INSTRUCTION AND OBJECTIVES

F. Agricultural Machinery

1. Identify the locally used machinery in terms of tillage, seeding, cultivation, chemical application, and harvesting equipment
2. Identify safe machinery operating practices
3. Describe the operating and calibration principles of:
 - a. tillage equipment
 - b. planters
 - c. grain drills
 - d. field sprayers
 - e. fertilizer applicators
 - f. balers
 - g. combines
 - h. other specialized equipment
4. Locate adjustment data in operators' manuals
5. Identify and compute harvest losses
6. Determine field capacity of machinery
7. Prepare machinery for storage
8. Install, adjust, and service belt and chain drives
9. Make hitch adjustments on pull-type and mounted tillage tools

G. Hydraulics

1. Identify the parts and functions of the hydraulic systems
2. Service hydraulic components
3. Operate and service hydraulically controlled machines

AG. 221 SMALL GASOLINE ENGINES

COURSE DESCRIPTION: A course designed to develop skills in selection, operation, and maintenance of small air-cooled engines.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Safety	235
Tool and Part Identification	940
Operating Principles	235
Overhaul Procedures	1,880
Troubleshooting and Tune Up Procedures	940
TOTAL MINUTES	4,230

AG. 221 SMALL GASOLINE ENGINES
UNITS OF INSTRUCTION AND OBJECTIVES

A. Safety

1. Identify safety equipment necessary for agricultural power technology
2. Apply basic laboratory safety instruction
3. Describe safety practices when using electrical equipment
4. Apply safety practices when using tools and equipment

B. Tool and Parts Identification

1. Determine what information is needed for parts and mechanics manual usage
2. Identify the basic engine parts and the functions of each in the operation of an engine
3. Use the manufacturer's respective master parts manual in ordering replacement parts for an engine
4. Use a manufacturer's manuals to solve the procedural problems specific to a particular engine
5. Identify the parts of a magneto ignition system
6. Identify the major components of a carburetor
7. Identify the types of carburetors and describe the features of each of these types of carburetors
8. Identify the basic types of governors
9. Identify the parts of a valve and its accessories
10. Identify the parts of the piston, rings and rod
11. Identify the types of lubricating systems and describe how they operate
12. Identify the parts of the camshaft and tappet mechanism
13. Identify the types of crankshafts and parts thereof
14. Identify the major types and applications of tools

AG. 221 SMALL GASOLINE ENGINES
UNITS OF INSTRUCTION AND OBJECTIVES

C. Operating Principles

1. Designate an engine as a two or four cycle
2. Identify engine by brand name and/or manufacturer
3. Determine what information is given on the nameplate
4. Identify operating conditions of small gasoline engines
5. Use horsepower terms such as indicated, friction, brake and "rated" in describing the size of an engine
6. Define and relate the following terms:
 - a. stroke
 - b. bore
 - c. cycle
 - d. crankshaft revolution
 - e. camshaft revolution
 - f. principle events
 - g. intake
 - h. compression
 - i. power
 - j. exhaust
 - k. camshaft timing
 - l. ignition timing
 - m. BTDC
 - n. TDC
 - o. BDC
 - p. power strokes per revolution of camshaft
 - q. displacement
 - r. compression ration
 - s. clearance volume
7. List the sequential order and explain the significance of the principle events in the operation of a four-stroke cycle engine
8. Explain the relationship of the main parts of the four-stroke cycle engine to the principle events
9. Identify a four-stroke cycle engine by visual observation
10. Explain the difference in operation and construction of the two and four-stroke cycle engine
11. Recognize a two-stroke cycle engine by visual observation
12. Describe the combustion as the focal point of engine operation
13. Describe the basic operating principles of a magneto ignition system
14. Describe the operational principles of a carburetor
15. Diagram the basic principle of carburetor to governor to throttle control linkage
16. Describe the operation of each type of governor
17. Describe the purpose and operation of valves

AG. 221 SMALL GASOLINE ENGINES
UNITS OF INSTRUCTION AND OBJECTIVES

D. Overhaul Procedures

1. Disassemble a small engine according to the procedures outlined by the manufacturer
2. Identify the wear points on a disassembled engine
3. Assemble a small engine according to the procedures outlined by the manufacturer
4. Describe the tolerance, specifications, clearance and reject size given by the manufacturer and how these terms affect engine operation
5. Identify those parts of an engine that need to be measured with a measuring device
6. Use micrometer measurements to determine if parts of a small engine are within the specifications set by the manufacturer
7. Manipulate the different micrometers and measuring devices so as to record proper measurements
8. Identify engines and machines according to model, serial, specification and type numbers when each applies
9. Use the manufacturer's specifications and torque data
10. Reface valves
11. Reface valve seats
12. Adjust valve tappet clearance
13. Install the piston rings
14. Install the piston rod assembly
15. Install the camshaft and tappets

E. Troubleshooting and Tune up Procedures

1. Clean and inspect the exhaust system of a two-cycle engine
2. Identify and service the different types of air cleaners
3. Identify and service the different types of breathers
4. Prepare a fuel and oil mixture for a two-stroke cycle engine
5. Identify and service the different types of spark plugs
6. Start an engine and adjust it for speed and load
7. Check and service the magneto and its parts for proper operation
8. Time the point opening to the piston position
9. Check each of the different types of carburetors for proper operation
10. Check and adjust the governors for proper operation
11. Find and use manufacturer's recommendations for troubleshooting problems in a small engine

AG. 222 AGRICULTURAL POWER TECHNOLOGY/LARGE ENGINES

COURSE DESCRIPTION: A course designed to develop skills in selection, operation and maintenance of small air-cooled engines, multi-cylinder engines, hydraulics, electric motors, and agricultural machinery and tractors.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Safety	470
Operating Principals	1,175
Fuels and Lubes	235
Power Transmission	1,175
Troubleshooting and Tune-up	1,175
TOTAL MINUTES	4,230

AG. 222 AGRICULTURAL POWER TECHNOLOGY/LARGE ENGINES
UNITS OF INSTRUCTION AND OBJECTIVES

A. Safety

1. Identify safety equipment necessary for agricultural power systems
2. Apply basic laboratory safety instruction
3. Describe safety practices when working with large engines
4. Apply safety practices when using tractors
5. Identify the safe tractor operation practices for field and highway conditions

B. Agricultural Tractors

1. Identify and describe the operating principles of internal combustion engines--both spark ignition and diesel
2. Identify the daily service and care operations from the operator's manual
3. Identify the operating principles of the air cleaning, fuel and oil filtering and engine cleaning systems
4. Interpret the circuit diagram of the electrical and fuel injection systems of a diesel tractor
5. Interpret Nebraska Tractor Test information
6. Conduct pre-operation inspection of a farm tractor
7. Start, operate and stop the tractor engine properly

C. Fuels and Lubes

1. Select, safely store and use fuels and lubricants for gasoline, LPG and diesel tractors
2. Decide what octane rating to select for gasoline engines with different compression ratios
3. Explain why the correct octane is important
4. Decide what grade of diesel fuel to select for different diesel engines
5. Decide what cetane rating of diesel fuel to select for different diesel engines
6. Explain why the proper grade and cetane rating are important
7. Describe how to store gasoline, L.P. -GAS and diesel fuel
8. Describe why the proper storage of fuels is important
9. Describe crank case oil classifications and grade
10. Decide what class and grade of crank case oil to select for different engines and operating conditions
11. Explain why the correct oil is important
12. Select gear lubricant
13. Select hydraulic fluid
14. Select bearing grease
15. Describe how to store oils and greases
16. Explain why the proper storage of oils and greases is important

AG. 222 AGRICULTURAL POWER TECHNOLOGY/LARGE ENGINES
UNITS OF INSTRUCTION AND OBJECTIVES

D. Power Transmission

1. Identify the function and operating principles of tractor clutches, transmission, control systems, including brakes
2. Lubricate the clutch release mechanism
3. Check and service the hydraulic system oil reservoir

E. Troubleshooting and Tune-up

1. Use ignition test equipment including dwell meters, tachometers, and timing devices
2. Test and service the battery and battery circuit
3. Adjust drive belts
4. Service the cooling system
5. Test and service the charging and cranking systems
6. Install diesel fuel filters and bleed the fuel system
7. Adjust control linkages including brakes, clutches, and safety disconnects
8. Properly pack front wheel bearings
9. Check and service the air cleaner
10. Change crankcase oil
11. Replace the oil filter
12. Check and service the crankcase breather
13. Check and maintain tractor tires
14. Adjust valve tappet clearance
15. Check and service tractor spark plugs
16. Clean the sediment bowl and fuel filter
17. Adjust the carburetor
18. Adjust tractor brakes
19. Adjust the engine clutch
20. Check and service the distributor
21. Time the ignition
22. Check and service the drive mechanism
23. Check and service the hydraulic system
24. Adjust the engine governor
25. Prepare the tractor for storage

AG. 225 AGRICULTURAL SYSTEMS/ELECTRICITY AND HYDRAULICS

COURSE DESCRIPTION: A course designed to develop skills in operation of tools and equipment, wiring, controls, electric motors, and hydraulics.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Safety	235
Electric Tools and Equipment	235
Electricity and Wiring	1,175
Electrical Controls	940
Electric Motors	940
Agricultural Hydraulic Systems	705
TOTAL MINUTES	4,230

AG. 225 AGRICULTURAL SYSTEMS/ELECTRICITY AND HYDRAULICS
UNITS OF INSTRUCTION AND OBJECTIVES

A. Safety

1. Identify safety equipment necessary for agricultural power technology
2. Apply basic laboratory safety instruction
3. Describe safety practices when using electrical equipment
4. Apply safety practices when using tools and equipment

B. Electrical Tools and Equipment

1. Identify, adjust, maintain and properly use the following tools:
 - a. volt meter
 - b. amp meter
 - c. ohm meter
 - d. portable GFCI
 - e. wire stripper
 - f. circuit tester
 - g. continuity tester
 - h. linesman pliers
 - i. conduit bender
 - j. fish-tape
 - k. deburring tool
 - l. growler

C. Electricity and Wiring

1. Describe electrical energy and how it works
2. Define common electrical terms and their relationships
3. Determine the amount of electrical energy used
4. Compute the cost of using electrical energy
5. Read and interpret wiring plans
6. Locate and mark routes for small appliances, general purpose and individual circuits
7. Install device boxes and outlet boxes
8. Install 120-volt, 120/240-volt circuits
9. Connect receptacles, switches and fixtures for each circuit
10. Ground the electrical system and equipment
11. Determine the type and size of service entrance equipment to install
12. Install service entrance equipment using cable or conduit with overhead or underground conductors
13. Install ground fault circuit interrupters
14. Install conduit
15. Estimate wiring costs
16. Install wiring for agricultural and other utility buildings

AG. 225 AGRICULTURAL SYSTEMS/ELECTRICITY AND HYDRAULICS
UNITS OF INSTRUCTION AND OBJECTIVES

D. Electrical Controls

1. Describe the function and importance of controls and control circuits in the operation of electric equipment
2. Explain the terminology and symbols used in discussing electric control circuits
3. Identify the characteristics of automatic and non-automatic control systems
4. Identify the characteristics of switches most commonly used in control circuits
5. Connect the tumbler switch having a built-in overload protector into a motor circuit
6. Explain how the overload protection device protects the motor from shore circuit or overload damage
7. Identify the function of a limit switch
8. Connect a limit switch into a motor circuit
9. List the characteristics of relays and the function of relay devices in control circuits
10. Connect the relay into a control circuit
11. Connect a time-delay relay into a motor control circuit
12. Identify the characteristics and types of motor control devices in an electrical circuit
13. Connect a commercial type starter switch and stop-start push-button stations into a motor control circuit
14. Describe the automatic sensing control devices available and how they might be applied in the control circuits used on the farm and in the home
15. Connect automatic sensing control devices into a control circuit
16. Explain how the automatic sensing control devices control an electric load

E. Electric Motors

1. Describe factors needing consideration if electric motors were to be replaced by alternative power sources
2. Use nameplate information to describe an electric motor
3. Identify electric motors by type
4. Match types of electric motors to starting load and duty characteristics
5. Identify major construction characteristics of electric motors by type of enclosures, mounts, bearings and lubrication systems
6. Spot motor ailments by sight, sound and touch
7. Use an organized trouble shooting procedure to identify the specific problem
8. Decide which problems can be corrected in place and which require removal to repair station
9. Identify possible causes and results of overloading an electric motor without overload protection
10. Recognize the modus operandi for overload protection devices
11. Replace or reset activated overload protection devices
12. Determine and order proper size of components for drive systems needing replacement
13. Remove and replace the needed drive systems
14. Explain how the poles of permanent magnet and electro-magnet attract and repel each other
15. Describe how the attracting and repelling forces of an electro-magnet can cause a free rotating magnet to turn
16. Identify a split-phase motor and a shaded-pole motor based on major internal parts and characteristics

AG. 225 AGRICULTURAL SYSTEMS/ELECTRICITY AND HYDRAULICS
UNITS OF INSTRUCTION AND OBJECTIVES

E. Electric Motors (continued)

17. Explain the operating principles of a split phase and shaded-pole motor integrating the parts and characteristics identified
18. List and describe loads requiring low starting torque
19. Identify capacitor-start motors based on major internal parts and characteristics
20. Explain the operating principles of the capacitor start motor integrating the parts and characteristics identified
21. List and describe loads requiring moderate starting torque
22. Identify repulsion-start and universal motors based on major internal parts and characteristics
23. Explain the operating principals of a repulsion start and universal motors integrating the parts and characteristics identified
24. List and describe loads requiring high starting torque
25. Identify electric motors that are reversible and are dual-voltage based on operating principles, nameplate information and wiring diagrams
26. Identify the leads to the starting and running windings of electric motors
27. Explain the operating principles involves when changing rotation and/or voltage of electric motors
28. Change the rotation and voltage of electric motors
29. Use the following terms in analyzing electric motors:
 - a. torque
 - b. starting current
 - c. horsepower
 - d. voltage drop
 - e. efficiency
 - f. power factor
 - g. apparent power
 - h. real power
30. Use a prony break, watt meter, volt meter, amp meter and appropriate formulas to collect data on various motors
31. Analyze the data and draw appropriate conclusion
32. Select an electric motor for a particular work situation according to the following variables:
 - a. power requirement of the load
 - b. capacity of the electric service entrance
 - c. speed requirements of the load
 - d. duty time required
 - e. starting torque required
 - f. direction of rotation
 - g. cost
33. Select the type of motor enclosure needed for a particular environment
34. Select the type of bearings and lubrications system needed based on the method and frequency of lubrication and the mounting position
35. Use a manufacturer's catalog and order the motor most nearly matching specifications given
36. Select the correct size of wire for the electric motor used
37. Order or purchase materials for installation of a motor
38. Evaluate hypothetical or real motor installations

AG. 225 AGRICULTURAL SYSTEMS/ELECTRICITY AND HYDRAULICS
UNITS OF INSTRUCTION AND OBJECTIVES

F. Agricultural Hydraulic Systems

1. Identify the applications of hydraulics in agriculture
2. Identify the components of a hydraulics system
3. Define terminology associated with hydraulic systems
4. Describe operating principles of hydraulic systems
5. List the advantages and disadvantages of utilizing hydraulics in agriculture
6. Read and interpret basic hydraulic schematic diagrams
7. Select the proper hydraulic fluid for a specific hydraulic system and operating condition
8. Drain, flush and refill hydraulic systems on agricultural equipment
9. Service and maintain hydraulic seals and packings
10. Select hydraulic tubing, pipe and remove hoses to fulfill specific pressure, volume and exposure requirements
11. Service, maintain and/or operate hydraulic fittings and couplers
12. Service and maintain hydraulic fluid filters
13. Trouble-shoot hydraulic motor operating problems
14. Select hydraulic motors to fit specific applications on agriculture equipment and power units
15. Determine relief valve pressure setting by the T-test method

AG. 227 AGRICULTURAL MACHINERY

COURSE DESCRIPTION: A course designed to develop skills in selection, operation, maintenance and management of agricultural machinery.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Safety	235
Tillage Equipment	705
Seeding and Planting Equipment	705
Pest Control and Fertilizing Equipment	705
Harvesting Equipment	1175
Agricultural Hydraulic Systems	235
Agricultural Machinery Management	470
TOTAL MINUTES	4,230

AG. 227 AGRICULTURAL MACHINERY
UNITS OF INSTRUCTION AND OBJECTIVES

A. Safety

1. Identify safety equipment necessary for agricultural power technology
2. Apply basic laboratory safety instruction
3. Describe safety practices when using electrical equipment
4. Apply safety practices when using tractors, machinery or hydraulics

B. Tillage Equipment

1. Identify the characteristics and applications of the major types of tillage equipment
2. Read and interpret an operator's manual for a major type of tillage equipment
3. Calculate the potential field capacity of various sizes of tillage equipment
4. Operate tillage equipment safely under field and transport conditions
5. Set up the tractor for primary tillage operations
6. Lubricate the appropriate points of primary tillage equipment
7. Adjust primary tillage equipment for initial operation
8. Trouble-shoot primary tillage equipment and operation under field and shop conditions

C. Seeding and Planting Equipment

1. Identify the major types of planting equipment
2. Describe the major characteristics and applications of the different types of planting equipment
3. Read and interpret an operator's manual for planting equipment
4. Identify the major components of the different types of planting equipment
5. Operate planting equipment safely under field and transport situations
6. Adjust planter row spacing on planting equipment
7. Adjust depth of seed placement on planting equipment
8. Service and maintain fertilizer and seed hoppers, agitators, seed tubes and fittings on planting equipment
9. Prepare planting equipment for storage
10. Identify the major types of seed metering mechanisms used on planters
11. Calibrate seed, fertilizer, herbicide and insecticide application rates under field conditions
12. Trouble-shoot planting equipment operation under field and shop conditions

D. Pest Control and Fertilizing Equipment

1. Describe the major functions of chemical application equipment
2. Identify the types of chemical application equipment
3. Describe the characteristics and applications of the major types of chemical application equipment
4. Describe the fundamentals of operation of the major types of sprayer pumps
5. Trouble-shoot sprayer pump operation
6. Describe the major characteristics and applications of the different types of sprayer nozzles
7. Read and interpret nozzle selection literature
8. Service and maintain sprayer nozzles and fittings
9. Describe the importance of accurate crop spraying equipment calibration
10. Select crop sprayer nozzles for desired application rate and spraying pressure
11. Calculate the required quantities of solution for spraying specific acreages

AG. 227 AGRICULTURAL MACHINERY
UNITS OF INSTRUCTION AND OBJECTIVES

E. Harvesting Equipment

1. Describe the alternative methods of harvesting crops.
2. Describe the characteristics and applications of the major types of harvesting equipment
3. Read and interpret an operator's manual for harvesting equipment
4. Calculate the potential field capacity for various sizes of harvesting equipment
5. Identify the sources of harvest losses
6. Operate harvesting equipment safely under field and transport situations
7. Prepare harvesting equipment for storage
8. Describe adjustments and operating controls on the basic types of harvesting equipment
9. Trouble-shoot harvesting equipment operation under field and shop conditions

F. Agricultural Hydraulic Systems

1. Identify the applications of hydraulics in agriculture
2. Identify the components of a hydraulics system
3. Define terminology associated with hydraulic systems
4. Describe operating principles of hydraulic systems
5. List the advantages and disadvantages of utilizing hydraulics in agriculture
6. Read and interpret basic hydraulic schematic diagrams
7. Select the proper hydraulic fluid for a specific hydraulic system and operating condition
8. Drain, flush and refill hydraulic systems on agricultural equipment
9. Service and maintain hydraulic seals and packings
10. Select hydraulic tubing, pipe and remove hoses to fulfill specific pressure, volume and exposure requirements
11. Service, maintain and/or operate hydraulic fittings and couplers
12. Service and maintain hydraulic fluid filters
13. Trouble-shoot hydraulic motor operating problems
14. Select hydraulic motors to fit specific applications on agriculture equipment and power units
15. Determine relief valve pressure setting by the T-test method

G. Agricultural Machinery Management

1. Describe the relationship between machinery costs and other farm costs
2. Identify the basic management skills required to manage agricultural machinery
3. Describe the importance of good records in a farm machinery management program
4. List the types of records used in a farm machinery management program
5. Identify the sources of information that can be utilized to provide the farmer with assistance for his machinery management program
6. Calculate field capacity for various types of agricultural equipment and machinery
7. Calculate the material capacity for various types of agricultural equipment and machinery
8. Calculate throughput capacity for various types of agricultural equipment and machinery
9. Identify the variables that effect the theoretical capacity of agricultural machinery
10. Calculate theoretical capacity for various types of agricultural machinery
11. Define the term "timeliness" as it relates to agricultural machinery

AG. 227 AGRICULTURAL MACHINERY
UNITS OF INSTRUCTION AND OBJECTIVES

G. Agricultural Machinery Management cont.

12. Describe how the time available for specific cropping operations effects decisions regarding machinery capacity requirements
13. Estimate economic and crop yield losses due to lost time or lack of timeliness in various cropping operations using a nomograph
14. Calculate the time available for specific cropping operations from past farm management records and university research data
15. List the factors that should be considered when matching agricultural machinery to a cropping system and/or power units
16. Compare the calculated ownership costs of various types of agricultural machinery and power units with differing capacities
17. List the factors that affect the field efficiency of agricultural machinery
18. Identify inefficient use of agricultural machinery and power units in a specific farming operation
19. Describe the ways that could be used to reduce the horsepower requirements for various types of agricultural machinery
20. Calculate horsepower requirements for various types of machinery based on needed capacity and available time
21. Describe the basic reasons why it is important to maintain a horsepower reserve when calculating horsepower requirements for agricultural machinery
22. List the factors to consider when selecting agricultural power units
23. Describe the methods used to rate agricultural power units and engines
24. Read and interpret university and manufacturer's literature, such as the Nebraska Tractor Tests, as it relates to the performance and specifications of agricultural power units and engines
25. Read and interpret data from a tractor dynamometer performance test
26. List the type of fixed costs that apply to agricultural machinery
27. Describe the term "depreciation" as it relates to agricultural machinery
28. Describe the ways that can be used to prevent rapid depreciation of agricultural machinery
29. Identify the major methods used in a management program to depreciate agricultural machinery
30. Estimate the average annual fixed cost for various types and sizes of agricultural machinery
31. List the types of operating costs that apply to agricultural machinery
32. Calculate the total operating costs for various types of agricultural machinery and power units given the necessary data
33. List the alternatives to ownership of agricultural machinery
34. List the advantages and disadvantages of each of the alternatives to ownership
35. Calculate the break-even point in acres per year and tons per year of various types of agricultural machinery
36. Compare leasing and rental costs to ownership costs of various types of agricultural machinery
37. Estimate the average life expectancy of various types of agricultural machinery
38. Estimate the optimum time to trade-in various types of agricultural machinery
39. List the factors that effect the trade-in value of various types of agricultural machinery
40. Read and interpret prepared tables, such as tractor and implement bluebooks, to estimate trade-in and salvage value of agricultural machinery

AG. 230 AGRICULTURAL STRUCTURES

COURSE DESCRIPTION: A course preparing students to maintain, evaluate, design, and build agriculture structures using approved construction techniques.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Concrete and Masonry	235
Leveling and Land Management	470
Carpentry	2,350
Electrical Wiring	705
Siding	235
Safety	235
TOTAL MINUTES	4,230

AG. 230 AGRICULTURAL STRUCTURES
UNITS OF INSTRUCTION AND OBJECTIVES

A. Concrete and Masonry

1. Select materials for concrete construction
2. Determine quantity and cost of materials for a job
3. Determine the water-cement ratio for a job
4. Plan and construct forms for concrete
5. Identify the use of air-entrained concrete
6. Order ready-mixed concrete
7. Identify the techniques for curing concrete
8. Determine moisture content in sand
9. Make a slump test
10. Mix concrete on the job site
11. Place concrete in forms
12. Finish concrete slabs
13. Mix masonry mortar
14. Lay concrete block

B. Leveling and Land Measurement

1. Set up leveling instrument
2. Take rod readings
3. Determine difference in elevation of two or more points
4. Record field notes for differential leveling
5. Measure distance with steel tape
6. Determine percent of slope
7. Determine land area
8. Use the hand level
9. Read legal land descriptions
10. Lay out foundations, footings, and batter boards

C. Carpentry

1. Identify structural parts of a farm building by name
2. Read plans and working drawings
3. Figure a bill of material
4. Select wood framing, roofing, and insulation materials
5. Use carpentry hand tools and measuring instruments
6. Use power tools for carpentry construction
7. Layout the framing of a building
8. Layout and cut rafters and braces
9. Apply glue, nails, bolts, screws, and construction fasteners
10. Evaluate insulation materials and building design for energy efficiency

AG. 230 AGRICULTURAL STRUCTURES
UNITS OF INSTRUCTION AND OBJECTIVES

D. Electrical Wiring

1. Understand the National Electrical Code requirements for wiring; especially for harsh environments found in agricultural structures
2. Describe the relationship of volts, amps, and ohms in terms of Ohm's Law
3. Plan an electrical circuit
4. Determine electrical power requirements
5. Read the kilowatt hour meter
6. Identify the function of overcurrent and ground fault protection
7. Measure electrical circuits for voltage, current flow, resistance, and wattage
8. Install electrical circuits
9. Trouble-shoot electrical circuits

(NOTE! IF A STRUCTURE IS WIRED AS A PART OF THE STUDENT ACTIVITIES FOR THIS UNIT, THE WORK SHOULD BE DONE UNDER THE SUPERVISION OF A CERTIFIED ELECTRICIAN.)

E. Siding

1. Identify different types of siding used when building agricultural structures
2. Identify the tools and equipment needed to hang siding
3. Demonstrate the ability to properly hang siding

F. Safety

1. Identify safety problems that may occur while working on agricultural structures
2. Identify safety equipment needed while working on agricultural structures
3. Demonstrate safe practices while working on agricultural structures

AG. 240 AGRICULTURAL FABRICATION

COURSE DESCRIPTION: A course to develop skills in metal equipment assembly and joining processes.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Safety	94
Metal Technology Skills	940
Cost Effective Construction Techniques	3,196
TOTAL MINUTES	4,230

AG. 240 AGRICULTURAL FABRICATION
UNITS OF INSTRUCTION AND OBJECTIVES

A. Safety

1. Determine the importance of Agricultural Metal Fabrication Technology
2. Reinforce basic technical skills
3. Identify safety practices
4. Identify laboratory management procedures

B. Metal Technology Skills

1. Determine uses of metal
2. Identify types of metal
3. Recognize properties of metal
4. Use appropriate bench metal techniques
5. Properly select and use oxy-fuel equipment
6. Properly select and use shielded metal arc welding equipment
7. Properly select and use gas metal arc welding equipment
8. Properly select and use gas tungsten arc welding equipment
9. Properly select and use plasma arc cutting and welding equipment
10. Properly apply specialty welding and cutting techniques

C. Cost Effective Construction Techniques

1. Utilize computer assisted design techniques
2. Prepare construction plans and working drawings
3. Determine recommended and required design features
4. Read and interpret plans and working drawings
5. Prepare bill of materials
6. Fabricate and maintain agricultural equipment

AG. 310 APPLIED LIVESTOCK MANAGEMENT

COURSE DESCRIPTION: A course that includes principles of animal production and management. Topics include health, evaluation, selection, feeding, and management.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Maintaining Healthy Livestock	470
Care and Feeding of the Beef Breeding Herd	470
Beef Cattle Management	235
Feeding Dairy Cattle	235
Dairy Cattle Management	235
Care and Feeding of the Swine Breeding Herd	470
Swine Management	235
Care of the Sheep Breeding Flock	235
Feeding Sheep	235
Sheep Management	235
Poultry and Small Animal Production	235
Horse Management	235
Fitting and Showing Livestock	235
Livestock Skills	235
SAE - Record Keeping	235
TOTAL MINUTES	4,230

AG. 310 APPLIED LIVESTOCK MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

A. Maintaining Healthy Livestock

1. Describe reasons for preventing diseases as compared to simply curing diseases (an ounce of prevention is worth a pound of cure)
2. Recognize healthy and unhealthy livestock
3. List the four general causes of disease
4. Describe an effective overall livestock health program
5. Match disinfectants to their uses and limitations
6. Discuss several factors that constitute a good sanitation program
7. Describe how vaccines should be cared for and used
8. Name three methods of giving animals oral medicines
9. Name the agencies responsible for enforcing livestock health regulations in Idaho
10. Demonstrate the ability to administer oral medicines to livestock

B. Care and Feeding of the Beef Breeding Herd

1. Describe the management of the cow and bull prior, during and after the breeding season
2. Describe the management of the calf including care at parturition, nursing to weaning and growing to maturity
3. Identify the nutritional requirements for the breeding herd
4. Discuss the advantages and disadvantages of artificial insemination in beef cattle
5. List, diagram and/or describe proper handling facilities, shelters, housing, and use of feeding and watering equipment and systems
6. Identify factors in sanitation and disease control and prevention associated with breeding animal enterprises
7. Develop a breeding and feeding program for a cow-calf herd
8. Discuss the procedure and advantage of fertility and pregnancy testing

C. Beef Cattle Management

1. Describe three types of feeding programs for market cattle
2. Describe the reasons for keeping records on cattle
3. Identify and discuss methods to increase weight gains and feed efficiencies
4. Determine adjusted weaning weights, efficiency of gain and dressing percentages of beef cattle
5. Identify recommended methods to prevent livestock losses in handling and shipping
6. Identify the factors in animal sanitation and disease prevention
7. Calculate marginal profit and losses, gain profits, and net profits
8. Describe four methods of buying cattle
9. Describe and use management procedures including production records, crossbreeding and identification

AG. 310 APPLIED LIVESTOCK MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

D. Feeding Dairy Cattle

1. List the nutrient areas of concern when balancing a dairy cattle ration
2. Describe the reasons pastures are becoming less important in commercial dairy herds
3. Describe the effect of poor quality hay on milk production and grain requirement
4. Distinguish between advantages of corn, alfalfa and grass silage
5. Name the most common grains and protein supplements for dairy cattle
6. List the minerals and vitamins most likely to be deficient in dairy cattle
7. List the type of information necessary to successfully balance a dairy cattle ration
8. Balance a dairy cattle ration
9. Describe general feeding tips for dairy cattle

E. Dairy Cattle Management

1. List, diagram and/or describe proper handling facilities, shelter, housing, milking facilities, and use of feeding and watering equipment and systems for dairy cattle
2. Identify factors in sanitation and disease control and prevention associated with dairy cattle production
3. Describe the relationship between age of freshening and lifetime milk production
4. Describe proper management practices to be used for dairy bulls
5. Describe mastitis control and treatment
6. List (in order) the steps involved in milk let-down
7. Describe milk flavors with their cause and prevention
8. Explain three systems of manure handling
9. List the factors used to classify milk in Idaho
10. Name four methods of dairy cattle identification
11. Describe the basic types of records kept on dairy cattle
12. List types of information recorded on DHIA records

F. Care and Feeding of the Swine Breeding Herd

1. Describe the amount and kind of feed recommended for sows, gilts, and boars
2. Describe procedures for maintaining healthy breeding stock
3. Distinguish among methods of breeding swine
4. Describe major management guidelines to follow during the gestation period
5. List in order the appropriate steps in cleaning and disinfecting a farrowing facility
6. Describe the steps in caring for newborn pigs
7. Develop a procedure to follow before, during, and after farrowing
8. Draw a farrowing facility for swine

AG. 310 APPLIED LIVESTOCK MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

G. Swine Management

1. Discuss swine facilities and equipment needed for the different phases of swine production
2. Identify the health and sanitation problems of the swine industry
3. Compare nutritional requirements of swine in three general areas: birth to weaning, weaning to 125 pounds, and 125 pounds to maturity
4. Distinguish between confinement, production systems, and pasture production systems
5. List and compare three methods of marketing swine for the different systems of production
6. List key techniques for shipping swine to market
7. Describe a management program for specific stages of growth for market swine
8. Describe the basic types of records kept for swine production

H. Care of the Sheep Breeding Flock

1. Select good management practices when caring for the ewe and ram
2. Explain the difference in estrus between sheep and other farm animals
3. Describe the amount and kind of feed recommended for the sheep breeding flock
4. Describe procedures for maintaining healthy breeding stock
5. Describe the steps in caring for newborn lambs
6. Explain why a lamb needs colostrum
7. Describe what is done to prepare ewes for breeding
8. Describe four procedures for grafting lambs
9. Identify the best time to dock and castrate lambs

I. Feeding Sheep

1. List the most common feeds fed to sheep
2. Describe the nutritionally critical time period for ewes
3. Explain the difference between ewe rations before and after lambing
4. Describe requirements for a good lamb milk replacer
5. Explain why lambs are creep fed
6. Describe ways to increase forage utilization
7. List the effects improved nutrition can have on wool
8. Balance a creep feeding ration

J. Sheep Management

1. List the causes of disease in sheep
2. List necessary vaccinations for ewes and lambs in the western states
3. List, diagram and/or describe proper handling facilities, shelters, housing, feeding and watering equipment and systems
4. Describe a successful accelerated lambing program
5. Describe the advantages of early weaning
6. Distinguish the primary marketing methods
7. Describe the basic types of records kept for sheep production
8. Describe the four methods of sheep production

AG. 310 APPLIED LIVESTOCK MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

K. Poultry and Small Animal Production

1. Demonstrate proficiencies and skills in poultry production and management
2. Demonstrate skills and proficiencies in goat and/or specialty livestock
3. Demonstrate skills in rabbit or small meat animal production
4. Demonstrate skills and proficiencies required in production of miscellaneous species
5. Demonstrate skills and proficiencies required in fish production

L. Horse Management

1. List practices important for maintaining an effective horse care program
2. List factors important in maintaining healthy horses
3. List infectious and non-infectious diseases
4. List, diagram and/or describe proper handling facilities, housing, and use of feeding and watering equipment

M. Fitting and Showing Livestock

1. List the tools and equipment needed to fit and show sheep, swine, beef and dairy animals
2. Describe the affect the showman's appearance and attitude has in the ring
3. Demonstrate how to fit swine, beef, sheep, and dairy animals
4. Demonstrate how to show swine, beef, sheep, and dairy animals
5. Demonstrate how to clip dairy and beef animals
6. Demonstrate how to trim hooves on show animals
7. Explain the purpose of fitting and showing livestock

N. Livestock Skills

1. Describe safety factors that should be incorporated when working with livestock
2. Demonstrate the ability to properly restrain livestock during castration, vaccination, and docking
3. Describe the do's and don'ts of vaccination
4. Describe the various types of infections
5. List the tools used for castration and demonstrate their use
6. List the precautions to be taken in livestock castration
7. List the methods of dehorning and the precautions to take when dehorning
8. Describe the reasons for docking
9. List tools used for docking and demonstrate their use
10. Demonstrate the methods of administering growth stimulants
11. List and describe the methods of identification used for cattle, sheep, and swine
12. Describe good sheep shearing practices
13. Describe the stages of parturition in the cow, ewe, and sow
14. Demonstrate the ability to assist a cow, ewe, sow or mare in giving birth

AG. 310 APPLIED LIVESTOCK MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

- O. SAE - Record Keeping (See AG. 120)
 - 1. Review the role of SAE programs
 - 2. Review types of SAE programs
 - 3. Review planning and implementing the SAE program
 - 4. Review the use of the SAE record book
 - 5. Plan individualized instructional programs in agriculture

AG. 320 APPLIED CROP MANAGEMENT

COURSE DESCRIPTION: A course that prepares students to operate enterprises concerned with the production of various field crops.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Planting	235
Potato Production	376
Small Grain Production	376
Corn Production	376
Forage Production	376
Pasture Management	235
Rangeland Management	235
Sugarbeet Production	376
Pea Production	235
Lentil Production	141
Commercial Bean Production	376
Rapeseed Production	141
Grass Seed Production	141
Specialty Crops	235
Crop Storage	235
Crop Marketing and Exporting	235
TOTAL MINUTES	4,230

AG. 320 APPLIED CROP MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

A. Planting

1. Discuss row spacing, seeding depth, and seeding rate as they affect plant growth and development
2. Discuss how soil texture, soil temperature, soil moisture, and plant emergence structure affect planting depth
3. List factors affecting final plant population
4. Identify different types of planting equipment
5. List the steps in adjusting and calibrating planting equipment
6. Calibrate planting equipment to deliver a known amount of seed per acre
7. Plan a planting schedule

B. Potato Production

1. Name the stages of growth of the potato plant
2. Discuss seedbed preparation for potato production
3. List common varieties of seed and discuss major points in selecting and preparing seed
4. Discuss the major factors in planting seed
5. Make fertilizer recommendations for potato production
6. Identify symptoms, names, and causal agents of diseases common to potato production, and discuss control methods
7. Identify and describe beneficial and harmful insects common to potato production and discuss control methods
8. Identify weeds that are common to potato production and discuss control methods
9. Discuss harvesting, handling and storage of potatoes
10. Identify potential markets for potatoes
11. Discuss enterprise management for potato production

C. Small Grain Production

1. Name the stages of growth of small grains
2. Discuss seedbed preparation for small grain production
3. List common varieties of seed and discuss major points in selecting and preparing seed
4. Discuss the major factors in planting seed
5. Make fertilizer recommendations for small grain production
6. Identify symptoms, names, and causal agents of diseases common to small grain production and discuss control methods
7. Identify and describe beneficial and harmful insects common to small grain production and discuss control methods
8. Identify weeds common to small grain production and discuss control methods
9. Discuss harvesting, storage and handling of small grains
10. Identify potential markets for small grain
11. Discuss enterprise management for small grain production
12. Describe equipment and adjustment for grain production

AG. 320 APPLIED CROP MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

D. Corn Production

1. Name the stages of growth of the corn plant
2. Discuss seedbed preparation for corn production
3. List common varieties of seed and discuss major points in selecting and preparing seed
4. Discuss major factors in planting
5. Make fertilizer recommendations for corn production
6. Identify symptoms, names, and causal agents of diseases common to corn production and discuss control methods
7. Identify and describe beneficial and harmful insects common to corn production and discuss control methods
8. Identify weeds common to corn production and discuss control methods
9. Discuss harvesting, storage and handling of corn
10. Identify potential markets for corn
11. Discuss enterprise management for corn production
12. Describe the equipment adjustments for corn production

E. Forage Production

1. Name the stages of growth of forage crop plants
2. Discuss seedbed preparation for forage production
3. List common varieties of seed and discuss major points in selecting and preparing seed
4. Discuss the major factors in planting seed
5. Make fertilizer recommendations for forage production
6. Identify symptoms, names, and causal agents of diseases common to forage production and discuss control methods
7. Identify and describe beneficial and harmful insects common to forage production and discuss control methods
8. Identify weeds common to forage production and discuss control methods
9. Discuss harvesting, storage and handling of forage crops
10. Identify potential markets for forage crops
11. Discuss enterprise management for forage production
12. Describe equipment adjustments for forage production

F. Pasture Management

1. List steps to follow in preparing the ideal seedbed for pasture
2. List common pasture plants and varieties of each
3. Discuss major factors in planting
4. Make fertilizer recommendations for pastures
5. Identify weeds and brush common to pastures and discuss control methods
6. List methods to follow in order to increase production of forage growth and advantages of renovating pastureland
7. Discuss economic value of pasture as compared to other livestock feeds
8. Discuss enterprise management for pastures
9. List compatible combinations of plants for pastures in your area

AG. 320 APPLIED CROP MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

G. Rangeland Management

1. List suitable grasses and legumes, and factors to consider in selection of rangeland foliage
2. Identify grasses and legumes which complement each other when grown together
3. Describe good summer and good winter rangeland
4. Select the proper method of seeding rangeland when given the soil type and topography
5. Describe the different grazing systems and ways to prevent overgrazing
6. Describe the ideal grazing system and identify management principles for a rangeland operation
7. Calculate, from given data, the carrying capacity of an acreage of rangeland
8. Calculate the animal units per month (AUM's) of a beef herd or sheep flock using public lands
9. Calculate the cost of leasing public land based on available AUM's and forage production capabilities
10. Identify rangeland plants

H. Sugarbeet Production

1. Name the stages of growth of the sugarbeet plant
2. Discuss seedbed preparation for sugarbeet production
3. List common varieties of seed and discuss major points in selecting and preparing seed
4. Discuss major factors in planting seed
5. Make fertilizer recommendations for sugarbeet production
6. Identify symptoms, names, and causal agents of diseases common to sugarbeet production and discuss control methods
7. Identify beneficial and harmful insects common to sugarbeet production and discuss control methods
8. Identify weeds common to sugarbeet production and discuss control methods
9. Discuss harvesting techniques and procedures to follow in handling sugarbeets
10. Identify potential markets for sugarbeets
11. Describe equipment adjustments for sugarbeet production

I. Pea Production

1. Name the stages of growth of the pea plant
2. Discuss seedbed preparation for pea production
3. List common varieties of seed and discuss major points in selecting and preparing seed
4. Discuss major factors in planting seed
5. Make fertilizer recommendations for pea production
6. Identify symptoms, names, and causal agents of diseases common to pea production and discuss control methods
7. Identify beneficial and harmful insects common to pea production and discuss control methods
8. Identify weeds common to pea production and discuss control methods
9. Discuss harvesting techniques and procedures to follow in handling peas
10. Identify potential markets for peas
11. Describe equipment adjustments for pea production

AG. 320 APPLIED CROP MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

J. Lentil Production

1. Name the stages of growth of the lentil plant
2. Discuss seedbed preparation for lentil production
3. List common varieties of seed and discuss major points in selecting and preparing seed
4. Discuss major factors in planting seed
5. Make fertilizer recommendations for lentil production
6. Identify symptoms, names, and causal agents of diseases common to lentil production and discuss control methods
7. Identify beneficial and harmful insects common to lentil production and discuss control methods
8. Identify weeds common to lentil production and discuss control methods
9. Discuss harvesting techniques and procedures to follow in handling lentils
10. Identify potential markets for lentils
11. Describe equipment adjustments for lentil production

K. Commercial Bean Production

1. Name the stages of growth of the bean plant
2. Discuss seedbed preparation for bean production
3. List common varieties of seed and discuss major points in selecting and preparing seed
4. Discuss major factors in planting seed
5. Make fertilizer recommendations for bean production
6. Identify symptoms, names, and causal agents of diseases common to bean production and discuss control methods
7. Identify beneficial and harmful insects common to bean production and discuss control methods
8. Identify weeds common to bean production and discuss control methods
9. Discuss harvesting techniques and procedures to follow in handling beans
10. Identify potential markets for beans
11. Describe equipment adjustments for bean production

L. Rapeseed Production

1. Name the stages of growth of the rapeseed plant
2. Discuss seedbed preparation for rapeseed production
3. List common varieties of seed and discuss major points in selecting and preparing seed
4. Discuss major factors in planting seed
5. Make fertilizer recommendations for rapeseed production
6. Identify symptoms, names, and causal agents of diseases common to rapeseed production and discuss control methods
7. Identify beneficial and harmful insects common to rapeseed production and discuss control methods
8. Identify weeds common to rapeseed production and discuss control methods
9. Discuss harvesting techniques and procedures to follow in handling rapeseeds
10. Identify potential markets for rapeseed
11. Describe equipment adjustments for rapeseed production

AG. 320 APPLIED CROP MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

M. Grass Seed Production

1. Name the stages of growth of the grass plant
2. Discuss seedbed preparation for grass seed production
3. List common varieties of seed and discuss major points in selecting and preparing seed
4. Discuss major factors in planting seed
5. Make fertilizer recommendations for grass seed production
6. List methods of increasing forage growth
7. Identify weeds common to grass seed production and discuss control methods
8. Discuss harvesting techniques and procedures to follow in handling grass seed
9. Identify potential markets for grass seed
10. Discuss enterprise management for grass seed production
11. Describe equipment adjustments for grass seed production

N. Specialty Crops

1. List and describe vegetative and reproductive growth of specialty crops in Idaho
2. Discuss the economic importance of selected specialty crops to Idaho
3. List common varieties of seed and discuss major points in selecting and preparing seed
4. Identify planting equipment used and discuss major factors involved in planting
5. Make fertilizer recommendations for specialty crops
6. Identify harmful pests common to specialty crops and discuss control methods
7. Discuss harvesting techniques and procedures to follow in handling specialty crops
8. List poor, average, and excellent yields for specialty crops in Idaho
9. Identify potential markets for specialty crops

O. Crop Storage

1. Describe the characteristics of a good crop storage facility
2. Describe advantages and disadvantages of different storage facilities
3. Describe the key factors to consider: moisture content, costs, time and labor, storage losses, etc. when selecting storage facilities
4. Calculate the volume of storage and estimate the products stored within
5. Operate a moisture tester to determine moisture content of harvested crop
6. Compare systems for drying crops and calculate drying costs in relation to benefits
7. Describe procedure for fumigating a storage bin for insect control
8. Plan a storage facility for a given farm taking into account existing facilities and long-range goals
9. Describe handling systems needed for storage facility
10. Calculate construction and operation costs of a given storage facility
11. Describe economics of on-farm storage vs. off-farm storage

AG. 320 APPLIED CROP MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

P. Crop Marketing and Exporting

1. Identify and describe traditional markets for farm goods
2. Discuss how supply and demand affect market conditions
3. List factors causing shifts in demand of a commodity
4. Discuss the main function of product standards
5. List factors that influence time to market
6. List sources of crop market information
7. List the advantages and disadvantages of the futures market
8. Discuss hedging as it relates to crop marketing
9. Discuss economic impact of exports on crop markets
10. Calculate marketing problems

AG. 330 LANDSCAPE DESIGN

COURSE DESCRIPTION: A course that prepares students to design, construct, and maintain planted areas and devices for the beautification of home grounds and other areas of human habitation and recreation.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Introduction to Landscaping	705
Landscape Design	705
Climate and Zonation	235
Soil Conservation	235
Ornamental Plant Identification	470
Horticulture Tools, Equipment and Machinery	235
Electrical Controls and Sensing Devices	235
Leveling and Land Measurement	235
Lawnsite Quality and Preparation	235
Maintaining Lawns	235
Identification and Control of Turf Grass Pests	235
Gardening	235
Salesmanship	235
TOTAL MINUTES	4,230

AG. 330 LANDSCAPE DESIGN
UNITS OF INSTRUCTION AND OBJECTIVES

A. Introduction to Landscaping

1. Match terms and definition associated with landscaping
2. List the duties and responsibilities of a landscape architect
3. List the duties and responsibilities of a landscape horticulturist
4. Name the objectives of developing a landscape plan
5. List the guiding principles of landscape design
6. Identify as true or false statements relating to the elements of a good landscape design
7. Name the main areas to develop in a landscape design
8. Identify the tools associated with landscape design
9. Select statements that pertain to corner plantings
10. Identify factors as they relate to entrance and foundation plantings
11. List three different occupations related to landscaping

B. Landscape Design

1. Match terms and definitions associated with landscape design
2. List the elements of landscape design
3. List the principles of symmetry in landscape design
4. Choose between formal and informal design factors
5. Draw and explain the symbols used in landscape design
6. List the sequence of planning a landscape design
7. List the ways to attain contrast in a landscape design
8. Identify as true or false statements about repetition and rhythm in landscape design
9. Discuss proportion or scale as it relates to landscape design
10. Identify plants that are commonly used in landscaping
11. List the common mistakes made in foundation plantings
12. List the maintenance considerations in a landscape design
13. List the factors used in developing a private area in landscaping
14. Complete a scale exercise landscape plan
15. Develop a home landscape plan

C. Climate and Zonation

1. Match terms and definitions associated with climate and plant zones
2. List the factors which influence weather
3. Explain plant hardiness and the importance of it in choosing plants for landscaping
4. Select appropriate plants for various landscaping conditions and considering climate
5. Demonstrate the ability to determine climate zone and develop a landscape plan for a given area

AG. 330 LANDSCAPE DESIGN
UNITS OF INSTRUCTION AND OBJECTIVES

D. Soil Conservation

1. List types of erosion
2. List factors that influence soil erosion
3. Describe the four categories of water erosion
4. List conservation practices for reducing erosion
5. List mechanical and cropping practices used to reduce water erosion
6. List factors that determine cropping systems
7. List three organizations involved with soil conservation

E. Ornamental Plant Identification

1. Discuss the system of plant classification
2. Identify the parts of simple and compound leaves
3. Name the types of leaf arrangement, venation and margins
4. Identify the types of leaf arrangement to the stem
5. Identify the parts of a stem
6. Match stem modification to their descriptions
7. Identify the types of inflorescences
8. Identify 100 common ornamental indoor plants
9. Identify 100 common ornamental outdoor plants

F. Horticulture Tools, Equipment, and Machinery

1. Match terms and definitions associated with horticulture tools
2. List the general rules for choosing garden tools
3. List the kinds of shovels
4. Name the kinds of hoes
5. Identify as true or false statements about hoes
6. List the kinds of shears
7. Name the kinds of spading forks and two uses of each
8. List some special tools used in horticulture
9. Select preventive maintenance techniques for horticulture tools
10. List the kinds of equipment used in horticulture and landscaping
11. Name the tractor implements used in horticulture applications

AG. 330 LANDSCAPE DESIGN
UNITS OF INSTRUCTION AND OBJECTIVES

G. Electrical Controls and Sensing Devices

1. Identify types of controls by nomenclature and use, including thermostats, humidostats, photoelectric cells, magnetic relays, timers, pressure switches, and time delay equipment
2. Set controls, such as timers and switches, for the desired performance
3. Use low voltage electrical control equipment
4. Interpret wiring diagrams
5. Select controls for electric motors from supply catalogs
6. Connect, start, and stop magnetic motor controllers
7. Install a timer circuit
8. Install a thermal delay relay control
9. Install a low voltage motor control system
10. Install switch control for starting 115 & 230 volt motors
11. Install a sensing device such as thermostat, humidostat, photoelectric cell, etc.

H. Leveling and Land Measurement

1. Set up leveling instrument
2. Take rod readings
3. Determine difference in elevation of two or more points
4. Record field notes for differential leveling
5. Measure distance with steel tape
6. Determine percent of slope
7. Determine land area
8. Use the hand level
9. Read legal land descriptions
10. Lay out foundations, footings, and batter boards

I. Lawn Site Quality and Preparation

1. Identify common lawn tools and the safety practices associated with them
2. Demonstrate the ability to prepare a lawnsite for proper drainage
3. Develop an irrigation plan for a lawn site
4. Demonstrate the ability to prepare a proper seedbed
5. Develop an overall plan for a lawn, protecting valuable natural features, to enhance property value

AG. 330 LANDSCAPE DESIGN
UNITS OF INSTRUCTION AND OBJECTIVES

K. Identification and Control of Turf Grass Pests

1. List the common diseases of turf grass
2. Describe the symptoms of various turf diseases
3. List the preventative management practices to avoid turf grass diseases
4. Identify the common insect pests harmful to lawns
5. Identify the common lawn diseases
6. Match the damage to the lawn with the pest responsible
7. Match the pests with the control measures for each
8. List the reasons for controlling weeds in lawns
9. Identify the common turf grasses used in the northwest and their specific area of advantage
10. List the management practice used in controlling lawn weeds

J. Maintaining Lawns

1. Describe how to properly water a lawn
2. Explain what happens when a newly seeded lawn has too much traffic
3. Describe the use of weed killers on a newly seeded lawn
4. Describe the mowing schedule of a newly seeded lawn
5. List the types of equipment for lawn mowing
6. Describe what each type of fertilizer does for a lawn
7. Develop a fertilizer schedule for a lawn
8. Identify common lawn problems
9. Select the qualities of a good and poor lawn
10. Demonstrate the ability to aerate a lawn
11. List the maintenance practices for lawns

L. Gardening

1. Locate a desirable garden site at home
2. Determine the size of garden a family of four would need
3. Plan a garden layout based on suggested planting groups
4. Select vegetable varieties based on family preference, geographics, and vegetable seed availability
5. Estimate cost and return of a home garden
6. Determine the proper time to prepare garden soil for crops
7. Demonstrate the ability to prepare garden soil with usual cultural practices
8. Demonstrate the ability to properly plant a garden
9. Demonstrate the ability to transplant vegetables from flats and hot beds
10. List proper garden irrigation methods
11. List the common garden fertilization methods

AG. 330 LANDSCAPE DESIGN
UNITS OF INSTRUCTION AND OBJECTIVES

- M. Salesmanship
1. Match terms and definitions associated with salesmanship
 2. Describe how to be a service to the customer
 3. Explain how to use persuasion in closing a sale
 4. Discuss the necessity to educate the customer before proceeding in the sales process
 5. Discuss how vital sales are in the American system of economy
 6. List the steps in making a sale

AG. 335 FLORAL DESIGN AND MARKETING

COURSE DESCRIPTION: A course designed to develop skills in floriculture and the techniques used to develop and complete a variety of retail items normally sold in a retail florist business. The skills learned are necessary to gain and maintain employment in the retail florist industry.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Concepts of Floral Design	141
Principles of Design	470
Cut Flowers and Foliage	141
Mechanics, Supplies and Safety	141
Body Flowers	470
Bud Vases and Rose Bowls	423
Cut Flower Arrangements	470
Accessories, Bases and Background	470
Dried Flowers	470
Living Plant Groups	470
The Retail Floriculture Industry	282
Sales and Services	282
TOTAL MINUTES	4,230

AG. 335 FLORAL DESIGN AND MARKETING
UNITS OF INSTRUCTION AND OBJECTIVES

A. Concepts of Floral Design

1. Identify, use and create the following designs
 - a. Mass arrangements
 - b. Line arrangements
 - c. Triangle variations
 - d. Circle variations
 - e. Line-mass arrangements
2. Psychology and use of colors
 - a. Warm, advancing
 - b. Cool, receding c. Neutral
 - d. Primary, secondary, and tertiary colors
3. Combining colors in arrangements
4. Textures

B. Principles of Design

1. Demonstrate by identifying and using the following principles of design:
 - a. Balance
 1. Symmetry
 2. Stability
 3. Depth
 - b. Scale
 - c. Rhythm
 - d. Harmony
 - e. Emphasis

C. Cut Flowers and Foliage

1. Identify flowers and foliage commonly used by retail florists.
2. Demonstrate ability to order required flowers and foliage from a wholesale outlet.
3. Estimate materials required for a particular project.

D. Mechanics, Supplies, and Safety

1. Demonstrate use of floral foam both wet and dry.
2. Demonstrate use of floral tape and clay.
3. Have a working
 - a. stem holding devices b. frogs
 - c. tools including glue guns and cutting tools
4. Properly order corsage supplies
5. Properly order Christmas supplies
6. Make arrangements (fresh and dry) in a variety of containers.

AG. 335 FLORAL DESIGN AND MARKETING
UNITS OF INSTRUCTION AND OBJECTIVES

E. Body Flowers

1. Design and construct corsages (silk and fresh)
2. Design and construct boutonniere (silk and fresh)
3. Properly use accessories for boutonniere and corsages
4. Describe different types of corsages

F. Bud vases and Rose Bowls

1. List types of bud vases available
2. List varieties of flowers frequently used in bud vases
3. List foliage suggested for use in bud vases
4. List optional accessories often used in bud vases
5. Design and construct fresh and dry bud vase arrangements

G. Cut Flower Arrangements

1. Design and prepare an example of the following types of arrangements:
 - a. mass arrangements
 - b. triangle arrangements
 - c. circular arrangements
 - d. line and line-mass arrangements
 - e. wreaths (grapevine and fresh)
 - f. swags
 - g. centerpieces

H. Accessories, Bases, and Background

1. Construct arrangements using a variety of accessories
2. Construct arrangements using a variety of bases and backgrounds

I. Dried Flowers

1. Demonstrate how flowers can be preserved
2. List selected flowers that will dry well and can be used in arrangements
3. Describe methods used in drying

J. Living Plant Groups

1. Design and complete a dish garden
2. Design and complete a terrarium
3. Demonstrate how to properly plant a dish garden and terrarium
4. Identify plants commonly used in dish gardens and terrariums
5. Identify a properly displayed large plant grouping and their importance as an element in interior design

AG. 335 FLORAL DESIGN AND MARKETING
UNITS OF INSTRUCTION AND OBJECTIVES

K. The Retail Floriculture Industry

1. Describe methods used to distribute flowers worldwide
2. List worldwide exporters of fresh flowers
3. Describe current marketing trends of flowers
4. Describe types of retail florist businesses
5. List job responsibilities of employees in florist businesses
6. List desirable qualifications of a retail florist

L. Sales and Services

1. Identify possible types of customers
2. Define qualities of a good salesperson
3. Complete a sales slip form a telephone order
4. Complete a sales slip utilizing:
 - a. sales tax computation
 - b. retail price
 - c. delivery/pick-up and location/directions
 - d. making change
 - e. checks and credit cards
 - f. flowers by wire
5. Demonstrate a successful sales completion

AG. 340 APPLIED GREENHOUSE AND NURSERY MANAGEMENT

COURSE DESCRIPTION: A course designed to prepare students in greenhouse and nursery operation and management.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Greenhouse Structures and Management	235
Nursery Management	470
Greenhouse Occupations	94
Ornamental Plant Identification	235
Properties of Soil	141
Leveling and Land Measurement	235
Climate and Zonation	235
Lawnsite Quality and Preparation	235
Maintaining Lawns	235
Identification and Control of Turf Grass Pests	235
Pot Chrysanthemum Production	161
Poinsettia Production	161
Easter Lily Production	158
Floral Design	225
Hydroponics	235
Gardening	235
Horticulture Tools, Equipment and Machinery	235
Electrical Controls and Sensing Devices	235
Salesmanship	235
TOTAL MINUTES	4,230

AG. 340 APPLIED GREENHOUSE AND NURSERY MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

A. Greenhouse Structures and Management

1. Identify the different types of greenhouses and their arrangements
2. Calculate the size of equipment needed to heat, cool, and circulate air within the greenhouse
3. Describe the internal structures and equipment of a greenhouse
4. Describe other structures used in raising plants
5. Match terms and definitions associated with greenhouse and forcing structures
6. Describe the uses of forcing structures
7. Match the greenhouse structures with their advantages
8. List the materials needed to build forcing structures
9. Develop a chart of covering materials with the durability, insulation qualities, and construction costs of each
10. List the functions of the alternate types of forcing structures

B. Nursery Management

1. Match terms and definitions associated with the nursery business
2. List the occupations related to nursery occupations
3. Select skills needed for various nursery occupations
4. Identify as true or false statements about nursery occupations
5. List occupations in nurseries that are common to your area
6. Explain the use of small propagating greenhouses
7. Describe the soil types best suited for various nursery plants
8. Develop a plan for row and plant spacing for various nursery plants
9. Identify the tools associated with nursery management
10. List the advantages and disadvantages of using containers for growing nursery plants
11. List the type of media used to propagate cuttings, seeds, and seedlings
12. List the weed control methods for nurseries
13. Describe the proper procedures for transplanting bareroot, ball and burlap stock
14. Explain how and when to stake trees
15. Describe how to protect nursery stock from winter injury

C. Greenhouse Occupations

1. Match terms and definitions associated with greenhouse occupations
2. List and describe the occupations associated with greenhouse management
3. Name the amount of education and experience needed for each of the greenhouse occupations

AG. 340 APPLIED GREENHOUSE AND NURSERY MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

D. Ornamental Plant Identification

1. Discuss the system of plant classification
2. Identify the parts of simple and compound leaves
3. Name the types of leaf arrangement, venation and margins
4. Identify the types of leaf arrangement to the stem
5. Identify the parts of a stem
6. Match stem modification to their descriptions
7. Identify the types of inflorescences
8. Identify 100 common ornamental indoor plants
9. Identify 100 common ornamental outdoor plants

E. Properties of Soils

1. Identify components and properties of soils
2. Recognize soil classification systems

F. Leveling and Land Measurement

1. Set up leveling instrument
2. Take rod readings
3. Determine difference in elevation of two or more points
4. Record field notes for differential leveling
5. Measure distance with steel tape
6. Determine percent of slope
7. Determine land area
8. Use the hand level
9. Read legal land descriptions
10. Lay out foundations, footings, and batter boards

G. Climate and Zonation

1. Match terms and definitions associated with climate and plant zones
2. List the factors which influence weather
3. Explain plant hardiness and the importance of it in choosing plants for landscaping
4. Select appropriate plants for various landscaping conditions and considering climate
5. Demonstrate the ability to determine climate zone and develop a landscape plan for a given area

H. Lawn Site Quality and Preparation

1. Identify common lawn tools and the safety practices associated with them
2. Demonstrate the ability to prepare a lawnsite for proper drainage
3. Develop an irrigation plan for a lawn site
4. Demonstrate the ability to prepare a proper seedbed
5. Develop an overall plan for a lawn, protecting valuable natural features, to enhance property value

AG. 340 APPLIED GREENHOUSE AND NURSERY MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

I. Maintaining Lawns

1. Describe how to properly water a lawn
2. Explain what happens when a newly seeded lawn has too much traffic
3. Describe the use of weed killers on a newly seeded lawn
4. Describe the mowing schedule of a newly seeded lawn
5. List the types of equipment for lawn mowing
6. Describe what each type of fertilizer does for a lawn
7. Develop a fertilizer schedule for a lawn
8. Identify common lawn problems
9. Select the qualities of a good and poor lawn
10. Demonstrate the ability to aerate a lawn
11. List the maintenance practices for lawns

J. Identification and Control of Turf Grass Pests

1. List the common diseases of turf grass
2. Describe the symptoms of various turf diseases
3. List the preventative management practices to avoid turf grass diseases
4. Identify the common insect pests harmful to lawns
5. Identify the common lawn diseases
6. Match the damage to the lawn with the pest responsible
7. Match the pests with the control measures for each
8. List the reasons for controlling weeds in lawns
9. Identify the common turf grasses used in the northwest and their specific area of advantage
10. List the management practice used in controlling lawn weeds

K. Pot Chrysanthemum Production

1. Name four holidays when chrysanthemums are in demand
2. Match the description of the bloom characteristics with the proper term
3. Explain the term "week group" and their importance in mum production
4. Describe how to promote vegetative growth throughout the year
5. Describe how to promote flower bud initiation throughout the year
6. List the proper steps for potting chrysanthemums
7. List the recommended temperature periods for producing high quality chrysanthemums
8. Explain the proper watering practices for chrysanthemums at various stages of growth
9. Recommend a fertilizer schedule for potted mums
10. Identify as true or false statements regarding pinching and disbudding
11. Describe the best stage of growth for selling mums
12. Demonstrate the ability to properly pot mums

AG. 340 APPLIED GREENHOUSE AND NURSERY MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

L. Poinsettia Production

1. Match terms and definitions associated with poinsettia production
2. List the factors to coincide when choosing a poinsettia cultivar
3. Name the popular varieties of poinsettias
4. List the lighting schedule for producing a poinsettia crop to be sold on December 15
5. Describe how to pot up poinsettia cuttings
6. Demonstrate the ability to pot up poinsettia cuttings
7. Explain the differences between automatic, semi-automatic and hand watering of poinsettias
8. Recommend a fertilizer schedule for poinsettias
9. Select true statements regarding temperature effects on poinsettias
10. List the types of pinches and when they should be performed
11. Explain how to control the height of poinsettias through the use of chemical growth retardants
12. List the proper packing and shipping practices for poinsettias
13. List the directions for home care of poinsettia plants

M. Easter Lily Production

1. List the lily cultivars that are used for forcing
2. List the proper steps in propagating lilies
3. Describe the relationship between bulb size and flower count
4. Explain the reason for pre-cooling bulbs and determine the proper cooling schedule for Easter lilies
5. Describe the proper soil mix for lilies
6. List the steps in planting a bulb
7. Develop a fertilizer schedule for Easter lilies
8. Explain the proper watering practices for lilies
9. Select factors affecting the timing of a lily crop
10. Describe what happens to the lily stem under greenhouse conditions and how to correct this problem
11. List the steps that can be taken to control the height of Easter lilies
12. Explain the proper packing and shipping practices for both cut and potted lilies
13. Demonstrate the ability to properly pot lily bulbs

AG. 340 APPLIED GREENHOUSE AND NURSERY MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

N. Floral Design

1. Match terms and definitions associated with floral design
2. List the types of containers which can be used in floral design
3. Select basic materials that are normally used for fresh flower arrangements
4. Select basic materials normally used for dried or silk flower arrangements
5. Discuss the proper use of color in floral design
6. List the basic color schemes used in floral design
7. Use a color wheel to determine combinations for various color schemes
8. Discuss the concepts of form, line, space, texture, and color
9. Discuss the use of symmetry and balance in an arrangement
10. List the sequence of procedure of planning a design
11. Select the types of floral designs
12. Explain the use of decorative accessories in floral designs
13. List the plant materials commonly used in floral arrangements and how to procure the materials
14. Demonstrate the ability to develop various types of floral arrangements for retail sale, based on cost of materials and labor
15. Demonstrate the ability to develop arrangements based on special themes, such as birthday, holiday, or anniversary
16. Evaluate flowers and potted plants for quality
17. Discuss storing and caring for cut flowers
18. Identify tools and equipment used in floral design

O. Hydroponics

1. Match terms and definitions associated with hydroponics
2. Select factors involved in growing plants hydroponically
3. List the types of media used in hydroponic gardening
4. Describe how to properly apply water to the media
5. List the advantages and disadvantages of several hydroponic watering systems
6. List the major, minor, and trace elements in a nutrient solution
7. Demonstrate the ability to make stock solutions of nutrients
8. Describe the insect and disease problems pertaining to hydroponics
9. Identify the proper temperatures and humidities for hydroponics
10. Select materials used in the construction of a hydroponic system

AG. 340 APPLIED GREENHOUSE AND NURSERY MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

P. Gardening

1. Locate a desirable garden site at home
2. Determine the size of garden a family of four would need
3. Plan a garden layout based on suggested planting groups
4. Select vegetable varieties based on family preference, geographies, and vegetable seed availability
5. Estimate cost and return of a home garden
6. Determine the proper time to prepare garden soil for crops
7. Demonstrate the ability to prepare garden soil with usual cultural practices
8. Demonstrate the ability to properly plant a garden
9. Demonstrate the ability to transplant vegetables from flats and hot beds
10. List proper garden irrigation methods
11. List the common garden fertilization methods

Q. Horticulture Tools, Equipment, and Machinery

1. Match terms and definitions associated with horticulture tools
2. List the general rules for choosing garden tools
3. List the kinds of shovels
4. Name the kinds of hoes
5. Identify as true or false statements about hoes
6. List the kinds of shears
7. Name the kinds of spading forks and two uses of each
8. List some special tools used in horticulture
9. Select preventive maintenance techniques for horticulture tools
 10. List the kinds of equipment used in horticulture and landscaping
11. Name the tractor implements used in horticulture applications

R. Electrical Controls and Sensing Devices

1. Identify types of controls by nomenclature and use, including thermostats, humidistats, photoelectric cells, magnetic relays, timers, pressure switches, and time delay equipment
2. Set controls, such as timers and switches, for the desired performance
3. Use low voltage electrical control equipment
4. Interpret wiring diagrams
5. Select controls for electric motors from supply catalogs
6. Connect, start, and stop magnetic motor controllers
7. Install a timer circuit
8. Install a thermal delay relay control
9. Install a low voltage motor control system
10. Install switch control for starting 115 & 230 volt motors
11. Install a sensing device such as thermostat, humidistat, photoelectric cell, etc.

AG. 340 APPLIED GREENHOUSE AND NURSERY MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

S. Salesmanship

1. Match terms and definitions associated with salesmanship
2. Describe how to be a service to the customer
3. Explain how to use persuasion in closing a sale
4. Discuss the necessity to educate the customer before proceeding in the sales process
5. Discuss how vital sales are in the American system of economy
6. List the steps in making a sale

AG. 350 FORESTRY AND WILDLIFE MANAGEMENT

COURSE DESCRIPTION: A course designed to examine the importance of forestry, wildlife, and outdoor recreation with emphasis on efficient use of natural resources.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Introduction to Forestry	94
The Forests	235
Identify Idaho Trees and Forest Plants	376
Forest Surveying	141
Forest Land Location	94
Tree Measurements	94
Log Scaling	141
Remote Sensing in Forestry	117
Pine Tree Grading	94
Plot Cruising	141
Point Sampling	141
Silvicultural Systems	141
Marking Timber	141
Seeding and Planting	188
Timber Stand Improvement	141
Harvesting Timber	94
Fire Fighting	94
Prescribed Burning	141
Forest Protection	141
Forest Business Methods	94
Importance of Wildlife Management	94
History of Wildlife and Fish Management	141
Ecological Concepts	235
Identify Wildlife and Fish Species	235
Management of Wildlife and Fish Populations	470
Natural Resources for Outdoor Recreations	118
Career Opportunities	94
TOTAL MINUTES	4,230

AG. 350 FORESTRY AND WILDLIFE MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

A. Introduction to Forestry

1. Match historical events with their major dates and people involved
2. List the federal and state agencies involved in management of forests
3. Describe how the forest industry operates in Idaho
4. Identify the location of National Forests in Idaho
5. Describe how private sector forestry plays its part in Idaho forestry
6. List the steps necessary to enter forestry training at the university level in the Northwest
7. Identify the size relationship of forestry to other agriculture industries in Idaho
8. List various types of forest products processed and manufactured in Idaho
9. Identify uses that a forest has other than the production of timber
10. Describe other cultural and environmental influences of forests
11. Describe the duties and responsibilities of one forestry related career
12. Select the types of Cedar products that are produced in Idaho
13. Identify types of forestry career training programs in the northwest

B. The Forests

1. Match terms associated with tree growth and forests
2. List the main parts of a tree including crown, trunk and root system
3. Describe the photosynthetic process of a tree
4. List the 2 kinds of wood formed in an annual ring of diameter growth
5. Classify trees according to size, crowns, and stands
6. Identify the six forest regions of the United States

C. Identify Idaho Trees and Forest Plants

1. Match terms associated with identifying trees and plants to their correct definition
2. Distinguish between the characteristics for angiosperms and gymnosperms
3. Label the parts of a simple leaf
4. Name the types of veins in a leaf
5. Label leaf shape and margins
6. Identify leaf arrangements
7. Identify evergreens based on needle, cone, and bark
8. Identify various species of forest plants
9. Identify the various reproductive systems as to sexual or asexual

D. Forest Surveying

1. Identify common forest surveying tools and equipment
2. Match terms and definitions associated with forest surveying
3. List the methods to find horizontal distance
4. List the types of tapes used in forest surveying
5. Arrange the steps in chaining horizontally and along slopes
6. Describe how to measure around obstacles with a tape
7. List the essential parts and accessories of a compass
8. Use a compass to obtain directions

AG. 350 FORESTRY AND WILDLIFE MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

D. Forest Surveying (cont.)

9. Describe how to find magnetic declination
10. Find true azimuths and bearings for magnetic angles
11. List the guidelines to follow when reading a compass
12. Demonstrate pacing skill
13. Demonstrate ability to use a clinometer to measure slope
14. Demonstrate how to set magnetic declination on a compass
15. Convert slope distance to horizontal distance
16. Demonstrate the proper use of a hip chain

E. Forest Land Location

1. Match terms and definitions associated with land location
2. Select the methods of land survey systems
3. Match subdivisions of a rectangular survey to a map
4. Determine the number of acres from a legal description
5. Locate and label the principle base line and meridian for Idaho
6. List the types of witness markings
7. List items of entry found in survey notes
8. List the locations where survey notes can be found
9. Locate points from a given legal description
10. Write the legal description for a given point

F. Tree Measurements

1. Classify trees as to form
2. Match terms associated with tree measurements
3. Classify tree diameters correctly when given exact measurements
4. Identify and properly use common equipment used for determining tree heights
5. Identify and properly use common equipment used for determining tree diameter
6. Select the proper volume table for different tree species and form classes
7. Properly use volume tables to determine standing tree volume given tree height, diameter, form class, and species

G. Log Scaling

1. Match terms and definitions associated with log scaling
2. List commonly used log rules
3. List the parts of a scale stick
4. List the steps in scaling a log
5. Identify the types of defects for logs
6. Demonstrate the use of the Scribner decimal C log rule to determine the gross and net volume of logs

H. Remote Sensing in Forestry

1. Identify the uses of aerial photographs for forestry
2. Identify the different types of aerial photographs
3. Identify equipment used with aerial photograph interpretation
4. Use aerial photograph stereo pairs to determine land formations, cover types, and tree heights

AG. 350 FORESTRY AND WILDLIFE MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

I. Pine Tree Grading

1. Match terms and definitions associated with pine tree grading
2. Choose the reasons trees are graded
3. List the common tools used to find upper stem diameters
4. List the procedure to establish tentative log grades
5. List the defects that degrade a log
6. Demonstrate ability to measure log height, measure upper stems, and grade trees

J. Plot Cruising

1. Match terms and definitions associated with plot cruising
2. Select the commonly used plot forms and sizes
3. State commonly used plot sizes based on plot radii
4. List the methods of determining cruise intensity
5. Select the methods of planning a sampling layout
6. List the steps for conducting a plot cruise
7. Distinguish between advantages and disadvantages of plot cruising
8. Demonstrate the ability to complete a plot cruise layout
9. Demonstrate the ability to determine sawtimber and pulpwood volumes per acre using the plot cruising method

K. Point Sampling

1. Match terms and definitions associated with point sampling
2. Select other names for point sampling
3. Diagram an illustration of point sampling
4. Identify the tools used for point sampling
5. Select the principles used to determine BAF
6. Match commonly used BAF's to the correct angle size
7. State the rule to use PRF
8. Match commonly used BAF to the correct PRF
9. Select the proper uses of a prism
10. State the rules for determining the number of points to use in a point sampling cruise
11. Demonstrate the ability to complete a point sample layout
12. Demonstrate the ability to determine sawtimber volume per acre using the point sampling method

L. Silvicultural Systems

1. Match terms and definitions associated with silvicultural systems
2. Name the types of reproduction methods that can be used
3. Select the principles of selection method
4. Name the characteristics used in selecting harvest trees
5. Identify various species of Christmas trees
6. Describe the cultural practices used for a Christmas tree crop
7. Compare the management systems used for even age and uneven age management

AG. 350 FORESTRY AND WILDLIFE MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

M. Marking Timber

1. Identify equipment used for marketing timber
2. Match terms and definitions associated with marking timber in thinnings
3. Match methods and definitions for thinning
4. Select the most commonly used methods of marking timber
5. Arrange the priorities for marking trees in a thinning
6. Select the correct factors for crown spacings
7. Select the reasons for removing diseased trees and snags

N. Seeding and Planting

1. Match terms and definitions associated with seeding and planting
2. Name the sources for seed and seedlings
3. Name the types of seedling packaging
4. Select the correct procedures for the care of seedlings for transport
5. Describe the ways of storing seedlings for long and short term periods
6. Select the factors for seedling spacing
7. Identify the tools and methods used in hand planting
8. Describe the time to collect conifer cones
9. Describe the procedures for seed treatment before seeding
10. Match seeding applications to methods of seeding
11. Identify the planting zones for each tree species
12. Identify the requirements needed for certified tree seed

O. Timber Stand Improvement

1. Match terms and definitions associated with timber stand improvement
2. Select the correct classifications of intermediate cuttings
3. Select the correct methods of cleaning, liberation, and recommendations for improvement
4. List the agents of damage that require salvage cutting
5. Select the factors influencing pruning
6. Identify tools and equipment for herbicide application
7. Describe the needs and uses for sanitation cutting

P. Harvesting Timber

1. Match term and definitions associated with harvesting timber
2. List factors associated with location and accessibility of a timber stand
3. Identify correct procedures used in felling and bucking timber
4. Identify tools and equipment associated with harvesting timber
5. Select the correct uses of various types of equipment
6. Identify safety procedures for harvesting timber
7. Describe the correct procedures for skidding, loading, and hauling timber
8. Demonstrate the ability to design skid trails, access roads, and skyline corridors
9. Demonstrate the proper use and maintenance skills for a chain saw

AG. 350 FORESTRY AND WILDLIFE MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

Q. Fire Fighting

1. Match terms and definitions associated with fire fighting
2. Name the elements of the fire triangle
3. Name the purposes of fire control organizations
4. Select the means of fire prevention
5. Name the classes of fire
6. Name the methods of fire attack
7. Name the methods of crew organization using hand tools
8. Identify the tools used in fire fighting

R. Prescribed Burning

1. Identify the tools used for prescribed burning
2. Match terms and definitions associated with prescribed burning
3. Select the reasons for prescribed burning
4. Select the most desirable wind direction and velocity
5. List the range of preferred relative humidity and the effects of temperature change on humidity
6. Name the desired range of temperatures for prescribed burning
7. Identify an anemometer and a psychrometer
8. List the steps of a pruning plan
9. Select the factors that determine the type of fire techniques to be used in a prescribed burn
10. Demonstrate the ability to determine weather factors related to burning
11. Demonstrate the ability to determine the prescribed pruning technique to be used

S. Forest Protection

1. Match terms and definitions associated with forest protection
2. List the reasons for identifying pest damage
3. Match the symptoms and causes for damage
4. Identify common insect pests in Idaho forests
5. Identify diseases prevalent in northwest forests
6. Match the problems with the control factors for pests such as insects, diseases, livestock, big game, and rodents for Idaho forests

T. Forest Business Methods

1. Match terms and definitions associated with forest business methods
2. List the categories of records necessary in a forestry business
3. List the basic items necessary in a timber sale
4. Arrange the steps in a bidding procedure
5. Select the elements of an offer
6. Select the items that might result in the termination of an offer
7. Identify the parts of a contract compliance
8. Inspect a timber sale for contract compliance
9. List the components of a timber sale appraisal

AG. 350 FORESTRY AND WILDLIFE MANAGEMENT
UNITS OF INSTRUCTION AND OBJECTIVES

- U. Importance of Wildlife Management
 - 1. Understand the ecological benefits of wildlife
 - 2. Understand the economic benefits of wildlife
 - 3. Identify the aesthetic benefits of wildlife
- V. History of Wildlife and Fish Management
 - 1. Identify historical aspects of wildlife management
 - 2. Identify the historical development of fish management
- W. Ecological Concepts
 - 1. Understand ecosystems
 - 2. Understand carrying capacity and population effects
- X. Identify Wildlife and Fish Species
 - 1. Examine animal species, including fur bearers
 - 2. Identify fish species (fresh and salt water)
 - 3. Identify fowl species
 - 4. Identify exotic game
- Y. Management of Wildlife and Fish Populations
 - 1. Explore water, food and cover requirements of wildlife
 - 2. Examine and develop habitats for wildlife production
 - 3. Discuss the management of wildlife populations
 - 4. Discuss the management of fish populations
- Z. Natural Resources for Outdoor Recreations
 - 1. Identify recreational enterprises
 - 2. Identify methods of developing recreational enterprises
 - 3. Discuss the management of recreational enterprises
 - 4. Review state and federal policies concerning recreational activities
- AA. Career Opportunities
 - 1. Identify career opportunities in wildlife management
 - 2. Identify career opportunities in outdoor recreation management

AG. 410 PERSONAL SKILL DEVELOPMENT

COURSE DESCRIPTION: A comprehensive course in developing agricultural leadership, citizenship, and cooperation. It includes topics in personal development, employee/employer relations, and group and individual interpersonal communications skills.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Discuss Personal Development	282
Introduction and Review of the FFA	470
Leadership Skills Development	705
Leadership Through Parliamentary Procedure	705
Leadership Through Public Speaking	705
Personality and the Individual	235
Applying For A Job	235
Labor Relations and Management	188
Relationships on the Job	235
Human Relations in Leadership and Management	235
Stress Management	235
TOTAL MINUTES	4,230

**AG. 410 PERSONAL SKILL DEVELOPMENT
UNITS OF INSTRUCTION AND OBJECTIVES**

- A. Discuss Personal Development
 - 1. Develop a positive self concept
Develop social skills
Project a professional image
- B. Introduction and Review of the FFA
 - 1. List, explain and/or recite the following FFA materials needed to become an FFA member:
 - a. a short history of the FFA
 - b. creed
 - c. motto
 - d. colors
 - e. emblem
 - f. kinds of membership
 - g. aims and purposes
 - h. the FFA salute
 - i. dress code
 - j. wearing the FFA jacket
 - k. code of ethics
 - l. receiving the Greenhand Degree
 - 2. Describe how to have a good chapter including:
 - a. planning-key to good meetings
 - b. how to take part in chapter meetings
 - c. what constitutes a chapter program of activities
 - 3. List and describe skills necessary to become a chapter leader
 - 4. List and describe FFA awards available to members
 - 5. Identify FFA contests available to members
 - 6. List the requirements for earning the Chapter, State, and American FFA Degree
- C. Leadership Skills Development
 - 1. Demonstrate skills necessary to be an officer in organizations
 - 2. Demonstrate skills in meeting and/or introducing others
 - 3. Demonstrate proper skills in presenting a good self image to the public
 - 4. Demonstrate communication skills using telephones, letter, memos, and verbal conversation
 - 5. Demonstrate skills necessary to work on committees effectively and efficiently
 - 6. Evaluate characteristics of a good citizen
 - 7. Participate in community service project

**AG. 410 PERSONAL SKILL DEVELOPMENT
UNITS OF INSTRUCTION AND OBJECTIVES**

D. Leadership through Parliamentary Procedure

1. Describe why parliamentary procedure improves a meeting
2. Write the order of business for meetings
3. Identify and demonstrate the purpose and use of the gavel
4. Identify and demonstrate the steps necessary to bring up and dispose of business properly
5. Identify and list motions according to purpose and precedence
6. Demonstrate the ability to conduct a business meeting

E. Leadership through Public Speaking

1. List and describe reasons why public speaking skills are important
2. List the types of speeches and explain how they are used
3. Demonstrate public speaking abilities by selecting, researching, developing, and delivering speeches
4. Demonstrate the ability to lead a discussion group
5. Demonstrate the ability to be a good listener

F. Personality and the Individual

1. Distinguish among interest, aptitude, and ability
2. Differentiate between a mental aptitude and a physical aptitude
3. Write the definition of personality
4. List the sources of personality--genetic and environmental
5. Discuss why personality traits are important for success on the job
6. Design an program to improve your interpersonal skills
7. Distinguish between an optimist and a pessimist
8. Evaluate your attitudes by completing an attitudinal inventory
9. Identify and describe twelve qualities that people most admire in other
10. Demonstrate common courtesies
11. Develop a personal time management plan

G. Applying for a Job

1. List five employment qualifications
2. Compare your employment qualifications with the qualifications needed for five occupations
3. List twelve different sources of job opportunities
4. Demonstrate how to fill out an application form accurately and completely
5. Prepare a letter of application and resume for a job
6. Be familiar with the components of a personal data sheet
7. Present orally the purposes of an interview and how to prepare for an interview

**AG. 410 PERSONAL SKILL DEVELOPMENT
UNITS OF INSTRUCTION AND OBJECTIVES**

H. Labor Relations and Management

1. Describe important characteristics for an effective employer/employee relationship from each point of view
2. List five basic human needs that affect how people perform in a job
3. Describe an orientation program for employees
4. Select criteria for an effective incentive plan
5. Describe the workman's compensation program in Idaho as it relates to fanning and other agribusiness
6. Select characteristics of unemployment insurance in Idaho
7. Describe the procedure for legally employing aliens
8. Describe reporting requirements for federal and state taxes and FICA
9. Prepare a job description for an agricultural occupation

I. Relationships on the Job

1. List and discuss attitudes which an employer desires in employees
2. List and discuss attitudes an employee desires in an employer
3. Discuss at least three factors which are necessary for good relationships among co-workers
4. Identify the major causes of co-worker relationship problems
5. List and discuss five advantages and five disadvantages of unions and professional organizations
6. Develop a set of criteria an employer could use for promoting an employee
7. List and explain the duties and responsibilities of a job supervisor
8. Describe the various methods of terminating a job

J. Human Relations in Leadership and Management

1. Discuss the meaning of self-concept
2. Compare the four models depicting human behavior
3. Discuss Maslow's Hierarchy of *Needs*
4. List the different types of leaders
5. Compare the characteristics of the different types of leaders
6. Define management
7. List the five resources to be used by a manager
8. Describe the five functions of management:
 - a. planning
 - b. organizing
 - c. coordinating
 - d. divesting
 - e. controlling

K. Stress Management

1. Describe the impact of intergenerational relationships on stress
2. List factors which contribute to stress
3. List positive and negative responses to stress
4. List resource agencies to contact for stress advice/consultation

AG. 460 AGRIBUSINESS MANAGEMENT AND MARKETING

COURSE DESCRIPTION: A course designed to introduce the student 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.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Agricultural Careers	188
Agricultural Safety Management	282
Basics of Agribusiness Management	235
Government Organizations Affecting Agriculture	94
Basic Economic Principles	376
Agricultural Credit	188
Agricultural Records	470
Budgeting	141
Cash Flow	94
Machinery and Equipment Management	235
Taxes	141
Insurance	188
Marketing	235
Purchasing	141
Agricultural Law	188
Real Property Ownership	141
Estate Planning	188
Decision Making	235
Using Computers	470
TOTAL MINUTES	4,230

AG. 460 AGRIBUSINESS MANAGEMENT AND MARKETING
UNITS OF INSTRUCTION AND OBJECTIVES

A. Agricultural Careers

1. Identify and describe careers in agriculture
2. Describe how to prepare for a career in agriculture
3. Describe the career opportunities available in agriculture
4. Develop and survey the agricultural careers in the community
5. Conduct a survey of a specific agribusiness occupation
6. Compare agricultural careers to non-agricultural careers

B. Agricultural Safety Management

1. Match terms associated with agricultural safety management to their correct definitions
2. List in decreasing order of importance the three factors which contribute to accidents
3. Describe managements responsibility in safety
4. List sources of safety information
5. Describe steps in developing a safety plan or checklist
6. Describe how to train a new worker so that safety precautions are observed
7. List examples of personal protective equipment recommended for safety
8. Describe how to prepare for an emergency
9. Describe safety practices that should be followed for livestock
10. Describe safety practices that should be followed for machinery
11. Select safety practices that should be followed when storing materials
12. Develop and carry out a safety plan
13. Develop an emergency plan for a farm, agribusiness or school shop
14. Demonstrate how to safely use a piece of equipment and how to follow the safety plan

C. Basics of Agribusiness Management

1. Describe agribusiness management
2. Distinguish among the main characteristics of individual proprietorships, partnerships and corporations
3. Select the characteristics of a cooperative
4. Design a partnership agreement

D. Government Organizations Affecting Agriculture

1. Identify and describe the primary agencies involved with agriculture and the services they provide
2. List the major objectives of the United States Department of Agriculture
3. List the methods used by the government to support prices
4. Describe the primary service provided by the Soil Conservation Service
5. List the primary government agencies involved with agricultural credit
6. Describe the services provided by the Cooperative Extension Service
7. Describe the creation, purpose and funding of the agricultural commodity commissions

AG. 460 AGRIBUSINESS MANAGEMENT AND MARKETING
UNITS OF INSTRUCTION AND OBJECTIVES

E. Basic Economic Principles

1. Describe the basic economic factors that affect farm and agribusiness management decisions
2. Select the basic beliefs of capitalism
3. Write the main characteristics of pure competition
4. List the functions of money
5. Describe how supply and demand affect prices
6. List factors that affect prices other than supply and demand
7. Describe the reasons price cycles occur
8. Distinguish among supplementary, complementary, competitive and independent enterprises
9. List the advantages of diversification and specialization

F. Agricultural Credit

1. Discuss the role of credit in agriculture
2. Define two specific kinds of credit
3. List factors to consider in selecting a source of credit
4. Match sources of credit to a list of advantages and disadvantages
5. List factors affecting repayment capacity
6. Distinguish among various types of assets and liabilities
7. Select factors that affect cost of credit
8. Determine the true annual interest rate
9. Calculate interest expense
10. Determine net worth and solvency ratio

G. Agricultural Records

1. List reasons for keeping records
2. Distinguish between the two methods of accounting
3. Describe the two basic systems of keeping books
4. Describe, complete and use inventory and depreciation schedules
5. Distinguish among the straight-line, declining balance, and sum-of-the-years digit methods of calculating depreciation, and government regulations
6. List the purposes of an inventory
7. Describe the use of the computer for agricultural record keeping

H. Budgeting

1. List the purposes of budgeting
2. List the different types of budgets
3. Arrange in order the steps in developing a budget
4. Distinguish between fixed and operating costs
5. Demonstrate the ability to complete an enterprise budget for an agribusiness

AG. 460 AGRIBUSINESS MANAGEMENT AND MARKETING
UNITS OF INSTRUCTION AND OBJECTIVES

I. Cash Flow

1. Describe the components of a cash flow statement
2. Describe benefits of cash flow planning
3. List methods for altering cash flow
4. Complete a cash flow statement

J. Machinery and Equipment Management

1. List ways machinery can be obtained
2. Select general rules concerning field efficiency
3. Distinguish between types of costs of machinery ownership
4. Calculate estimated salvage value of a machine
5. Calculate estimated fixed cost, repair cost, fuel and lubrication, and variable cost for a machine
6. Calculate overall cost per acre for farm machinery
7. List ways preventive maintenance can help get the most out of your equipment
8. Describe economic advantages of preventive maintenance
9. Identify factors for economical and safe machine operation
10. Describe the most basic rule of safety

K. Taxes

1. Describe the purposes of taxes
2. Describe the purposes of tax planning
3. List records and information helpful for tax management
4. Describe time requirements in income tax payment
5. Distinguish between taxable and non-taxable items
6. List deductible business expense
7. Describe types of tax credits

L. Insurance

1. Write the basic purpose of insurance
2. List the types of insurance
3. List three questions to answer in deciding whether to insure against a loss
4. Describe the types of health insurance
5. Distinguish between the two basic types of life insurance
6. Select times that influence the cost of property insurance

AG. 460 AGRIBUSINESS MANAGEMENT AND MARKETING
UNITS OF INSTRUCTION AND OBJECTIVES

M. Marketing

1. Describe key factors involved in marketing
2. Describe types of markets
3. Describe the importance of grades and standards
4. List characteristics of price cycles
5. List factors affecting product quality and price
6. List points to consider when forward contracting
7. Distinguish between hedging and speculation
8. Select characteristics of the futures market
9. Develop a marketing plan for a commodity
10. Describe purpose and function of local markets

N. Purchasing

1. List advantages and disadvantages of purchasing new versus used equipment
2. List advantages and disadvantages of leasing
3. List factors involved with leasing and renting land or equipment
4. List procedures in leasing public domain land
5. List factors to consider in purchasing seed, fertilizer, fuel, repairs, and other services
6. List the types and benefits of professional purchasing services
7. Select among purchasing new equipment, purchasing used equipment, leasing equipment and using custom services

O. Agricultural Law

1. Identify major agricultural laws and their purposes
2. List the purposes and components of a lease
3. Describe the characteristics of common fence law
4. Describe the steps in establishing and maintaining water rights
5. Describe the steps in establishing and maintaining mineral rights
6. List the characteristics regarding liability laws in agriculture
7. Describe health and safety regulations governing agriculture
8. Describe the property rights of agricultural landowners

P. Real Property Ownership

1. Describe the purposes of the legal instruments involved in real property ownership
2. List the types of real property descriptions
3. Demonstrate the procedure of describing real property
4. List the reasons for appraising land and buildings
5. Compare methods of purchasing real property
6. List the factors to consider when purchasing real property
7. List the types and components of rental agreements
8. Identify factors necessary to determine real property values

AG. 460 AGRIBUSINESS MANAGEMENT AND MARKETING
UNITS OF INSTRUCTION AND OBJECTIVES

Q. Estate Planning

1. Describe the importance of estate planning
2. List the major estate planning laws
3. Describe how the types of property ownership affects estate planning
4. Describe the procedures necessary to transfer property
5. Identify the required records for property transfer
6. List the components of a will
7. List the laws which govern property transfer
8. Compare the cost of property transfer

R. Decision Making

1. Describe the management-decision process
2. Write a justification in developing an office
3. Describe the benefits of a microcomputer in making decisions
4. List the personnel resources available to assist decision making
5. List the publications one can obtain to assist decision making
6. Describe the latest systems available for marketing crops or livestock

S. Using Computers

1. Enter the following on the computer:
 - a. inventories
 - b. budgets
 - c. cash flow statement
 - d. financial statement
 - e. daily journal records
2. Demonstrate how the computer will determine efficiency factors and management decisions
3. Demonstrate the ability to use:
 - a. word processing
 - b. spreadsheets
 - c. data bases
 - d. electronic mail

AG. 470 AGRICULTURAL SALES

COURSE DESCRIPTION: A course designed to develop skills in preparing, developing, and practicing agribusiness sales competencies. The skills learned are necessary to gain and maintain employment in the wholesale/retail agriculture sales field.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Selling: An Overview	490
Preparing to Sell: The Preapproach	540
Developing Sales Skills: The Steps of a Sale	1520
Selling: Special Skills Needed	1270
Selling: Your Future	410
TOTAL MINUTES	4230

AG. 470 AGRICULTURAL SALES
UNITS OF INSTRUCTION AND OBJECTIVES

A. Selling: An Overview

1. Introduction to Selling

- a. Explain the importance of selling in your personal life.
- b. Demonstrate the attitude that selling is assisting the customer.
- c. List three phases of our economy.
- d. Describe the contribution of selling to our country.
- e. Describe the importance of the customer to a business.

2. The Salesman and Human Relations

- a. List functions performed by a salesperson.
- b. Define the difference between a salesperson and an order taker.
- c. Describe customer oriented selling.
- d. Demonstrate personality traits of a good salesperson.
- e. Analyze your personality.
- f. Describe what customers expect of salespeople.
- g. Describe what employers expect of salespeople.

3. The Buying and Selling Process.

- a. List five stages of the customer's buying process.
- b. List seven steps of a sale.
- c. Describe selling techniques used in each step of the sale.
- d. Describe the importance of customer empathy

B. Preparing To Sell: The Preapproach

1. Your Customer

- a. Describe the importance of the customers to your business.
- b. Describe treating customers as friends.
- c. Describe what influences customers before they make a purchase.
- d. List wants and needs of customers.
- e. List different types of customers.
- f. Describe customers moods.
- g. List five customer buying decisions.

2. Customer Buying Motives

- a. Describe what motivates customers to buy.
- b. List seven most common buying motives.
- c. Explain why a customer shops at a particular store.
- d. Describe the importance of buying motives in every sale.
- e. Explain how to appeal to the customer's strongest buying motives.

AG. 470 AGRICULTURAL SALES
UNITS OF INSTRUCTION AND OBJECTIVES

3. Product Information
 - a. Discuss benefits of product or service knowledge.
 - b. Explain what to learn about your products or services.
 - c. Identify sources of product information.
 - d. Describe how to present product information.

- C. Developing Sales Skills: The Steps of a Sale
 1. The Approach
 - a. Discuss the importance of the approach.
 - b. Demonstrate how to welcome the customer.
 - c. Demonstrate how to take control of the sales presentation.
 - d. Demonstrate how to introduce yourself and learn the customers name.
 - e. Select and use the appropriate customer approach.
 - f. Describe how to get the sale off to a good start.

 2. Determining Customer Needs and Wants
 - a. Describe how to observe customers.
 - b. Demonstrate how to observe and listen to customers reactions.
 - c. Discuss how to ask well - chosen questions.
 - d. Develop effective use of listening skills.
 - e. Describe how to select the right product to show the customer.
 - f. Define customer's buying motives.
 - g. Discuss buying signals.

 3. Planning A Feature - Benefit Sales Presentation
 - a. Describe the importance of planning a sales presentation.
 - b. Demonstrate how to plan a sales presentation.
 - c. Describe the difference between a feature - benefit and a buyer benefit.
 - d. List common types of buyer benefits.
 - e. Demonstrate use of the formula: Feature & Performance = buyer benefits.
 - f. Describe how to translate product features into buyer benefits.

 4. Making A Feature - Benefit Sales Presentation
 - a. Begin a sales presentation by asking qualifying questions
 - b. Describe how to get your customer's opinion.
 - c. Describe how to check customer's understanding.
 - d. Describe how to determine customer's buyer benefits.
 - e. Demonstrate presenting the products features as buyer benefits.
 - f. Discuss involving your customer in the sales demonstration.
 - g. Describe how to appeal to your customer's senses.
 - h. Demonstrate how to handle the product properly.

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5. Handling Customer Objectives
 - a. Demonstrate welcoming customer objections.
 - b. Describe the necessary attitude to accept objections from customers.
 - c. List differences between an excuse and a real objection.
 - d. Describe how to listen to customer objections.
 - e. Demonstrate skill in pausing before answering customer objections.
 - f. Describe empathy for your customer.
 - g. Demonstrate answering customer objections.
 - h. Describe how to check customer's reactions to your response.
 6. Closing The Sale
 - a. Discuss how to make the buying decision seem easy for the customer.
 - b. Describe how to narrow the customer's product choice.
 - c. Demonstrate how to ask the customer to buy using an appropriate closing technique.
 - d. Identify customer buying signals.
 - e. Demonstrate giving a trial close.
 - f. Demonstrate providing reassurance to the customer after closing the sale.
 - g. Describe importance of analyzing unsuccessful closings.
 7. Suggestion Selling And Reassurance
 - a. Describe why suggestion selling is important.
 - b. Describe how suggestion selling increases the business profit.
 - c. Demonstrate suggesting related items, merchandise, or larger quantities.
 - d. Discuss using trade-up selling skills.
 - e. Demonstrate the suggested item.
 - f. Demonstrate providing reassurance to the customer.
- D. Selling: Special Skills Needed
1. Sales Forms and Transactions
 - a. Describe importance of sales forms.
 - b. Describe information to put on a sales form.
 - c. Demonstrate how to prepare a sales form using an organized routine.
 - d. List mistakes to avoid when completing sales forms.
 - e. List types of sales and non-sales transactions.
 2. Cash Register Operation and Handling Money
 - a. Describe importance of a cash register.
 - b. List features of the cash register keyboard.
 - c. Demonstrate operation of the cash register.
 - d. Discuss establishing a cash register routine.
 - e. Demonstrate general change-making procedure.
 - f. Discuss preparing a change fund and balance the cash register.

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3. Store Losses
 - a. Recognize the methods of shoplifting.
 - b. Discuss how to apprehend a shoplifter.
 - c. Identify money manipulating schemes.
 - d. Describe how to prevent money manipulators from stealing.
 - e. List causes of other store losses.
 - f. Describe procedures that help prevent employee thefts.
 4. Sales-Supporting Skills
 - a. List sales-supporting duties performed by salespeople.
 - b. Describe the importance of a neat and clean store.
 - c. Describe the purpose of window and interior displays.
 - d. Discuss rules of building displays.
 - e. Describe ways of developing product knowledge.
 - f. Demonstrate how to handle a customer complaint.
 - g. Discuss planning work using a "to do" list.
 5. Telephone Selling
 - a. List advantages of telephone selling over person-to-person selling.
 - b. Discuss planning an effective telephone sales presentation.
 - c. List steps of a telephone sales presentation.
 - d. List common buying motives.
 - e. Complete an effective telephone sales presentation.
 - f. Demonstrate how to overcome customer objections in a telephone sales presentation.
 - g. Develop an effective closing for a telephone sales presentation.
- E. Selling Your Future
1. Improving Your Selling Skills
 - a. Describe how to evaluate your sales personality.
 - b. Identify personal strengths and weakness.
 - c. Evaluate your ability to:
 1. approach customers
 2. qualify your customers
 3. ability to give a feature-benefit sales presentation
 4. handle customer's objections
 5. close the sale
 6. use suggestion and customer reassurance

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2. Career Opportunities in Selling
 - a. List three major types of businesses that employ salespeople.
 - b. Define difference between personal selling and self-service selling.
 - c. Define difference between the major types of retail stores.
 - d. List types of job opportunities in wholesale selling.
 - e. List types of job opportunities in manufacturer's selling.
 - f. Describe benefits of a career in selling.

3. How To Get A Selling Job
 - a. Take an honest look at your qualifications by listing them.
 - b. Discuss sources for finding a job.
 - c. Complete resumes and letters of application.
 - d. Complete an application form.
 - e. Prepare for an interview.
 - f. Sell yourself in an interview.
 - g. Describe the importance of the follow-up.
 - h. Describe how to succeed in a new job.

AG. 510 BOTANY\PLANT AND SOIL SCIENCE

COURSE DESCRIPTION: A course designed to examine soil and plant relationships that affect the production of food and fiber. Topics include soils, plants, plant ID, and plant pests.

OF INSTRUCTION	MINUTES OF UNITS INSTRUCTION
Elementary Study of Soils	470
Soil Fertility	375
Soil Conservation	235
Introduction to Plant Science	141
Plant Anatomy	470
Plant Processes	470
Plant Growth and Development	423
Plant Identification	304
Weed Pests of Plants	72
Insect Pests of Plants	235
Plant Diseases	235
Biotechnology	235
Careers in Plant and Soil Science	235
TOTAL MINUTES	4,230

AG. 510 BOTANY\PLANT AND SOIL SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

A. Elementary Study of Soils

1. Select from a list the reasons why soils are important
2. Discuss the function of soil as it relates to plant growth, development, and maintenance
3. Select factors that affect soil formation
4. List the four physical properties of soil
5. Identify soil particles according to size, and discuss what methods are used to determine soil texture
6. Identify five kinds of soil structure
7. Match the terms indicating soil color and depth with their correct descriptions
8. Label an illustration showing the different layers of a soil profile
9. Discuss how acidity and alkalinity effect the soil and methods of correcting pH problems

B. Soil Fertility

1. Match primary and secondary nutrients to their correct function for plant growth
2. Match plant nutrients to their correct deficiency symptoms
3. Select from a list factors that influence the use of fertilizers
4. List four sources of plant nutrients
5. Match dry, liquid, and gaseous fertilizers with their correct description and use
6. Calculate problems comparing fertilizer cost by comparing cost per pound of nutrients
7. Discuss methods and procedures involved in collecting a representative soil sample
8. Complete a soils test report form, and make fertilizer recommendations from the soil test analysis
9. Identify and discuss methods of fertilizer application

C. Soil Conservation

1. List the types of soil erosion
2. Select from a list factors that influence soil erosion
3. Describe the four categories of water erosion
4. Select conservation practices that reduce soil erosion
5. List mechanical and cropping practices used to reduce water erosion
6. Select from a list factors that determine cropping system to use
7. List three organizations involved with soil conservation

D. Introduction to Plant Science

1. List the necessities of life that are furnished by plants
2. List the major crops grown in the U.S.
3. List the crops of Idaho ranking them by production and compare that relationship to other states in the U.S.
4. Classify plants as cereal, root crop, tree crop, pulse oil seed, or forage crop
5. Match the percentage of land use in the U.S. and Idaho with its correct use
6. Match common crops of Idaho with their average yields
7. List factors that affect crop production
8. Discuss the purpose of the Crop Reporting Service and the Idaho Crop Improvement Association

AG. 510 BOTANY\PLANT AND SOIL SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

E. Plant Anatomy

1. List the primary parts of a plant and their functions
2. List the parts of a cell and describe their functions
3. Discuss the types of tissues found in a plant

F. Basic Plant Processes

1. List the important plant processes in food manufacture and growth
2. Explain why photosynthesis is an important process
3. Explain the chemical process of photosynthesis
4. List factors that affect photosynthetic rate
5. Explain the chemical process of respiration
6. Distinguish between the characteristics of photosynthesis and respiration and describe their relationship
7. Explain transpiration and list factors that affect transpiration rate
8. Explain osmosis and the process of absorption by plant roots

G. Plant Growth and Development

1. List the stages of plant growth and development
2. Describe the requirements for good seed germination
3. List factors that cause poor seed germination
4. Identify two types of root systems
5. Label a drawing showing the parts of a plant stem
6. Match stem modifications with correct descriptive term
7. List conditions affecting the vegetative growth of plants
8. Discuss asexual and sexual reproduction in plants
9. Label a drawing showing the parts of a complete flower
10. Match types of flowers to their correct botanical description
11. List methods of pollination

H. Plant Identification

1. Discuss the system of plant classification
2. Identify the parts of simple and compound leaves
3. Name the types of leaf arrangement, venation and margins
4. Identify the types of leaf attachment to the stem
5. Identify the parts of a stem
6. List the types of stem modifications with their correct description
7. Identify the parts of a perfect flower
8. Identify the types of inflorescences

AG. 510 BOTANY\PLANT AND SOIL SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

I. Weed Pests of Plants

1. Identify common plants of economic impact to Idaho
2. Discuss weed competition and losses caused by weeds
3. Discuss how weeds spread
4. Discuss methods of cultural, mechanical, chemical and biological weed control

J. Insect Pests of Plants

1. List ways that insects cause losses in plants
2. Select from a list beneficial effects of insects
3. Identify the three regions of an insect body
4. Describe the way an insect feeds on plants
5. Label a drawings showing the life cycles of various insects
6. Discuss the importance of economics in relation to plant insect control
7. Select from a list cultural, biological, and chemical control practices for insects
8. List the classifications of insecticides
9. Identify the insects having an economic impact on Idaho agriculture

K. Plant Diseases

1. Identify by names, symptoms, and causal agents the diseases that have an economic impact on Idaho crops
2. Describe the life cycles of diseases
3. Describe the ways and means diseases are spread
4. Describe growing conditions and cultural practices favorable to common diseases
5. Describe preventative measures for diseases
6. Describe cultural and chemical control measures for diseases

L. Biotechnology

1. Describe the technique of transferring genetic material into a chromosome
2. Discuss the improvements made through genetic engineering to the plant industry
3. Explain how tissue culture is used for plant development

M. Careers in Plant and Soil Science

1. Explore the careers that are available in plant and soil science
2. List the requirements of gaining and keeping employment in the field of plant and soil science

AG. 512 BOTANY\SCIENCE OF PLANT GROWTH AND DEVELOPMENT

COURSE DESCRIPTION: A course designed to examine the importance of plant cell structure, functions of cells, plant processes, nonvascular plants, vascular plants, roots, stems, leaves, flowers and reproduction of plants.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Organisms	141
Cell Structure	329
Function of Cells	329
Dividing Cells	423
Plant Processes	470
Nonvascular Plants	235
Vascular Plants	329
Vegetative Plant Parts	611
Reproductive Plant Parts	329
Vegetative Plant Growth	423
Reproductive Plant Growth	611
TOTAL MINUTES	4,230

AG. 512 BOTANY\SCIENCE OF PLANT GROWTH AND DEVELOPMENT
UNITS OF INSTRUCTION AND OBJECTIVES

A. The Organisms

1. List the groups found in the classification system and classify a plant using the classification system
2. Describe the kingdoms and the types of organisms found within each kingdom
3. List the phylums of the plant kingdom

B. Cell Structure

1. Identify the parts of the plant cell and the functions of each
2. Identify the parts of the animal cell and the functions of each
3. Distinguish the difference between plant and animal cells
4. List three specialized cells found within the plant and determine how they differ from the basic plant cell

C. Functions of Cells

1. Identify the composition of protoplasm
2. Describe the importance of energy to the functioning of the cell and where the energy is found within the cell
3. Discuss the compounds formed in the cell and the functions of each of these compounds to the cell

D. Dividing Cells

1. Identify the parts of the cell dealing with cell division
2. Describe the importance of genes and chromosomes to cell division
3. Describe the process of mitosis
4. Describe the process of meiosis

E. Plant Processes

1. List the important plant processes in food manufacture and growth
2. Explain why photosynthesis is an important process
3. Explain the chemical process of photosynthesis
4. List factors that affect photosynthetic rate
5. Explain the chemical process of respiration
6. Distinguish between characteristics of photosynthesis and respiration
7. Explain transpiration and list factors that affect transpiration rate
8. Explain osmosis and the process of absorption by plant roots
9. Discuss the process of conduction

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UNITS OF INSTRUCTION AND OBJECTIVES

F. Nonvascular Plants

1. Classify the major phyla of nonvascular plants
2. Explain how algae differ from land plants
3. List the plant parts commonly found on nonvascular plants
4. Discuss the importance of nonvascular plants to the plant world
5. Explain the methods of reproduction in nonvascular plants

G. Vascular Plants

1. Label the parts common to all vascular plants
2. Discuss the advantages of a vascular plant to a nonvascular plant
3. List the methods of reproduction in a vascular plant

H. Vegetative Plant Parts

1. List the primary parts and functions of the vegetative plant
2. Identify the parts of the leaf and functions of the leaf
3. Label a drawing showing the parts of a plant stem
4. Describe the functions of plant stems
5. Match stem modification with correct descriptive terms
6. Identify the parts of the root and the functions of each part
7. Describe the two types of root systems
8. Describe the two types of vascular systems found in the vegetative plant

I. Reproductive Plant Parts

1. List the primary parts of the reproductive system and the functions of each part
2. Identify the parts of the flower
3. Describe the functions of the flower parts
4. Define what a fruit is and list the tissue layers of the fruit
5. Describe two main types of fruits
6. Label a drawing showing the parts of a seed
7. Describe the functions of the seed parts

J. Vegetative Plant Growth

1. List the stages of plant growth and development
2. List the conditions affecting the vegetative growth of plants
3. Discuss the nutrients needed for proper plant growth
4. Explain the relationships between reproductive and vegetative plant growth
5. Describe the three processes involved in vegetative growth

AG. 512 BOTANY\SCIENCE OF PLANT GROWTH AND DEVELOPMENT
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K. Reproductive Plant Growth

1. Discuss sexual and asexual reproduction in plants
2. List the different types of reproductive growth
3. List the methods of pollination
4. Discuss the difference between pollination and fertilization
5. Explain the development of the seed
6. Describe the steps in seed germination
7. List the requirements for good seed germination
8. List the factors that cause poor seed germination
9. Diagram the vegetative and reproductive stages of plant growth as it relates to the plant life cycle

AG. 514 BOTANY\HORTICULTURE PLANT SCIENCE

COURSE DESCRIPTION: A course that prepares students to produce greenhouse/nursery plants and to maintain plant growth and propagation structures.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Elementary Study of Soils	470
Organic Matter	141
Potting Soil and Media	94
Soil Fertility	376
Organic Fertilizers	94
Plant Growth and Development	235
Basic Plant Processes	235
Plant Growth Regulators	141
Seed Selection	235
Seeding in Flats	141
Care and Transplanting of Seedlings	235
Introduction to Asexual Plant Propagation	235
Propagation by Cuttings	141
Propagation by Layering and Division	141
Propagation by Budding	141
Propagation by Grafting	141
Plant Identification	376
Plant Pests	423
Plant Disease Identification and Control	235
TOTAL MINUTES	4,230

AG. 514 BOTANY\HORTICULTURE PLANT SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

A. Elementary Study of Soils

1. List the reasons that soils are important
2. Discuss the functions of soil as related to plant growth, development, and maintenance
3. Select factors that affect soil formation
4. List the four physical properties of soil
5. Identify soil particles according to size, and discuss what methods are used to determine soil texture
6. Identify five kinds of soil structure
7. Match terms indicating soil color and depth with their correct descriptions
8. Label an illustration showing the different layers of a soil profile
9. Discuss how acidity and alkalinity effect the soil and methods of correcting pH problems

B. Organic Matter

1. Match terms and definitions associated with organic matter
2. List the importance of organic matter to plant production
3. List the factors affecting the rate of organic matter decomposition
4. List the basic ways in which nutrients obtained from organic matter affect the soil
5. Identify the factors that cause the loss of organic matter from soil
6. Name the types of organic matter which can be applied to soil
7. List the purposes of mulches
8. Select the organic and inorganic mulches that are available
9. Select the factors to consider when choosing mulching material

C. Potting Soil and Media

1. List the reasons for variation in types of soils
2. Discuss how root zone affects the availability of plant nutrients
3. Select plants tolerant to various pH ranges
4. Test soils for pH levels
5. Develop a chart of planting media with the characteristics of each media
6. List several soil mixes identifying media data for each soil mix
7. Identify the correct fertilizers to add for various soil mixes
8. Sterilize a potting soil mix

D. Soil Fertility

1. List the primary and secondary plant nutrients and describe the function of each for plant growth
2. Match nutrients to their correct plant deficiency symptoms
3. Select from a list factors that influence the use of fertilizers
4. List four sources of plant nutrients
5. Match dry, liquid, and gaseous fertilizers with their correct description and use
6. Calculate problems comparing fertilizer cost by comparing cost per pound of nutrients
7. Discuss methods and procedures involved in collecting a representative soil sample
8. Complete a soils test report form, and make fertilizer recommendations using the test analysis data
9. Identify and discuss methods of fertilizer application

AG. 514 BOTANY\HORTICULTURE PLANT SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

E. Organic Fertilizers

1. Match terms and definitions associated with organic fertilizers
2. List sources of soil organic matter
3. Identify how the soil temperature, aeration, moisture, and reactions affect the rate of decomposition or organic matter
4. Discuss the value of humus and an organic fertilizers to soil fertility and plant growth
5. Describe how organic matter is produced
6. List the functions of growing a crop to produce organic matter
7. List the types of manures that can be produced
8. Select other sources of organic fertilizers
9. List the disadvantages of organic fertilizers
10. Demonstrate the ability to construct a compost pile

F. Basic Plant Processes

1. List the important plant processes in food manufacture and growth
2. Explain why photosynthesis is an important plant process
3. Explain the chemical process of photosynthesis
4. List factors that affect photosynthetic rate
5. Explain the chemical process of respiration
6. Distinguish between photosynthesis and respiration characteristics
7. Explain transpiration and list factors that affect transpiration rate
8. Explain osmosis and the process of absorption by plant roots
9. Label the parts of a common plant cell and describe the function of each part

G. Plant Growth and Development

1. List the stages of plant growth and development
2. List requirements for good seed germination
3. List factors that cause poor seed germination
4. List the primary parts of and functions of a plant
5. Identify two types of root systems
6. Label a drawing showing the parts of a plant stem
7. Match stem modifications with correct descriptive term
8. List conditions affecting the vegetative growth of crop plants
9. Discuss asexual and sexual reproduction in plants
10. Label a drawing showing the parts of a complete flower
11. Match types of flowers to the correct botanical description
12. List methods of pollination

AG. 514 BOTANY\HORTICULTURE PLANT SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

H. Plant Growth Regulators

1. Match terms and definitions associated with plant growth regulators
2. List the environmental factors that influence plant growth
3. List the ways hormones influence plant growth
4. Select statements that describe the effects of photoperiod on plant growth
5. Name the photoperiod responses
6. Explain how plants respond to day length
7. Select statements that either describe how to shorten or lengthen the day for plants
8. List the techniques for physical control over plant growth
9. Identify as either true or false reasons for using chemical growth regulators
10. List the biological factors that affect plant growth
11. List the controllable plant growth processes
12. List the effects of chemicals on plant growth
13. Identify the effects of growth regulators on plants
14. List the important chemical growth regulator groups
15. Describe statements as true or false as they relate to how auxins, gibberellins, kinins, dormins, or ethylenes affect plant growth and development
16. Select statements that describe plant responses attributed to auxins
17. List the uses of auxins
18. List the important commercial uses for plant growth regulators

I. Seed Selection

1. List factors to consider in selecting high quality seed
2. Discuss conditions that exist when good seed is not selected
3. List and describe the certifiable seed classes
4. List information required on certified seed tags
5. Discuss types and purposes of seed treatments
6. Discuss procedures to follow in handling and storing seed
7. Calculate the value of pure live seed

J. Seeding in Flats

1. Match terms and definitions associated with seeding in flats
2. List the materials from which flats can be made
3. List the advantages and disadvantages of using flats for propagating
4. List the advantages and disadvantages of starting seedlings inside flats
5. List the steps for seeding in flats
6. List the information that should appear on the label of a flat after it has been planted
7. Describe the procedure to follow after seeds have germinated in a flat
8. Demonstrate the ability to build a flat and plant seeds in it

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UNITS OF INSTRUCTION AND OBJECTIVES

K. Care and Transplanting of Seedlings

1. Match terms and definitions associated with care and transplanting of seedlings
2. Describe how to care for young seedlings
3. List the types of transplanting pots that are available
4. List the factors to consider when choosing plant containers
5. Describe the procedures to follow when transplanting seedlings
6. List the steps of transplanting seedlings
7. Describe how to harden seedlings
8. Demonstrate the ability to transplant seedlings properly

L. Introduction to Asexual Plant Propagation

1. Match terms and definitions relating to asexual plant propagation
2. List the methods of asexual plant propagation
3. List the reasons for using asexual propagation
4. Select cuttings that require leaves and cuttings that do not require leaves
5. List the main types of propagating by layering and the requirements for layering
6. Describe propagation by division
7. List the methods of propagating by budding
8. List the methods of grafting

M. Propagation by Cuttings

1. Match terms and definitions associated with propagation by cuttings
2. List treatments made to cuttings before placing them in rooting media
3. List the basic kinds of plant wounding
4. Explain the use of hormone treatment on cuttings
5. Describe why storage and callusing are used with hardwood cuttings
6. Demonstrate the ability to make various types of wounds on cuttings
7. Demonstrate how to treat a cutting with hormone
8. Demonstrate the ability to store and callus plant cuttings
9. Demonstrate the propagation of a coleus stem cutting
10. Demonstrate a leaf bud cutting
11. Demonstrate a root cutting

N. Propagation by Layering and Division

1. List the advantages and disadvantages of propagation by layering
2. List the types of layering
3. Identify the steps in transplanting layering plants
4. Demonstrate how to propagate by tip, simple, and air layering
5. Name the types of plants propagated by division
6. List the steps in divisional propagation
7. Demonstrate propagation by division of perennials and bulbous plants

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UNITS OF INSTRUCTION AND OBJECTIVES

O. Propagation by Budding

1. Match terms and definitions associated with propagation by budding
2. List the types of budding
3. List the techniques used when propagating by budding
4. List the precautions to be used with T-budding
5. Describe patch budding and list the variations of patch budding
6. Demonstrate the ability to T-bud and patch bud

P. Propagation by Grafting

1. Match terms and definitions associated with propagation by grafting
2. List the reasons for using grafting
3. Discuss the limitations of using grafting
4. List the sequence of making a union graft
5. List the functions of the callus tissue
6. List the types of grafting that are used when the diameter of the stock and scion are similar, and when the diameter of the stock is greater than the scion
7. Describe the qualities of a grafting wax
8. List the basic functions of grafting wax
9. List the basic kinds of grafting waxes
10. Demonstrate the ability to perform the basic types of plant grafts

Q. Plant Identification

1. Discuss the system of plant classification
2. Identify the parts of simple and compound leaves
3. Name the types of leaf arrangement, venation and margins
4. Identify the types of leaf attachment to the stem
5. Identify the parts of a stem
6. Match stem modifications with their correct description
7. Identify the parts of a perfect flower
8. Identify the types of inflorescences
9. Identify common plants of economic impact to Idaho

AG. 514 BOTANY\HORTICULTURE PLANT SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

R. Plant Pests

1. Match terms and definitions associated with plant pests
2. List the basic methods of weed control
3. Discuss weed competition and losses caused by weeds
4. Discuss how weeds spread
5. Discuss methods of cultural, mechanical, chemical and biological weed control
6. Identify the factors of a weed control program
7. Select statements as they apply to non-selective and selective herbicide compounds
8. Identify as true or false statements relating to pre-emergence and post-emergence weed control treatments
9. List ways that insects cause losses in plants
10. List beneficial effects of insects
11. Identify the three regions of an insect body
12. Match the way an insect feeds on plants with the correct description
13. Label drawings showing the life cycles of various insects
14. Discuss the importance of economics in relation to plant insect control
15. Select from a list cultural, biological, and chemical control practices for insects
16. Match classifications of insecticides to their correct description
17. Identify the insects having an economic impact on Idaho agriculture

S. Plant Disease Identification and Control

1. Identify by name, symptoms, and causal agents of diseases of that have economic impact on Idaho crops
2. Describe the life cycles of diseases
3. Describe the ways and means diseases are spread
4. Describe growing conditions and cultural practices favorable to common diseases
5. Describe preventative measures for diseases
6. Describe cultural and chemical control measures for diseases

AG 516 BOTANY\FORESTRY SCIENCE

COURSE DESCRIPTION: A course designed to introduce students to the biological, environmental and ecological concepts encountered in a temporal forest environment.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Life and Structure of Woody Plants	470
Naming and Classifying Woody Plants	470
Forest Zones of the United States	188
Dendrology of Idaho Tree Species	282
Forest Tree Variability and Diversity	188
Solar Radiation	188
Temperature	188
Atmospheric Moisture and Other Factors	188
Climate	188
Soil	188
Nutrient Cycle	235
Soil-Plant-Water Cycle	235
Fire Effects	235
Forest Animals	235
Forest Succession	188
Disturbance Factors (Forest Protection)	188
Spatial Variation in the Forest	188
The American Forest Since 1600	188
TOTAL MINUTES	4,230

AG. 516 BOTANY\FORESTRY SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

A. Life and Structure of Woody Plants

1. Identify reproduction methods of woody plants
2. Describe sexual reproduction methods and structures of woody plants
3. Describe asexual reproduction methods and structures of woody plants
4. Explain how woody plants grow
5. Identify the parts of a tree and their functions
6. Identify different tree forms

B. Naming and Classifying Woody Plants

1. Match terms and definitions associated with plant classification
2. Describe different classification systems of living things
3. Identify levels of botanical classification system
4. Demonstrate the ability to use the taxonomic key to identify common forest plants

C. Forest Zones of the United States

1. Identify six major forest vegetation zones of the U.S.
2. Describe climatic and vegetation characteristics of the major U.S. forest zones

D. Dendrology of Idaho Tree Species

1. Match the scientific name to the common names of Idaho trees
2. Identify Idaho tree species based on tree characteristics
3. Match the tree species to the elevations and areas that they are found in Idaho
4. Describe special adaptations of each tree species to environmental hazards such as drought, fire, disease, and insects

E. Forest Tree Variability and Diversity

1. Describe the evolutionary sequence of forest trees
2. Identify the components of phenotypic variation
3. Identify sources of variation
4. Explain patterns of gynecological differentiation
5. List examples of gynecological differentiation

F. Solar Radiation

1. Match terms associated with solar radiation with their definition
2. Explain how sunlight is important to development of trees
3. Discuss how trees react to various levels of sunlight
4. Identify different types of light and their importance to tree and forest plant growth

AG. 516 BOTANY\FORESTRY SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

G. Temperature

1. List the effects of latitude, altitude and topographic position on forest temperature
2. Describe temperature differences at the soil surface and within the forest
3. Explain temperature effects on plant growth
4. Describe cold injury to plants

H. Atmospheric Moisture and Other Factors

1. Match terms associated with moisture with their definition
2. Explain how water vapor is exchanged between the plant and the atmosphere
3. Describe the effects of different forms of moisture on the forest
4. Identify geological variation in precipitation
5. Describe the importance of carbon dioxide to trees
6. Explain the effects of wind and pollutants on the forest
7. Describe what causes lightning and its effects on the forest

I. Climate

1. Match the climate classification systems to their names
2. Describe how climate influences forests and how forests influence climate
3. Explain how human activities modify the climate

J. Soil

1. Identify forest soils by their parent material
2. Match forest soil classifications to their descriptions
3. Describe methods by which forest soils are transported
4. Identify physical properties of forest soils
5. Explain the different forest soil profile developments
6. Describe the effect of topographic position on soils

K. Nutrient Cycle

1. Diagram nutrient cycles of the forest
2. Explain nutrient uptake in trees
3. Describe effects of nutrients on tree growth
4. Describe how nutrients are lost to or locked up in the forest system

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L. Soil-Plant-Water Cycle

1. Identify the importance of forests as a source of water
2. Diagram the Soil-Plant-Water cycle
3. Explain how trees control transpiration
4. Describe how water deficits affect tree growth
5. Describe the relationship between precipitation and distribution of forests
6. Explain how human activities in the forest affect water yield

M. Fire Effects

1. Match the types of fires with their descriptions
2. Identify the ways that fire can damage trees and forests
3. Identify the causes of fires
4. Explain how tree species have adapted to fire

N. Forest Animals

1. Identify the kinds and abundance of forest animal species
2. Explain the interrelationships between animals and the forest
3. Identify plant defense adaptations against animals
4. Explain how different animals cause tree damage
5. Describe the impact of large animals on the forest site

O. Forest Succession

1. Identify the stages of forest succession
2. Define forest succession
3. Describe primary succession
4. Explain the concept of climax
5. Describe why a forest is always changing

P. Disturbance Factors (Forest Protection)

1. Identify the common methods of forest destruction
2. Explain the role of catastrophic devastation in the forest ecosystem
3. Describe how destruction changes the composition of the forest

Q. Spatial Variation in the Forest

1. Explain the concept of a forest community
2. Describe spatial continuity of the forest community
3. Define discrete and merging forest communities

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- R. The American Forest Since 1600
1. Identify the characteristics of the presettlement forest
 2. List contemporary observers of American forests
 3. Describe how human activity has changed the forests
 4. Compare the American forests to European forests

Ag. 517 BOTANY/ADVANCED FORESTRY SCIENCE

(TO BE INSERTED AT A LATER DATE)

AG. 518 BOTANY\ RANGE SCIENCE

COURSE DESCRIPTION: A course designed to acquaint students with principles of conservation, natural resources, ecology, and range science.

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A History of Conservation in the United States	188
Principles of Ecology: Ecosystem Structure	235
Principles of Ecology: Ecosystem Function	235
Principles of Ecology: Ecosystem Balance and Imbalance	235
Concept of Natural Resources	188
Introduction to Range Science	235
History and Policies of Range Science Before 1934	235
History and Policies of Range Science After 1934	235
Range Classification	470
Range Ecology and Physiology	470
Range Inventories	940
Carrying Capacities	235
Range Improvement	141
TOTAL MINUTES	4,230

AG. 518 BOTANY\ RANGE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

A. Our Natural Resources Then and Now

1. Match terms associated with natural resources with their definitions
2. Define and discuss the concept of natural resources
3. List and describe the major categories of natural resources in America
4. Explain what makes something a natural resource
5. Explain why nature's resources once seemed limitless, and why this is no longer true
6. Describe how the usefulness of a natural resource change over time, and what factors most effect their usefulness
7. Identify the land area of the United States, indicating how much is suitable for farming, and how much is suitable for crop production
8. Explain why there is a water shortage problem in this country
9. Indicate how many species of wild animals, birds, and fish have become extinct in this country since colonial times
10. Diagram the forested area of this country 300 years ago compared to today, and explain how our smaller forest area produces more wood today
11. Explain what the direct or indirect source of most of our energy resources is
12. List our key mineral resources and what their known reserves are

B. A History of Conservation in the United States

1. Define terms associated with conservation of our natural resources
2. Compare exploitation, conservation, and preservation as they related to natural resources management
3. Outline the history of conservation in the United States
4. Describe the role of the federal government in conservation
5. Explain why Americans have had such wasteful practices in using our natural resources in the past
6. Discuss what would have happened to our fish and game animal populations if sport hunters and fisherman had not fought market hunters
7. Indicate who pays for wildlife conservation in this country
8. Explain what the Weeks Law of 1911 was, and why it was important
9. Explain the concept of a soil and water conservation district, and how it works
10. Explain how the federal government helped local farmers and other landowners work to solve their soil and water conservation problems
11. Explain why soil and water conservation is a federal concern
12. List the three needs that early water management efforts in America centered around

AG. 518 BOTANY\ RANGE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

C. Principles of Ecology: Ecosystem Structure

1. Define ecology and explain its subdivision structure
2. List the characteristics of all living organisms, describe the term irritability and give examples of irritability
3. Describe the process of evolution including the concepts of natural selection and adaption
4. Explain how genetic change could result in the major changes that occur in evolution and what role the environment plays in evolution
5. Define the term biosphere and explain why the biosphere is considered a closed system naming some closed systems
6. Define the term biome and explain what determines the type of vegetation in a biome
7. Define the term ecosystem and explain some common features of all ecosystems
8. Describe the abiotic components of the ecosystem and how these factors affect plant and animal life
9. Discuss the concept "range of tolerance"
10. Explain a limiting factor and tell what the limiting factor is in most terrestrial ecosystems
11. Discuss the terms niche and habitat
12. Discuss the statement: no two organisms can occupy the same niche in the same habitat
13. Explain an ecological equivalent and give an example

D. Principles of Ecology: Ecosystem Function

1. Explain a food chain, discussing the two major types of food chain, how they are different and how they are similar
2. Sketch several simple food chains and indicate all producers and consumers
3. Explain microconsumers and why they are important
4. Explain biomass and how it is measured
5. Discuss why biomass decreases as we ascend the food chain
6. Define the following terms: consumer, producer, trophic level and food web
7. Explain cellular respiration and why carbon dioxide is released during respiration in producers and consumers
8. Explain the implications of decreasing biomass in the food chain and how this affects the number of higher-level consumers
9. Define the terms gross primary productivity and net primary productivity, explaining the most productive regions of the earth and why or why not these can be tapped for food
10. Draw the carbon cycle, and describe what happens during the various parts of the cycle
11. Draw the nitrogen cycle and list organisms that fix atmospheric nitrogen and why this is critical to the operation of the nitrogen cycle
12. Draw and describe the phosphorus cycle
13. Define the following terms: predation, commensalism, mutualism, neutralism and competition, comparing them for similarities and differences

AG. 518 BOTANY\ RANGE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

E. Principles of Ecology: Ecosystem Balance and Imbalance

1. Describe ecosystem stability and give examples of stable ecosystems
2. If you were to examine a mature ecosystem over the course of 30 years at the same time each year, discuss why you would expect the number of species in the ecosystem and the population size of each of these species to be the same from year to year or not
3. Define inertia and resilience
4. Explain environmental resistance and the role it plays in population balance and ecosystem balance
5. Define the term species diversity and give evidence that species diversity affects ecosystem stability and any evidence contradicting this idea
6. Discuss a mature ecosystem and its major features
7. Describe temporary imbalances caused in ecosystems you are familiar with and how the ecosystem returns to normal
8. Explain succession and why one biotic community eventually is replaced by another during succession
9. Discuss a pioneer community
10. Discuss why environmental resistance changes during succession as one community is gradually replaced by another and in what ways human populations change environmental resistance and how that affects our population
11. Describe how introducing and removing competitors into an ecosystem can affect ecosystem stability and give examples
12. Discuss why it is necessary for humans to simplify their ecosystem and how it may be avoided and give some examples

F. Concepts of Natural Resources Management

1. Match the terms and concepts of natural resource management with their definitions
2. Explain the differences between nonexhaustible, renewable, and exhaustible natural resources
3. Discuss the concept of balance in natural ecosystems
4. Discuss the role of food chains in maintaining balanced ecosystems
5. Discuss the role of ecology in human efforts at natural resources management
6. Define an ecosystem
7. Define man's ecosystem
8. Discuss some ways that nature is balanced
9. Trace the human population level over the past 8000 years
10. Discuss differences between conservation and preservation

G. Introduction to Range Science

1. Define or describe the terms associated with range science
2. List and describe the various uses of range lands
3. Describe the most common limiting factor associated with rangelands
4. List the approximate amounts of rangeland in the world, the United States, and Idaho
5. Identify the regions or the states consisting of the most range land

AG. 518 BOTANY\ RANGE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

H. History and Policies of Range Science Before 1934

1. List the opportunities that the western ranges offered early pioneers
2. Describe the effects cattle and sheep had on rangelands from 1825 - 1886
3. Date and describe the following Acts that relate to range science:
 - a. Homestead Act
 - b. Timber Culture Act
 - c. Desert Land Act
 - d. Enlarged Homestead Act
 - e. Stock Grazing Homestead Act
 - f. Forest Reserve Act
 - g. Soil Erosion Service
4. Explain what happened to range management during World War I

I. History and Policies of Range Science After 1933

1. Date and describe why the Taylor Grazing Act was established
2. List the three goals of the Taylor Grazing Acts Administration
3. Date and describe why range inventories were taken
4. Explain what the BLM did to prevent over/grazing
5. Describe and explain commensurate and priority property
6. Explain why grazing permits were allocated
7. Define carrying capacity
8. Date and describe the major legislation that stimulated range restoration and management
9. Date and describe Land Adjustment and Utilization projects
10. Date and describe the Halogeton Control act

J. Range Classification

1. Summarize each type of physical range classification
2. Describe the range vegetation in Idaho as described by the Forest Service after 1911
3. List 10 of the 18 forage types that were designated to cover the western range region, by the Interagency Range Survey Committee
4. List the vegetation units occurring in Idaho, as described by Kuckler
5. Describe the best basis for obtaining uniformity in classification
6. Define or describe the terms associated with range classification
7. Summarize the vegetative features of each vegetative zone in Idaho

K. Grazing Systems

1. List and describe the four principles of a grazing system
2. List and describe the six objectives of a grazing system
3. Define the terms associated with grazing systems
4. Describe the five requirements of a successful grazing system
5. List and describe the advantages and disadvantages of the grazing systems presented

AG. 518 BOTANY\ RANGE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

L. Rangeland Ecology and Physiology

1. List and describe the three climatic factors
2. Define soil, soil texture, and soil structure
3. List the five soil forming factors
4. List and describe the two types of range soils
5. List and describe the four topographic factors and how they affect an ecosystem
6. Describe the three types of fire climax communities
7. List the entropic factors and describe their effects on the ecosystem
8. Indicate the best measure of sight capacity
9. List the four factors involved in the physical description of an ecosystem
10. Describe the two interactions within a plant community
11. Describe the three primary concerns in the management of an ecosystem or plant community
12. Define terms associated with range ecology
13. Describe the regression of plant cover
14. Describe physiological disturbance and composition change

M. Range Inventories

1. List and describe the four types of range inventories
2. Explain what is meant by primary and secondary site degradation
3. Explain what is meant by the terms range condition, and trend and how they are related
4. Describe a multiple use survey and its uses
5. Explain what a range appraisal is
6. List the five types of information provided by a range inventory
7. Explain the primary purpose of a range inventory
8. Describe the term sampling error and explain how it occurs and how it may be reduced
9. List and describe the factors that are included in a vegetational inventory
10. Describe plant dominance, its attributes, and how it is measured

N. Carrying Capacity

1. Explain what is meant by the term carrying capacity
2. List the factors that are used to determine the carrying capacity of a particular area
3. Explain the term proper use factor
4. Describe how an animal unit and animal unit month are measured
5. List the animal equivalents for common range wildlife
6. Describe limited stocking rate and how it is used
7. Explain range condition and trend assessment and how they are related
8. Explain condition classifications and how index ratings are used to assess them
9. Describe the difference between apparent trend estimates and true trends
10. Explain a climax condition is determined in a range community

AG. 518 BOTANY\ RANGE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

O. Range Improvement

1. Explain the two types of range improvements, indirect and direct
2. Explain the relationship between range management and range improvement
3. List the two ecological principles that range improvements must be based on
4. List and describe the seven reasons for range improvement
5. Identify those plants that are undesirable in a typical range community and explain the accepted measures used to control them

AG. 520 ECOLOGY\NATURAL RESOURCE SCIENCE

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Marine Fisheries	141
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Outdoor Safety	94
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Alternative Energy Sources	47
Metals and Minerals	94
TOTAL MINUTES	4,230

AG. 520 ECOLOGY\NATURAL RESOURCE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

A. Our Natural Resources Then and Now

1. Define terms associated with natural resources
2. Define and discuss the concept of natural resources
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4. Explain what makes something a natural resource
5. Explain why nature's resources once seemed limitless, and why this is no longer true
6. Describe how the usefulness of a natural resource change over time, and what factors most effect their usefulness
7. Indicate the land area of the United States, how much is suitable for farming, and how much is suitable for crop production
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9. Indicate how many species of wild animals, birds, and fish have become extinct in this country since colonial times
10. Indicated what the forested area of this country was 300 years ago, what it is today, and explain how it can be that our smaller forest area produces more wood today
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9. Explain the concept of a soil and water conservation district, and how it works
10. Explain how the federal government helped local farmers and other landowners work to solve their soil and water conservation problems
11. Explain why soil and water conservation is a federal concern
12. List the three needs that early water management efforts in America centered around

AG. 520 ECOLOGY\NATURAL RESOURCE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

C. Principles of Ecology: Ecosystem Structure

1. Define ecology and explain its subdivision structure
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11. Discuss the terms niche and habitat
12. Discuss the statement: no two organisms can occupy the same niche in the same habitat
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5. Discuss why biomass decreases as we ascend the food chain
6. Define the following terms: consumer, producer, trophic level and food web
7. Explain cellular respiration and why carbon dioxide is released during respiration in producers and consumers
8. Explain the implications of decreasing biomass in the food chain and how this affects the number of higher-level consumers
9. Define the terms gross primary productivity and net primary productivity, explaining the most productive regions of the earth and why or why not these can be tapped for food
10. Draw the carbon cycle, and describe what happens during the various parts of the cycle
11. Draw the nitrogen cycle and list organisms that fix atmospheric nitrogen and why this is critical to the operation of the nitrogen cycle
12. Draw and describe the phosphorus cycle
13. Define the following terms: predation, commensalism, mutualism, neutralism and competition, comparing them for similarities and differences

AG. 520 ECOLOGY\NATURAL RESOURCE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

E. Principles of Ecology: Ecosystem Balance and Imbalance

1. Describe ecosystem stability and give examples of stable ecosystems
2. If you were to examine a mature ecosystem over the course of 30 years at the same time each year, discuss why you would expect the number of species in the ecosystem and the population size of each of these species to be the same from year to year or not
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3. Discuss the concept of balance in natural ecosystems
4. Discuss the role of food chains in maintaining balanced ecosystems
5. Discuss the role of ecology in human efforts at natural resources management
6. Define an ecosystem
7. Define man's ecosystem
8. Discuss some ways that nature is balanced
9. Trace the human population level over the past 8000 years
10. Discuss differences between conservation and preservation

AG. 520 ECOLOGY\NATURAL RESOURCE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

G. Soil Characteristics

1. Define terms associated with soil characteristics
2. Outline the processes involved in soil formation
3. Describe a mature soil profile
4. Discuss the eight land capability classes
5. Define soil series and explain how those differ from land capability classes
6. List the major weathering forces
7. Discuss how parent materials differ from rocks and minerals
8. Give the main categories of parent material and define each
9. Differentiate between original tissue and humus, telling which gives topsoil its color
10. Tell how organic-matter content affects the soil
11. List and define six important physical properties of the soil

H. Soil Erosion

1. Define terms associated with soil erosion
2. Differentiate natural soil erosion from soil erosion caused by humans
3. List the main causes of accelerated soil erosion
4. List and define the major types of soil erosion
5. Explain geological erosion
6. Explain accelerated erosion
7. Discuss how humans cause accelerated erosion.
8. List and discuss three types of water-caused erosion

I. Controlling Erosion

1. Define terms associated with controlling erosion
2. Explain how land capability classes relate to wise soil use
3. Explain why soil erosion control should be important to everyone
4. List the most important thing we can do to control soil erosion
5. Describe the major sources of nonfarm soil erosion
6. Explain why nonfarm landowners should accept responsibility for soil erosion control on their land
7. Explain the relationship between mining or construction and erosion
8. Discuss the importance of conversion of land from farm to nonfarm use in this country and what this implies about the erosion problem
9. Explain why highway construction presents a special erosion problem
10. Discuss the need for erosion control and reclamation in strip mining operations
11. Describe some important techniques used in controlling agricultural and non-agricultural soil erosion

AG. 520 ECOLOGY\NATURAL RESOURCE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

J. Land-Use Planning

1. Define terms associated with land use planning
2. Explain why land-use planning is important to our ecosystems and to our economy
3. Differentiate between on-farmland-use planning and political land-use planning
4. Compare farming for immediate income and farming for long-term income as they relate to soil conservation
5. Explain why economic development for short-term profit can be damaging to the economy as a whole in terms of long-run soil erosion
6. Explain the most important part of the farm's conservation effort
7. Explain how fast farmland is being converted to nonfarm use in America
8. Explain how zoning regulations affect land use

K. Water Supply and Water Users

1. Define terms associated with water supply and water users
2. Explain the components of the hydrologic cycle
3. Explain the main water users
4. Identify and discuss the common types of irrigation systems
5. Give the three zones of groundwater supply
6. Describe how hydroelectric plants affect our environment
7. List common ways water is used in recreation
8. List five domestic uses of water

L. Water Pollution

1. Define terms associated with water pollution
2. Identify the three major water pollution groups
3. Explain the four major categories of industrial pollution
4. Explain the function of a cooling tower and cooling lagoon
5. List and explain the major agricultural pollutants
6. Explain the common water pollution control measures
7. Explain the "BOD" test, and what it measures
8. Explain why water control measures are difficult to implement

M. Waste Management

1. Define terms associated with waste management
2. Identify the three major groups of wastes
3. Explain how a septic system functions
4. Explain primary, secondary, and tertiary sewage disposal systems
5. Identify the main solid waste products
6. Explain the problem created by asbestos, mercury, and lead
7. Explain the main disposal methods commonly used
8. Describe the by-product of the waste disposal system and how it is used
9. List the automotive by-products creating the largest problem with waste disposal

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UNITS OF INSTRUCTION AND OBJECTIVES

N. Water-Use Planning

1. Define terms associated with water-use planning
2. Explain the principle water management techniques
3. Explain how to remove salt from water
4. Identify ways to reuse water
5. Explain how water runoff can be controlled in urban areas

O. Our Forests and Their Products

1. Define terms associated with forests and forest products
2. Explain the differences between commercial and noncommercial forests - between growing and mature forests
3. List and describe the major forest regions of the United States
4. Identify the parts of a tree and describe the functions of each part
5. Differentiate between pure and mixed forests - between even-aged and all-aged forests
6. Define forest canopy and explain the importance of shade tolerance in the canopy
7. Define a forest and tell why a clump of trees in a park is not a forest
8. Indicate how much forestland there is in the United States today and how much is commercial forest
9. Explain how a tree grows in length and in diameter
10. Explain annual rings and how scientists can "read" them
11. Define the following terms
 - a. shade tolerant
 - b. shade intolerant
 - c. dominant
 - d. co-dominant
 - e. intermediate
 - f. suppressed
 - g. pure forest
 - h. mixed forest
 - i. even-aged forest
 - j. all-aged forest

AG. 520 ECOLOGY\NATURAL RESOURCE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

P. Woodland Management

1. Define terms associated woodland management
2. Define the most common ways to measure wood
3. Describe the different methods of harvesting a stand of trees and explain the advantages and disadvantages of each
4. Explain why good woodland management is important to (1) the forest owner, (2) the neighbors of the forest owner, (3) the economy as a whole, and (4) you and me
5. Explain how a forest can grow faster if the trees are harvested
6. Describe the main methods used in forest regeneration
7. Tell how we can be getting more forest products from less forest and no more cut trees than we did in 1900
8. Explain the following: board foot, cubic foot, cord
9. Define diameter at breast height (dbh) and tell how it is measured
10. Explain why the height of a tree for sawtimber is measured in logs instead of feet
11. List five types of harvest cuttings
12. List and describe four methods of forest reproduction and give advantages and disadvantages of each
13. List and discuss the four steps in developing a forest management program

Q. Forest Enemies and Their Control

1. Define terms associated with forest enemies
2. Describe the major insect pests of our forests
3. Describe the most important disease problems of our forests
4. Outline other enemies of the forest
5. Outline woodland management techniques for controlling forest insect problems, disease problems, and problems caused by other forest enemies
6. List and describe the types of damage insects cause to trees
7. List and describe the four categories of forest insect control measures
8. Explain management steps that a forest owner can take to help prevent forest disease problems
9. Explain how wildlife damage the forest
10. Identify when grazing is a problem in the forest
11. Explain how we can help to cut down on environmental damage to forestland

R. Fire!

1. Define terms associated with fire
2. List and describe some of the most destructive forest fires in United States history
3. Draw and explain the fire triangle
4. Explain how fire can be used as a positive tool in woodland management
5. Describe the anatomy of a typical forest wildfire
6. Explain how fire fighters find and attack a forest wildfire
7. Identify the main causes of forest fires in the United States
8. List and describe the three types of forest fires
9. List some techniques being used in the prevention of forest fires

AG. 520 ECOLOGY\NATURAL RESOURCE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

S. Fish and Wildlife in America

1. Define terms associated with fish and wildlife
2. Explain the difference between extinct and endangered species of wildlife
3. Discuss endangered mammals, birds, and fish species
4. Explain how various species of animals became extinct
5. Define wildlife
6. Using fur trapping as an example, explain how humans have caused the extinction of wildlife
7. Explain how each of the following became endangered
 - a. passenger pigeon
 - b. Carolina parakeet
 - c. heath hen
 - d. labrador duck
 - e. bighorn sheep
 - f. polar bear
 - g. key deer
 - h. wolf
 - i. mountain lion
 - j. whooping crane
 - k. bald eagle
 - l. ivory-billed woodpecker
 - m. prairie chicken

T. Game Management

1. Define terms associated with game management
2. Identify the habitat requirements of wildlife
3. Discuss the difference between an euryphagous and stenophagous animal
4. Explain the most commonly accepted methods of game management
5. Explain how an individual landowner can employ game management techniques
6. Discuss major legislation affecting game management
7. Explain the difference between home range and territory
8. Explain how a woodland should be managed to increase game populations
9. Discuss how wildlife is coordinated with other natural resources
10. Discuss the advantages and disadvantages of hunting
11. Explain how controlling predators helps manage game
12. Differentiate between carrying capacity and population density
13. Discuss what the private landowner can do to increase game in an area
14. Discuss the agencies that the private landowner can contact to get technical assistance in game management procedures
15. Discuss the six major laws concerning game management and what these laws have accomplished

AG. 520 ECOLOGY\NATURAL RESOURCE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

U. Marine Fisheries Management

1. Define terms associated with marine fisheries management
2. List and explain the ways the ocean is zoned
3. Discuss the types of ocean water movements, including waves, tides, and currents
4. Know the characteristics of marine fish, marine shellfish, and marine mammals
5. Explain the characteristics of the estuarine ecosystem
6. Discuss how the ocean can be artificially cultivated
7. Explain how salinity is measured
8. Explain the role of plankton in the biological ocean
9. Explain the life cycle of the salmon
10. Explain what is meant by:
 - a. bait fishing
 - b. long-lining
 - c. purse seining
11. Explain the life cycle of the shrimp, oyster and lobster
12. Explain the life cycle of the whale
13. Explain modern whaling techniques

V. Freshwater Fishery Management

1. Define terms associated with freshwater fishery management
2. Explain the zones of the lake and the habitat of each
3. Discuss the uses and management of a farm pond
4. List the characteristics of the common freshwater fish
5. Explain the main management procedures for freshwater fisheries
6. Describe the habitat requirements of largemouth bass, bluegill, and channel catfish, rainbow and cutthroat trout
7. Explain the common fish sampling techniques
8. Explain why you would want to fertilize a lake
9. Describe how fishing regulations are determined
10. Indicate the best temperature for fish production
11. Indicate at what pH level fish grow best
12. Explain how it is determined if the water is too muddy to produce fish

W. Recreation on Public Lands

1. Define terms associated with recreation on public land
2. Discuss the recreational possibilities on public land
3. Explain the federal government's main natural resource and recreation programs
4. Explain how our public lands are misused and abused
5. Explain why there has been an increase in recreational activities in recent years
6. Describe how the national parks are classified
7. List the national parks located in your state
8. Explain the system of island trusts
9. Explain which type of national trail does not allow motorized vehicles and which does
10. List the categories of wild and scenic rivers
11. Explain how state governments provide recreation areas

AG. 520 ECOLOGY\NATURAL RESOURCE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

X. Outdoor Safety

1. Define terms associated with outdoor safety
2. List the ten commandments of gun safety
3. Explain the hunter's code of ethics
4. List the correct safety procedures for using bows and arrows
5. List the ten rules for safe snowmobile operation
6. Explain basic survival and first-aid techniques
7. Explain safe boating procedures
8. Describe the common traffic rules for boats
9. List the water skiing signals
10. List the responsibilities of the hunter to wildlife, the environment, himself, and the habitat
11. List what a first-aid kit should contain

Y. Fossil Fuel Management

1. Define terms associated with fossil fuel management
2. Explain the various ways coal is mined from the earth
3. Discuss oil exploration and drilling techniques
4. Explain how natural gas is obtained and distributed
5. Discuss oil shale, tar sands, and the petroleum potential
6. Differentiate between shaft mines, slope mines, and drift mines
7. Indicate who governs coal mine safety standards
8. Explain how oil is formed
9. List at least ten uses of oil
10. Identify the unit of measure used for natural gas

Z. Alternative Energy Sources Management

1. Define terms associated with alternative energy sources management
2. Explain the use of solar energy as an alternative energy source
3. Discuss the operation of a nuclear power plant
4. Explain the value of geothermal energy, alcohol, methane, hydropower, tidal power, wind, and wood as alternative energy sources
5. Discuss the potential of solar energy
6. Explain the difference between an active and passive solar energy system
7. Define fission

AA. Metals and Minerals

1. Define terms associated with metals and minerals
2. Explain the principle metal and mineral resources
3. List and explain the various metals and minerals, including ferrous, nonferrous, scarce, and plant minerals
4. Discuss mining principles, resources available, and uses of minerals

AG 525 ECOLOGY/ENVIRONMENTAL SCIENCE

COURSE DESCRIPTION: A course that provides science instruction and practical experience in environmental science including agricultural/industrial chemical issues, habitat preservation/restoration, remediation of damaged resources, conservation practices, environmental law and current environmental issues.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Introduction To Environmental Science	470
Identification and Management of Ecosystems	940
Chemicals and the Environment	564
Land Uses, Regulations and Ordinances	564
Soil Conservation	564
Water Quality	564
Air Quality	564
TOTAL MINUTES	4,230

AG. 525 ECOLOGY/ENVIRONMENTAL SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

A. Introduction to Environmental Science

1. Introduction to Ecology

- a. Define ecology
- b. Describe the environment and its relationship with people c. Define natural resources
- d. Analyze environmental issues from political and scientific perspectives
- e. Discuss evolution of policy and public sensitivity to ecological issues
- f. Explain the influence of animals and plants on the environment
- g. Describe the concepts of energy flow and material cycling

2. Human Relationships with the Environment

- a. Discuss world population trends and the impact on the environment
- b. Explore the impact of individuals on the environment
- c. Explain the principle of biological succession
- d. Distinguish between interaction and interdependence of species
- e. Discuss the principle of sustainable development from a global perspective
- f. Describe homeostasis within an ecosystem
- g. Identify environmental influences and limiting factors
- h. Explain the concepts of community and ecosystems

3. Agricultural Relationships with the Environment

- a. Define the significance of agricultural production to humans
- b. Identify positive impacts of agriculture on our lives
- c. Relate the concept of ecological sustainability to sustainable agricultural management
- d. List agricultural practices that contribute to improved quality of air and water
- e. Identify positive and negative impacts of agricultural production practices on the environment

B. Identification and Management of Ecosystems

1. Basic Ecological Concepts

- a. Identify the elements of an ecosystem
- b. Identify abiotic factors and explain their effects on an ecosystem
- c. Describe how energy is transferred from one organism to another using the concepts of producer, consumer, decomposer, food web, food chain, and biotic pyramid
- d. Define ecological succession

2. Ecosystems of the United States and Their Management

- a. Locate and describe the ecosystems within the United States
- b. Describe how abiotic environmental factors influence the locations of ecosystems
- c. Describe how ecosystems are impacted by human activities
- d. Explain how sustainable and multiple-use management approaches can help maintain ecological balance in ecosystems

AG. 525 ECOLOGY/ENVIRONMENTAL SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

3. Grassland Ecosystems
 - a. Describe a grassland ecosystem and the abiotic factors influencing their distribution
 - b. Identify and locate grassland ecosystems in the United States
 - c. Describe ecological succession in grasslands
 - d. Discuss the role of fire in grassland ecological succession
 - e. Give examples of plant and animal association and of their adaptations to grassland habitats
 - f. Give examples of human activities that have had impacts on grassland ecosystems
 - g. Describe how the concepts of sustainability and multiple use can help to maintain grassland ecosystems
 4. Forest Ecosystems
 - a. Describe a forest ecosystem
 - b. Locate the forest ecosystems found in the United States
 - c. Identify the abiotic factors that affect the biota of forest ecosystems
 - d. Explain how ecological succession occurs in forest ecosystems
 - e. Interpret the value of forest ecosystems for humans
 - f. Identify impacts of human activities on forest ecosystems
 - g. Identify techniques that are used to manage forest ecosystems
 - h. Describe how the concepts of sustainability and multiple use can help to maintain our forest resources
 5. Aquatic Ecosystems
 - a. Explain how water cycles function in the environment
 - b. Identify abiotic factors that are important in aquatic ecosystems
 - c. Describe the different types of aquatic ecosystems
 - d. Explain the function of a watershed
 - e. Name some examples of human influences on aquatic ecosystems
 - f. Explain the watershed protection approach to managing aquatic ecosystems
 6. Wetland Ecosystems
 - a. Distinguish wetlands from other ecosystems
 - b. Identify different types and locations of wetlands that are found in the U.S.
 - c. Explain how wetlands function as ecosystems in transition
 - d. Define the value of wetland ecosystems to humans
 - e. Describe the impacts of humans on wetlands
 - f. Explain how the concepts of sustainability help maintain wetland ecosystems
- C. Chemicals and the Environment
1. The Importance of Chemicals
 - a. Assess the economic benefits of chemical usage
 - b. Evaluate the convenience and accessibility of chemicals
 - c. Determine the implications if chemicals were not used
 - d. Identify chemicals used in households
 - e. Identify chemicals used in agricultural practices
 2. Chemicals Defined

- a. Define the meaning of chemicals
- b. Assess the history of chemical usage
- c. Distinguish between natural and synthetic chemicals

AG. 525 ECOLOGY/ENVIRONMENTAL SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

3. Safe Handling and Application Practices of Chemicals
 - a. Identify the safety-assurance factors in using chemicals
 - b. Identify the proper use and application of chemicals
 - c. Evaluate the disposal systems for excess chemicals and containers
 - d. Identify responsible practices in chemical application
 4. Regulating and Controlling Chemical Uses
 - a. Assess the developmental and regulatory processes for chemicals
 - b. Identify governmental provisions concerning chemical applications
 - c. Analyze benefits versus potential adverse effects of chemicals
 - d. Identify federal regulations governing the disposal of industrial wastes
 - e. Determine how chemical residues are measured in the environment
- D. Land Uses, Regulations and Ordinances
1. Land Uses and Land Use Planning
 - a. Define land
 - b. Explain what is meant by land use
 - c. Compare past and present uses of land including alternative uses of land
 - d. Explain land use planning and the reasons for planning for land uses
 2. Soil Effects on Land Uses
 - a. Analyze soil properties that affect how land is used
 - b. Identify the effects that natural processes have on soil properties
 - c. Determine the influences of natural disasters on land uses
 - d. Use a soil survey to determine possible uses of land
 3. Land Use Issues
 - a. Understand the relationships between land uses and population growth
 - b. Define the rights and responsibilities of land owners
 - c. Identify laws pertaining to land use
- E. Soil Conservation
1. Characteristics of Soil
 - a. Describe the composition of soil and explain how it is formed
 - b. Explain the functions of soil
 - c. Relate the importance of soil to the lives of humans
 2. Physical Properties of Soils
 - a. Explain the importance of soil texture
 - b. Illustrate soil structure and explain its importance
 - c. Appraise soil based on soil color
 - d. Describe how soil characteristics affect the uses of land

3. Soil Erosion and the Effects of Human Activities on Soil Erosion
 - a. Define soil erosion
 - b. Assess the impacts of soil erosion on the environment
 - c. Distinguish between geological erosion and man-made soil erosion
 - d. Assess the causes and effects of man-made soil erosion
 - e. Discover ways that soil erosion can be prevented or reduced

AG. 525 ECOLOGY/ENVIRONMENTAL SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

4. Environmental Impacts of Soil Degradation
 - a. Define soil degradation
 - b. Assess the impacts of soil degradation on the environment
 - c. Categorize the different types of soil erosion
 - d. Explain the effects that agricultural pesticides and chemicals have on soil properties and characteristics
 - e. Discuss the effects of waste disposal on soil properties and characteristics
 - f. Suggest ways that soil degradation can be controlled
 5. Methods of Soil Erosion Control
 - a. Classify land according to its best use
 - b. Distinguish between mechanical and vegetative soil erosion control
 - c. Analyze methods of controlling farm and non-farm soil erosion
 - d. Identify government agencies and programs that are involved with soil conservation
- F. Water Quality
1. The Importance of Water Quality to Humans
 - a. Determine the different uses of water
 - b. Describe factors that make water quality important to society
 - c. Identify societal costs associated with water quality
 - d. List economic factors associated with water quality
 2. Understanding Water Quality
 - a. Identify the factors that affect water quality
 - b. Identify the different classifications of water quality
 - c. Describe how water is processed in the hydrologic cycle
 - d. Suggest factors that may distort the natural processes by which water quality is maintained
 3. Factors that Influence the Quality of Water
 - a. Identify contaminants that influence water quality
 - b. Assess the cumulative effects of pollution on water quality
 - c. Describe the steps in municipal and commercial waste treatment systems
 - d. Describe different animal waste handling systems
 4. Measures to Ensure Water Quality
 - a. Identify federal, state and local standards and regulations for water quality
 - b. Explain how water quality thresholds are determined
 - c. Identify human activities which can maintain or improve the quality of water
 - d. Analyze industrial activities that are designed to maintain or improve water quality
 5. Management Practices that Enhance the Quality of Water
 - a. Explore the impacts that wetlands have on water quality
 - b. Describe the relationships between water quality and watersheds

- c. Identify soil conservation practices that maintain or improve water quality
- d. Describe the impact of water conservation on water quality

AG. 525 ECOLOGY/ENVIRONMENTAL SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

G. Air Quality

1. Air Pollutants and Their Effects

- a. Name the major air pollutants
- b. Describe the effects of major air pollutants on the health of people and animals
- c. Explain the effects of major air pollutants on the health of plants
- d. Describe how major air pollutants can damage material objects
- e. Describe how noise pollution can be damaging to the hearing of humans and animals

2. Quality of Life and Air Pollution

- a. Describe the sources of the major air pollutants
- b. Describe how the major air pollutants are regulated and controlled
- c. Explain how the damage done by the major air pollutants affects the economy
- d. Explain the economic impacts of controlling air pollution
- e. Describe the benefit-cost analysis used in economics to compare the benefits to control air pollution versus the cost

3. Acid Rain

- a. Assess the cumulative effects of acid rain (precipitation)
- b. Identify the possible air pollutants, which influence the pH of precipitation
- c. Identify sources of air pollutants, which cause acid precipitation
- d. Describe the processes and technologies that are used to control air pollution
- e. Describe the implementation of the 1990 Clean Air Act in relation to acid precipitation

4. Clean Air Act and Environmental Law

- a. Describe the impacts of past human activities on air quality
- b. Describe the effects of air pollution on the US. and other countries
- c. Explain how the Clean Air Act has impacted air quality
- d. Describe air pollution allowances
- e. Identify governmental regulations and the monetary costs associated with maintaining air quality
- f. Describe how air quality legislation is passed

AG. 530 ZOOLOGY\ANIMAL SCIENCE

COURSE DESCRIPTION: A course designed to develop knowledge and skills pertaining to nutrition, reproduction, diseases, breeding, genetics, anatomy, and physiology in livestock

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Introduction to Animal Management	188
The Organisms	188
Cell Structure	188
Functions of the Cell	192
Animal Tissues	141
Animal Organs and Systems	235
Genetics and Heredity	235
Breeding and Reproduction	705
Animal Nutrition	940
Animal Health	609
Animal Products	609
TOTAL MINUTES	4,230

AG. 530 ZOOLOGY\ANIMAL SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

A. Introduction to Animal Science

1. Name the types of livestock and their uses
2. Discuss animal production in the United States
3. Discuss animal production in Idaho
4. Describe reasons against and for using livestock as a food source
5. Identify the current employment available in the livestock industry

B. The Organisms

1. Outline the classification system used to identify organisms
2. List the five kingdoms and describe the unique characteristics of the individuals within each kingdom
3. Explain the concept: the more closely organisms are related the more similar their classification will be
4. Outline the classification of the major livestock animals in the United States

C. Cell Structure

1. Identify the parts and organelles of the plant and animal cells
2. Describe the differences between plant and animal cells
3. List and describe the functions of each of the major types of specialized animal cells
4. Describe the functions of the vacuole, microtubules, and microfilaments as they relate to the cell structure and support
5. Explain how a cell is able to maintain a particular shape, and the nutrients that help it do so

D. Functions of the Cell

1. List and describe the nutrient and elemental composition of the cells protoplasm
2. List the cell organelles and the functions of each part
3. Trace the pathway of a glucose molecule through the cell
4. Describe the process of cellular metabolism of proteins, fats, and complex carbohydrates
5. Describe the process of cellular respiration and list the products produced

E. Animal Tissues

1. Describe how specialized cells are organized to form a tissue type
2. List and describe the six types of specialized animal tissues and their individual functions

F. Animal Organs and Systems

1. List the eight systems of animals and the major organs that make up each system
2. Explain the functions of each of the eight systems

AG. 530 ZOOLOGY\ANIMAL SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

G. Genetics and Heredity

1. Demonstrate phenotypic and genotypic selection of breeding and market livestock
2. Be able to recognize different types of production records
3. List the types of livestock and the correct number of chromosomes
4. Describe how genetic make-up is determined
5. Distinguish between simple and multiple gene inheritance
6. Distinguish between dominant, recessive, and incomplete dominant genes

H. Breeding and Reproduction

1. Discuss types of mating systems and methods
2. Discuss breeding periods
3. List and discuss the major parts of the female reproduction tract
4. List and discuss the major parts of the male reproduction tract
5. Describe reproductive hormones
6. Recognize fertility problems
7. Explain gestation and parturition in the various livestock species
8. Discuss genetics and heritability in livestock
9. Discuss and demonstrate methods of artificial insemination and heat detection

I. Animal Nutrition

1. Discuss livestock digestive systems
2. Describe the functions of essential nutrients
3. List and discuss animal feed classifications and their uses
4. Calculate rations and feed needs

J. Animal Health

1. Discuss the causes of disease
2. Develop diagnosis procedures
3. Discuss disease prevention
4. Describe procedures for controlling parasites
5. Discuss the controlling of poisonous plants
6. Explain the treatment of disease
7. List various health regulations and agencies

K. Animal Products

1. Discuss the nutritional food value of animal meat, dairy, and poultry products

AG. 532 ZOOLOGY\SCIENCE OF ANIMAL NUTRITION

COURSE DESCRIPTION: A course of study designed to provide learning experiences for students in the areas of animal nutrition and physiology.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
The Organisms	188
Cell Structure	188
Functions of the Cell	235
Animal Tissues	141
Animal Organs and Systems	235
Introduction to Animal Nutrition	235
Digestion In Animals	235
Protein	235
Minerals	470
Vitamins, Feed Additives, and Water	470
Classification and Use of Feeds	235
Nutrient Quality and Analysis	423
Metabolism of Nutrients for Maintenance, Health and Production	234
Environment and Nutrition	235
Relationship Between Nutrition and Animal Products	235
Relationship Between Nutrition and Reproduction	235
TOTAL MINUTES	4,230

AG. 532 ZOOLOGY\SCIENCE OF ANIMAL NUTRITION
UNITS OF INSTRUCTION AND OBJECTIVES

A. The Organisms

1. Outline the classification system used to identify organisms
2. List the five kingdoms and describe the unique characteristics of the individuals within each kingdom
3. Explain the concept: the more closely organisms are related the more similar their classification will be
4. Outline the classification of the major livestock animals in the United States

B. Cell Structure

1. Identify the parts and organelles of the plant and animal cells
2. Describe the differences between plant and animal cells
3. List and describe the functions of each of the major types of specialized animal cells
4. Describe the functions of the vacuole, microtubules, and microfilaments as they relate to the cell structure and support
5. Explain how a cell is able to maintain a particular shape, and the nutrients that help it do so

C. Functions of the Cell

1. List and describe the nutrient and elemental composition of the cells protoplasm
2. List the cell organelles and the functions of each part
3. Trace the pathway of a glucose molecule through the cell
4. Describe the process of cellular metabolism of proteins, fats, and complex carbohydrates
5. Describe the process of cellular respiration and list the products produced

D. Animal Tissues

1. Describe how specialized cells are organized to form a tissue type
2. List and describe the six types of specialized animal tissues and their individual functions

E. Animal Organs and Systems

1. List the eight systems of animals and the major organs that make up each system
2. Explain the functions of each of the eight systems

AG. 532 ZOOLOGY\SCIENCE OF ANIMAL NUTRITION
UNITS OF INSTRUCTION AND OBJECTIVES

F. Introduction to Animal Nutrition

1. List the major functions of animals in human society
2. List the eight major animal sources of food in the world and approximately what percent of the total does each supply
3. Describe the use of animal power in the world today
4. Compare the relative efficiencies of the major farm animals in converting feed to protein and energy for human consumption
5. Explain why the livestock industry adds to the human food base rather than decreasing it
6. Describe how animals are important in providing clothing for human use
7. Describe the importance of livestock production in the total agricultural industry in the United States
8. List, define, and give examples of the two major feed groups generally used in livestock feeding
9. List the six components of feed that are important when balancing rations for livestock
10. List the feed components that provide energy for animals
11. List the major minerals needed in livestock rations
12. Identify the factors that affect the water intake of animals
13. Explain why feed additives are used in livestock rations
14. List some important byproducts of the livestock industry
15. Describe the use of animal power in the world today

G. Digestion in Animals

1. Define the terms associated with animal digestion
2. Name the three kinds of digestive systems and give an example of the animals with each type
3. List the parts of the monogastric digestive system and describe the function of each
4. Match the digestive enzymes with their function
5. Describe the function of the liver
6. Describe the difference between the digestive system of the horse and the swine
7. List the four major compartments of the stomach of the ruminant and describe the function of each
8. Describe regurgitation in the ruminant and tell how it relates to the digestive process
9. List the major microorganisms found in the rumen and describe their function
10. List the parts of the avian digestive system and describe the functions of each
11. Describe the process of absorption
12. Describe the process of metabolism

AG. 532 ZOOLOGY\SCIENCE OF ANIMAL NUTRITION
UNITS OF INSTRUCTION AND OBJECTIVES

H. Energy Nutrients

1. Define terms associated with energy
2. Describe each of the six energy nutrients
3. List the sources of energy nutrients
4. Describe the functions of the energy nutrients
5. Describe the symptoms of energy deficiencies in the ration
6. Explain the term critical temperature and how it is important in livestock management
7. Describe the energy needs of animals for milk production, pregnancy, and work
8. List the three nutrients that are the major sources of energy in livestock rations
9. Name the most important nutrient and explain why it is the most important
10. List the carbohydrates that are the most easily digested, and those that are the hardest to digest
11. List the most important compound sugars in the animals body
12. Identify the parts of the plant that store the most easily digested carbohydrates
13. Describe the digestion of fiber
14. Compare the amount of energy supplied by fats and oils as compared to carbohydrates
15. List three essential fatty acids

I. Protein

1. Define the term protein and the terms associated with it.
2. List the common sources of protein
3. Describe the function of protein
4. Describe the symptoms of protein toxicity
5. Discuss and describe the use of nonprotein nitrogen sources
6. Identify the part of the plant in which most of the protein is stored
7. Describe digestible protein
8. Explain the difference between essential and nonessential amino acids
9. Explain what is meant by the quality of protein
10. Describe protein quality as it relates to formulating rations for ruminant and nonruminant animals
11. Identify at what stages of the animal's life the protein requirements are the greatest
12. Explain the relationship between protein deficiency and energy nutrition
13. Explain what causes protein in a ration to be available
14. Describe the biological value of protein

J. Minerals

1. Describe minerals used in animal nutrition
2. List the sources of minerals for animal nutrition
3. Describe the functions of minerals in animal nutrition
4. Describe the deficiency symptoms caused by the lack of minerals in the ration
5. Describe the toxicity symptoms cause by specific minerals
6. Discuss the mineral requirements needed in a balanced ration
7. List the major minerals needed by livestock
8. List the trace minerals needed by livestock
9. List the minerals that are most likely to be deficient in livestock feeding
10. Describe the common way to add trace minerals to the livestock ration

AG. 532 ZOOLOGY\SCIENCE OF ANIMAL NUTRITION
UNITS OF INSTRUCTION AND OBJECTIVES

K. Vitamins, Feed Additives, and Water

1. Describe vitamins and feed additives
2. List the sources of vitamins and feed additives
3. List the vitamins that are essential in animal nutrition
4. List the chemical elements that are found in vitamins
5. List the vitamins that are soluble in water and which are soluble in fat or fat solvents
6. List the vitamins that are commonly synthesized in the rumen
7. Explain how the solubility of vitamins affects the need for supplying them in the diet
8. Describe how vitamins may be supplied other than through natural feed sources
9. Describe the functions of vitamins/feed additives and water
10. Describe the deficiency symptoms caused by the lack of each of the vitamins in a ration
11. Discuss the relationship between age and fat content of the body and the percent of water it contains
12. In addition to drinking water, list the other sources of water for the animal
13. List and discuss factors affecting the amount of water an animal will consume
14. List the typical water intakes for various classes of livestock
15. Describe the ways by which animals lose water from the body
16. List the symptoms of water deprivation in livestock
17. Discuss the effects of feed additives in the ration
18. Describe the regulations on the use of feed additives in the ration

L. Classification and Use of Feeds

1. List and briefly tell the difference between the two general classes of feeds used for animal nutrition
2. List the eight descriptors used in determining International Feed Names
3. List and briefly describe each of the eight feed classes
4. Identify the class of livestock that are fed urea and other nonprotein nitrogen sources
5. Describe how nutrition affects reproduction in livestock
6. Describe nutrient needs of young, growing animals as compared to more mature animals
7. Explain why a maintenance ration requires a certain amount of the total feed consumed by an animal
8. Describe the life processes that are supported by a maintenance ration
9. Explain why the amount of an animal's body surface is more closely related to its maintenance needs than is its weight
10. Explain how milk production affects the nutrient requirements of an animal
11. Explain how wool and mohair production affects the nutrient requirements of sheep and goats
12. Describe the effect of work on nutrient requirements of horses

AG. 532 ZOOLOGY\SCIENCE OF ANIMAL NUTRITION
UNITS OF INSTRUCTION AND OBJECTIVES

M. Nutrient Quality and Analysis

1. List and describe the factors that affect feed quality
2. List the six components into which a feedstuff is separated by proximate analysis
3. Describe the method of proximate analysis for each of these six components
4. List the limitations of using proximate analysis to determine feed value
5. Describe and give examples of how feeds may be converted from one composition basis to another
6. Explain why the Van Soest method of forage analysis is sometimes used
7. Describe the Van Soest method of forage analysis
8. Explain why digestion trials are of importance when determining the value of a feedstuff
9. Describe how net energy values of feed may be determined
10. List and briefly describe some other measures of feed value
11. Explain why feeding trials are of value in developing rations
12. Describe the major provisions found in most state feed laws

N. Metabolism of Nutrients for Maintenance, Health and Production

1. Define the terms associated with this unit
2. Explain why a balanced ration is important in livestock feeding
3. Describe the general principles for formulating a ration
4. Describe the general principles for ration selection
5. Describe the steps in balancing a ration
6. Use feeding standards and feed composition tables to help balance a ration
7. Use the Pearson Square or algebraic equations to balance rations
8. Discuss the use of computers to balance rations
9. Describe how urea should be used as a protein supplement in ruminants to achieve maximum benefits, without causing harm to the animal
10. Discuss the proper use of growth stimulants and the role they play in the animal's development
11. Describe the relationship between proper nutrition and the essential elements and nutrients that compose the cell's protoplasm

O. Environment and Nutrition

1. Define the term effective ambient temperature
2. Describe how animals maintain body heat balance
3. Define the term thermoneutral zone
4. Define the terms upper critical temperature and lower critical temperature and discuss their significance for livestock producers
5. Explain why large ruminants have lower critical temperatures than other farm animals
6. Explain how animals generally react when they pass the upper critical temperature
7. Discuss the effects of temperature on forage quality and intake
8. List the three major sources of water for livestock
9. List three major ways livestock lose water
10. Describe the effect temperature has on feed efficiency
11. Explain why the efficiency of egg production increases during periods of high temperature
12. Explain what adjustments in diet may be beneficial when temperatures are above or below the thermoneutral zone

AG. 532 ZOOLOGY\SCIENCE OF ANIMAL NUTRITION
UNITS OF INSTRUCTION AND OBJECTIVES

P. Relationship Between Nutrition and Animal Products

1. Describe the effects of animal nutrition on the composition of milk, meat and eggs
2. Describe the effects of over and under feeding on the composition of animal products
3. Describe the importance of protein quality on muscle and fiber composition
4. Describe the role vitamins and minerals play in the composition of animal products
5. Describe the effect that certain by-products have on animal products when included in the diet (ex. fish meal when fed to swine)
6. Explain the importance of proper nutrition in the laying hen as related to egg shell quality and yolk composition
7. Describe the importance of proper nutrition for milk production
8. Describe the importance of proper nutrition on the composition of milk
9. Explain the effects of feed odors on animal product quality

Q. Relationship Between Nutrition and Reproduction

1. Describe the reproductive benefits which are derived from flushing, and the rations that are needed to derive these benefits
2. Describe the reproductive problems encountered from deficient nutritional levels
3. Describe the reproductive problems that result from over feeding
4. Describe the role of minerals in the reproductive process
5. Describe how the nutrient levels required for reproduction change as each animal species proceeds through pregnancy
6. Describe the differences in nutrient requirements between growing and mature animals as related to reproductive efficiency
7. Indicate the most critical nutrient for lactating animals
8. Indicate the minimum level of fiber needed in the ration of lactating dairy cows and why is it needed
9. Describe how proper nutrition during pregnancy will prevent postpartum diseases and ailments in the offspring
10. Describe the role of antibiotics in animal rations during gestation
11. Describe how sires should be fed for best reproductive performance
12. Describe all the nutrient requirements associated with lactation
13. Describe the importance of the calcium-phosphorous ratio to reproductive performance
14. List the recommended protein and energy requirements for pullets and hens of the egg laying species

AG. 534 ZOOLOGY\SCIENCE OF ANIMAL REPRODUCTION

COURSE DESCRIPTION: A course of study which provides learning experiences in the subject matter relating to anatomy and physiology of animal reproduction.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
The Organisms	141
Cell Structure	141
Functions of the Cell	141
Animal Tissues	141
Animal Organs and Systems	235
Genetics and Heredity	470
Macroscopic Male Functional Anatomy	141
Microscopic Anatomy of Spermatogenesis	188
Hormones and Puberty In the Male	188
Ejaculation and Semen Collection	94
Breeding Soundness Evaluation	141
Semen Production, Processing, and Storage	94
Macroscopic Female Functional Anatomy	141
Microscopic Female Functional Anatomy	141
Hormones and Puberty in the Female	235
Estrus and the Estrous Cycle	235
Ovulation Control	141
Artificial Insemination	141
Fertilization and Embryo Transfer	329
Gestation and Pregnancy Determination	235
Parturition and the Postpartum Period	141
Reproductive Diseases	141
Relationship Between Nutrition and Reproduction	235
TOTAL MINUTES	4,230

AG. 534 ZOOLOGY\SCIENCE OF ANIMAL REPRODUCTION
UNITS OF INSTRUCTION AND OBJECTIVES

A. The Organisms

1. Outline the classification system used to identify organisms
2. List the five kingdoms and describe the unique characteristics of the individuals within each kingdom
3. Explain the concept: the more closely organisms are related the more similar their classification will be
4. Outline the classification of the major livestock animals in the United States

B. Cell Structure

1. Identify the parts and organelles of the plant and animal cells
2. Describe the differences between plant and animal cells
3. List and describe the functions of each of the major types of specialized animal cells
4. Describe the functions of the vacuole, microtubules, and microfilaments as they relate to the cell structure and support
5. Explain how a cell is able to maintain a particular shape, and the nutrients that help it do so

C. Functions of the Cell

1. List and describe the nutrient and elemental composition of the cells protoplasm
2. List the cell organelles and the functions of each part
3. Trace the pathway of a glucose molecule through the cell
4. Describe the process of cellular metabolism of proteins, fats, and complex carbohydrates
5. Describe the process of cellular respiration and list the products formed by it

D. Animal Tissues

1. Describe how specialized cells are organized to form a tissue type
2. List and describe the six types of specialized animal tissues and their individual functions

E. Animal Organs and Systems

1. List the eight systems of animals and the major organs that make up each system
2. Explain the functions of each of the eight systems listed above

AG. 534 ZOOLOGY\SCIENCE OF ANIMAL REPRODUCTION
UNITS OF INSTRUCTION AND OBJECTIVES

F. Genetics and Heredity

1. Describe mitosis and meiosis
2. Explain why genes are important in animal breeding
3. List and describe the two ways in which genes control inherited traits
4. Define the following terms:
 - a. Dominant gene
 - b. Recessive gene
 - c. Homozygous gene pairs
 - d. Heterozygous gene pairs
5. Demonstrate the use of the punnett square to predict the traits of the offspring when the male and female carry heterozygous gene pairs of a given trait
6. Define and give an example of incomplete dominance
7. Explain how the sex of the offspring is determined in mammals and poultry
8. Define and give an example of sex linked characteristics
9. Explain linkage, crossover, and mutation
10. Explain a heritability estimate and how it is used to improve livestock through breeding
11. List the pairs of chromosomes for each of the various species of livestock

G. Macroscopic Male Functional Anatomy

1. Identify and relate the gross anatomical structures of the male reproductive system
2. Describe the function of the parts of the male reproductive system
3. Differentiate reproductive structures of the bull, ram, boar, and stallion
4. Trace a spermatozoan in the male reproductive tract
5. Explain why temperature is so critical to the testes and what three structures regulate it
6. Define monorchid and explain how it may be determined
7. Explain the cause of a scrotal hernia
8. Indicate where sperm is mixed with the accessory fluids first to become semen
9. Diagram and label how the parts of penis of the bull differs from that of the stallion in cross section

AG. 534 ZOOLOGY\SCIENCE OF ANIMAL REPRODUCTION
UNITS OF INSTRUCTION AND OBJECTIVES

H. Microscopic Anatomy of Spermatogenesis

1. Distinguish reproductive organs by cell type
2. Indicate the function of an organ to the cell types present
3. Diagram spermatogenesis from its beginning to the mature spermatozoan
4. Explain the major purpose of the ciliated columnar epithelial cells, and indicate where they are found in the male reproductive tract
5. Define the following terms:
 - a. tunica
 - b. corpus
 - c. recti
 - d. albuginea
 - e. parietal
 - f. spermatocytogenesis
 - g. efferent
 - h. sustentacular
6. Describe the function of the sustentacular cells
7. Indicate from what does the helical portion of the midpiece of the sperm form
8. Indicate at what point of sperm progression through the tract does forward motion occur
9. Identify the primary cells found in the seminiferous tubules
10. Indicate how many spermatazoa form from a single primary spermatocyte in livestock species
11. Indicate the amount of time spermatogenesis takes in the bull
12. Explain the effect of infection of a cut on the scrotum of a bull and resulting reproductive response

I. Hormones and Puberty In the Male

1. Identify the major hormones of reproduction and their actions
2. Distinguish between releasing hormones, hypophyseal, and gonadal hormones
3. Relate action to specific male hormones and their sources
4. Explain the factors affecting puberty and their interactions
5. Relate age, size and weight to puberty
6. Determine factors to be considered in selecting breeding stock
7. Define gonadotropic
8. Relate the four parts of the hypophysis to their function
9. Diagram the hormonal sequence in the male, beginning and ending with ICSHRH
10. List the effects of testosterone on secondary sex characteristics in the bull
11. Indicate the bull-to-cow ratio when using young bulls for the first time compared to mature bulls

J. Ejaculation and Semen Collection

1. Explain the process of mating
2. Describe the composition of semen and the point of deposition in the female, and its composition
3. Describe the passage of sperm through the tract during ejaculation
4. List the males that have fractionated ejaculates
5. List the advantages and disadvantages of the various methods of collecting semen
6. Describe in detail the use of the artificial vagina and electroejaculator for collecting semen

AG. 534 ZOOLOGY\SCIENCE OF ANIMAL REPRODUCTION
UNITS OF INSTRUCTION AND OBJECTIVES

K. Breeding Soundness Evaluation

1. Describe and explain the criteria used for evaluating the outward signs of fertility in the male and female
2. Describe how to evaluate the internal reproductive organs for breeding soundness
3. Explain the value of the various factors used in evaluating semen
4. List and describe the kinds of performance records which might be used when selecting breeding animals
5. Explain how a pedigree might be used when selecting breeding stock
6. Describe the traits that are desirable in selecting a herd sire and females for each species

L. Semen Production, Processing, and Storage

1. Describe the efficacy of using fresh sperm in a breeding program
2. Evaluate the various ways of processing sperm
3. List the constituents of semen extender
4. Calculate semen extension for processing fresh and frozen semen
5. List the advantages and disadvantages of the various methods of packaging semen
6. Explain which method of selecting a sire is the most effective
7. Explain what 60-90 NR means

M. Macroscopic Female Functional Anatomy

1. Trace the path of the ovum in the female reproductive tract
2. List the anatomical differences of the reproductive systems among the species
3. Describe the distinguishing external features of the ovaries of the cow, sow, ewe and mare
4. Identify the structures of the ovary and relate them to their functions
5. Classify the uteri of different species according to their configuration

N. Microscopic Female Functional Anatomy

1. Distinguish between a follicle, corpus hemorrhagicum, corpus luteum, corpus albicans, and an atretic follicle
2. List and describe the steps in follicular growth
3. Describe cell division during oogenesis
4. Describe the relationship of cell types to function in the oviduct, uterus, cervix, vagina, vestibule, and vulva
5. Indicate where the majority of the oocytes are located at birth
6. Explain how one would distinguish between a follicle and a corpus luteum by palpation in the cow
7. Indicate when the myometrium is most active

AG. 534 ZOOLOGY\SCIENCE OF ANIMAL REPRODUCTION
UNITS OF INSTRUCTION AND OBJECTIVES

O. Hormones and Puberty in the Female

1. List the hormones originating in the hypothalamus, hypophysis, and the gonads that are related to female reproduction
2. Identify the various hormones with their resulting target organs
3. Describe the four factors related to puberty
4. List the ages and ranges for the onset of puberty in the various species
5. Describe the effects of hormones, genetics, nutrition, and environment on the manifestation of puberty
6. Explain why one would want to shorten the prepubertal interval

P. Estrus and the Estrous Cycle

1. Describe the symptoms of estrus in the various species
2. Describe the meaning for the following: proestrus, estrus, metestrus, diestrus, and anestrus
3. Diagram the hormonal pathways used to initiate the activities of the various glands and organs in the body
4. Match specific hormones to their specific responses from target organs
5. Describe the growth of ovarian structures through an estrous cycle
6. Indicate the length of the estrous cycle for each species
7. Describe when each species is most likely to be receptive to the male
8. Describe the activity of the oviduct at the time of ovulation
9. Explain how the menstrual cycle differs from the estrous cycle

Q. Ovulation Control

1. List the advantages and disadvantages of ovulation control
2. Describe the various compounds used for ovulation control for each class of livestock
3. Distinguish between the action of progesterone, progestogens, and prostoglandins for ovulation control
4. Explain why two injections of prostoglandins are needed to control ovulation
5. Describe a general plan for breeding sheep in anestrus
6. Outline a method for increasing the number of pigs per litter
7. Discuss the general approach to the superovulation of mares
8. Explain why one would want to breed calves before they normally reach puberty
9. Explain the difference between prostaglandin and prostaglandin analogue
10. Explain why interuterine (PGF 2 alpha a) is injected at a lower rate than intermuscular
11. List the detrimental side effects that are present in swine when synchronized with progestogens
12. Explain why it is necessary to have a functional CL before using prostaglandins
13. Describe the hormone sequence that is used to superovulate a cow

AG. 534 ZOOLOGY\SCIENCE OF ANIMAL REPRODUCTION
UNITS OF INSTRUCTION AND OBJECTIVES

R. Artificial Insemination

1. List the advantages and disadvantages of artificial insemination for the various classes of livestock
2. Describe the differences between the various techniques of artificial insemination
3. List the various techniques that are used to check estrus in cattle
4. Outline an AI program and its specific management for any class of livestock
5. Describe and explain the time of insemination to optimum conception
6. Explain the A.M. - P.M. inseminating rule
7. Indicate the best temperature to thaw frozen semen to be used immediately
8. Explain why sheep artificial insemination is so poorly accepted in the U.S.
9. Describe one method of restraint for mares during insemination

S. Fertilization and Embryo Transfer

1. Describe the mechanisms involved in sperm and ovum transport
2. List in order the barriers to sperm penetration of the ovum
3. Discuss the advantages and disadvantages of embryo transfer, particularly for the bovine
4. Describe the importance of synchronization, condition, superovulation, and insemination to embryo transfer
5. Describe in outline form embryo transfer in any domestic species
6. Distinguish between "good" and "bad" eggs
7. Describe some of the problems of and need for continued research on embryo transfer
8. Explain how sperm moves so rapidly from the point of natural deposition to the point of fertilization
9. Indicate where fertilization takes place
10. Indicate how long it takes sperm to reach the point of fertilization in the cow, ewe, and sow
11. Explain where sperm is deposited in the normal copulation of the horses
12. Define syngamy
13. Explain what is so critical about the synchronization of the donor and recipient for embryo transfer
14. Explain what must be considered when inseminating the donor cow
15. Describe the nonsurgical approach to embryo transfer in the mare
16. Describe the main reason for transferring embryos in swine

T. Biotechnology

1. Explain biotechnology
2. Discuss the use of genetic engineering in agriculture
3. List and describe 5 current genetic activities that have the potential to have a major impact on agriculture
4. Discuss the problems relating to the use of genetic engineering
5. Explain Recombinant DNA technology
6. List the possible effects of the recent patent office ruling concerning the patentability of genetic engineered animal and plant products

AG. 534 ZOOLOGY\SCIENCE OF ANIMAL REPRODUCTION
UNITS OF INSTRUCTION AND OBJECTIVES

U. Gestation and Pregnancy Determination

1. List the gestation lengths for domestic animals
2. Describe the importance of progesterone and its source to maintenance of pregnancy
3. List the embryonic membranes of the embryo
4. List the major developments of the prenatal young
5. Describe the age to developmental periods of the embryo
6. Distinguish placentae by structure, shape, and animal in which each is found
7. List reasons for pregnancy determination and outline methods for determining pregnancy
8. List the determining characteristics for age of the fetus in the cow at different stages of development

V. Parturition and the Postpartum Period

1. List and describe the factors influencing parturition
2. Describe the stages of parturition as they apply to the various species
3. List the problems that may arise during birth and methods of alleviating them
4. Relate and describe the postpartum period to ensuing estrous activity and conception
5. Explain what changes occur in progesterone and estrogen at parturition in the cow, ewe, sow, mare
6. Define terms associated with parturition and the postpartum period
7. List the beginning and ending activities of the three stages of parturition in the cow
8. Define dystocia
9. Explain what should be done if the cow retains her placenta
10. List the problems involved with induced parturition in cattle
11. Indicate when it would be profitable to induce birth in cattle
12. Describe the farrowing process
13. Describe the birth process of a foal
14. Explain what "foal heat" is, and how it differs from postpartum estrus in the sow

W. Reproductive Diseases

1. Identify symptoms of major reproductive diseases
2. List the necessary specimens needed for diagnosing by the veterinarian or diagnostic laboratory
3. Identify those diseases transmitted by coitus only (venereal diseases)
4. Describe the importance of preventive measures and the need for the veterinarian and diagnostic laboratory
5. Indicate that specimens that are most commonly needed to diagnose the cause of an abortion
6. Indicate the hormone that may be deficient during gestation
7. Explain why torsion of the umbilical cord would cause abortion

AG. 534 ZOOLOGY\SCIENCE OF ANIMAL REPRODUCTION
UNITS OF INSTRUCTION AND OBJECTIVES

X. Relationship Between Nutrition and Reproduction

1. Describe the reproductive benefits which are derived from flushing, and the rations that are needed to derive these benefits
2. Describe the reproductive problems encountered from deficient nutritional levels
3. Describe the reproductive problems that result from over feeding
4. Describe the role of minerals in the reproductive process
5. Describe how the nutrient levels required for reproduction change as each animal species proceeds through pregnancy
6. Describe the differences in nutrient requirements between growing and mature animals as related to reproductive efficiency
7. Indicate the most critical nutrient for lactating animals
8. Indicate the minimum level of fiber needed in the ration of lactating dairy cows and why is it needed
9. Describe how proper nutrition during pregnancy will prevent postpartum diseases and ailments in the offspring
10. Describe the role of antibiotics in animal rations during gestation
11. Describe how sires should be fed for best reproductive performance
12. Describe the all the nutrient requirements associated with lactation
13. Describe the importance of the calcium - phosphorous ratio to reproductive performance
14. List the recommended protein and energy requirements for pullets and hens of the egg laying species

AG. 536 ZOOLOGY\FISH AND WILDLIFE SCIENCE

COURSE DESCRIPTION: A course designed to examine the importance of fish and wildlife science, outdoor recreation and natural resources.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Importance of Wildlife	470
History of Wildlife	470
Ecological Concepts	235
Identify Wildlife and Fish Species	470
Management of Wildlife and Fish Populations	705
Fish and Game Regulations	235
Aquaculture	940
Natural Resources for Outdoor Recreation	470
Career Opportunities	235
TOTAL MINUTES	4,230

AG. 536 ZOOLOGY\FISH AND WILDLIFE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

- A. Importance of Wildlife
 - 1. Describe the ecological benefits of wildlife
 - 2. Discuss the economic benefits of wildlife
 - 3. Identify the aesthetic benefits of wildlife

- B. History of Wildlife and Fish Species
 - 1. Identify historical aspects of wildlife management
 - 2. Identify the historical development of fish management

- C. Ecological Concepts
 - 1. Define ecosystems
 - 2. Explain carrying capacity and population effects

- D. Identify Wildlife and Fish Species
 - 1. Examine animal species, including fur bearers
 - 2. Identify fish species (fresh and salt water)
 - 3. Identify fowl species
 - 4. Identify exotic game

- E. Management of Wildlife and Fish Populations
 - 1. Explore water, food and cover requirements of wildlife
 - 2. Examine and develop habitats for wildlife production
 - 3. Discuss the management of wildlife populations
 - 4. Discuss the management of fish populations

- F. Fish and Game Regulations
 - 1. Discuss Idaho regulations and seasons for big game animals, fur bearers, waterfowl, upland game birds, and fishing
 - 2. List the ethics of sportsmanship
 - 3. Identify the skills needed in map reading
 - 4. Discuss safety aspects relating to sportsmanship

AG. 536 ZOOLOGY\FISH AND WILDLIFE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

G. Aquaculture

1. Discuss the history of aquaculture
2. Explain how aquaculture has become a profitable business
3. Examine management techniques in aquaculture
4. List the steps in marketing fish
5. Discuss the fish processing industry
6. Discuss the fish feed industry

H. Natural Resources for Outdoor Recreations

1. Identify recreational enterprises
2. Identify methods of developing recreational enterprises
3. Discuss the management of recreational enterprises
4. Review state and federal policies concerning recreational activities

I. Career Opportunities

1. Identify career opportunities in wildlife management
2. Identify career opportunities in outdoor recreation management

AG. 540 AGRICULTURAL BIOTECHNOLOGY

COURSE DESCRIPTION: A course designed to incorporate basic elements of science with a variety of technology applications that are used to modify living organisms. Areas of emphasis include basic science laboratory procedures, implementation of the scientific method of discovery, plant science, animal science, environmental science and food science.

UNITS OF INSTRUCTION	MIINUTES OF INSTRUCTION
Introduction To Biotechnology	470
Genetics and Genetic Engineering	940
Impacts of Biotechnology	705
Biotechnology in Plant Science	705
Biotechnology in Animal Science	705
Microbial Biotechnology in Agriculture	705
TOTAL NIINUTES	4,230

AG. 540 AGRICULTURAL BIOTECHNOLOGY
UNITS OF INSTRUCTION AND OBJECTIVES

- A. Introduction To Biotechnology
 - 1. Define biotechnology
 - 2. Match biotechnology historical events with their proper time periods
 - 3. Arrange the steps of the scientific method of discovery in their proper order
 - 4. Identify the steps to be included in a laboratory report
 - 5. Write a laboratory report
 - 6. List laboratory safety rules
- B. Genetics and Genetic Engineering
 - 1. Match genetic terms with correct definitions
 - 2. Match basic cell structures with correct descriptions
 - 3. Distinguish between the kinds of cell reproduction
 - 4. Explain the role of DNA in living organisms
 - 5. Identify the steps of the genetic engineering process
 - 6. Describe procedures for gene transfer
 - 7. Explain the process of suing DNA by gel electrophoresis
 - 8. Extract DNA from cells
 - 9. Transform bacterial cells
- C. Impacts of Biotechnology
 - 1. List benefits and concerns for biotechnology
 - 2. Identify environmental impacts of biotechnology
 - 3. Name regulatory agencies and laws affecting biotechnology
 - 4. Identify ethical issues impacting biotechnology
 - 5. Defend a position on the ethics of biotechnology
- D. Biotechnology in Plant Science
 - 1. Define plant science terms
 - 2. Distinguish between traditional plant breeding and genetic engineering of plants
 - 3. Explain the processes of micropropagation and tissue culture
 - 4. Describe agricultural applications for plant culture
 - 5. Construct a still air chamber from a box
 - 6. Build a light stand for plant culture
 - 7. Demonstrate propagation of dry bean shoot tips Demonstrate tissue culture of a cauliflower

AG. 540 AGRICULTURAL BIOTECHNOLOGY
UNITS OF INSTRUCTION AND OBJECTIVES

E. Biotechnology in Animal Science

1. Define animal science terms
2. Describe ways that biotechnology might be used in animal science
3. Distinguish between traditional animal breeding and genetic engineering of animals
4. Identify ways that biotechnology may be used to make changes in animals and animal products
5. Define terms relating to immunology
6. List methods of stimulating an immune response
7. Distinguish between types of immunity
8. Describe and list uses for monoclonal antibodies
9. Write opinion statements about concerns in animal biotechnology

F. Microbial Biotechnology in Agriculture

1. Define microbial biotechnology
2. Identify the types of microorganisms used in biotechnology
3. List uses of the fermentation process
4. Describe the components of a fermentation system
5. Distinguish between types of fermentation systems
6. List the sequence of events that occur in a fermentation process
7. Identify some products of fermentation
8. Describe how microbial biotechnology can benefit agricultural production
9. List some benefits of microbial biotechnology to the food processing industry
10. List some benefits of microbial biotechnology to the environment
11. Identify food products produced through fermentation
12. Explain the role of microorganisms in biodegradation
13. Demonstrate bacterial nitrogen fixation with inoculated clover seeds

AG 550 FOOD SCIENCE/AG APPLICATIONS

COURSE DESCRIPTION: Food Science is an applied science of food production, processing, transporting, storage, toxicology and quality control. Students apply the scientific method of discovery as they study the biological and chemical basis of food preparation, processing and preservation. Students develop writing and critical thinking skills through data collection, laboratory procedures, science-based experimentation, and written lab reports. This course focuses primarily on the food processing industry and may be used as a companion course to the Family and Consumer Sciences course in Food Science.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Introduction to Food Science	470
Scientific Evaluation of Food	705
Science of Food Processing	705
Processing Practices	470
Food Safety/Quality Control	705
Toxicology	705
Food Engineering/ResearchBiotechnology	470
TOTAL MINUTES	4230

AG. 550 FOOD SCIENCE/AG APPLICATIONS
UNITS OF INSTRUCTION AND OBJECTIVES

A. Introduction to Food Science

1. Analyze the size and scope of the U.S. food industry.
2. Compare food expenditures in different countries as a percent of income.
3. Compare food expenditures of different income groups in the U.S. and other countries.
4. Explain how the supply of food affects the Consumer Price Index.
5. Define the term "value added" as it relates to food.
6. Describe the food industry system from farm to retail.
7. Understand basic components of Foods.

B. Scientific Evaluation of Food

1. Explain and apply the steps in the scientific method of discovery.
2. Identify and use the basic units of measurement: standard/metric.
3. Determine area, weight, volume, mass and density.
4. Demonstrate the ability to use symbols, formulas and equations.
5. Write accurate, complete laboratory reports.
6. Identify scientific equipment used in the food science laboratory.
7. Demonstrate proper use and care of scientific equipment.
8. Describe and demonstrate safe practices in the laboratory.
9. Explore sensory evaluation of food.
10. Determine the factors that affect food preferences.
11. Examine the structures of atoms and molecules.
12. Distinguish between elements, compounds and mixtures.
13. Explain the differences between ionic and covalent bonds, and ionic and covalent compounds.
14. Differentiate between physical and chemical changes in foods.
15. Demonstrate physical and chemical changes in foods.
16. Explain how the process of ionization is related to the formation of acids and bases.
17. Discuss the importance of pH in the process of digestion.
18. Determine the pH of common foods.
19. Explore relationships among energy, physical changes and chemical reactions.
20. Examine the relationship between molecular motion and temperature.

C. Science of Food Processing

1. Describe scientific practices that are used to protect food crops from diseases and pests.
2. Explain how organic farming practices are different from traditional farming practices.
3. Name advantages and disadvantages for both organic and traditional food production methods.
4. List some food production practices that protect food products against spoilage and damage in the field.
5. Discuss the role of chemicals in protecting crops from damage.
6. Explain how the use of "integrated pest management" practices affects food production.

AG. 550 FOOD SCIENCE/AG APPLICATIONS
UNITS OF INSTRUCTION AND OBJECTIVES

Food Processing cont.

7. Identify some quality problems with food crops that are the result of poor harvesting practices.
8. Describe some science based practices that will protect crops during the harvesting process.
9. List some science based storage practices, and describe how the practices prevent food spoilage.
10. Identify science based methods of transporting food products to avoid damage and/or spoilage.

D. Processing Practices

1. Analyze the food processing procedures used in the U.S. to maintain and preserve foods.
2. Describe the conditions necessary for microbial growth.
3. Explain the role that food processing plays in retarding the growth of microbes.
4. Identify five specific food items and determine the most appropriate processing method for each.
5. Define the terminology associated with food processing.
6. Explain the process for making a cultured dairy product.
7. Describe the roles of food additives in food processing.
8. Compare and contrast "good" and "harmful" bacteria as they relate to food processing and food quality.
9. Describe the types of thermal processes used to preserve foods and compare their relative effectiveness.
10. Compare different canning methods using heat processing.
11. Discuss the pros and cons of irradiation as a method of food preservation.
12. Cite some advantages of food dehydration as a processing method.
13. Calculate the amount of dehydration, on a weight basis that has occurred in a dehydrated food.
14. Compare the three basic commercial methods of freezing foods.
15. Explain the importance of proper packaging for preserving foods.
16. Calculate the BTUs that are required to maintain a given amount of frozen meat for a given period of time.
17. Explain the relationship between temperature and microbial growth of foods.
18. Explain the value of packaging in the marketing of foods.
19. Contrast the effects of different kinds of packaging materials.

E. Food Safety/Quality Control

1. Define the terminology related to food safety.
2. Name the agencies that are responsible for assuring that food is safe.
3. Analyze the seven steps of the HACCP system for maintaining safe food during processing.
4. Evaluate the process of inspecting a food facility for safe sanitation practices.
5. Identify procedures and controls that will prevent contamination of food products during processing.
6. Describe ways to prevent contamination of food products by processing personnel.
7. Explain how quality control procedures are used to maintain products that are uniform and consistent in both quantity and quality.

AG. 550 FOOD SCIENCE/AG APPLICATIONS
UNITS OF INSTRUCTION AND OBJECTIVES

F. Toxicology

1. Discuss the legal uses and restrictions of pesticides on food crops.
2. Explain why restrictions on the use of pesticides are necessary.
3. Describe how plants and animals are used to evaluate the amount of pesticide residue on food crops.
4. Explain how risk is assessed when animals are used to test for carcinogenic substances.
5. Describe the steps that are taken to ensure that food crops are protected from harmful levels of chemical residues.
6. Explain toxicity and address the role that moderation can play in avoiding potentially adverse effects of toxins in foods.
7. Identify some natural substances found in foods that are toxic to humans.
8. Examine some common food allergies that affect some members of the human population.
9. Explain the negative consequences of natural toxins in plants.

G. Food Engineering/Research/Biotechnology

1. Describe ways that science is used to develop new food products.
2. Identify packaging materials for food products that have been developed by engineers and food scientists.
3. Identify kinds of research activities that are conducted by food scientists.
4. Identify some food products that have been developed using bio-technology methods and techniques.

AG. 560 AQUACULTURE SCIENCE

COURSE DESCRIPTION: Aquaculture is the art, science, and business of cultivating plants and animals in water. This course emphasizes the scientific knowledge and methods necessary for aquaculture. Students learn the history, the structure and function of aquatic plants and animals, scientific marketing, general management practices supported by science, nutrition, health, water chemistry, and the role of science in structures, equipment, regulations and careers. Students develop writing and thinking skills through complementary laboratory exercises involving experimentation, data collection, analysis and written laboratory reports.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Aquaculture Basics and History	150
Aquatic Plants and Animals	750
Marketing Aquaculture	250
Aquatic Management Practices	650
Fundamentals of Nutrition in Aquaculture	550
Health of Aquatic Animals	680
Water Requirements for Aquaculture	750
Aquatic Structures and International Agencies and Regulations	100
Career Opportunities in Aquaculture	100
TOTAL MINUTES	4230

AG. 560 AQUACULTURE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

A. Aquaculture Basics and History

1. Identify significant events or people who contributed to the development of aquaculture.
2. Explain the National Sea Grant Program and its role in scientific research.
3. Discuss the role of science and technology in the development of aquaculture.
4. Indicate the role of scientific research in the future of aquaculture.

B. Aquatic Plants and Animals

1. Recognize the scientific names for some common aquatic species.
2. List and describe important biological characteristics in selecting a species for aquaculture.
3. Explain how aquatic species save energy when compared to terrestrial species.
4. List and describe the major characteristics of aquatic plants and animals.
5. Discuss the morphology, anatomy, and physiology of common aquatic animals.
6. Name and describe the nine body systems of aquatic animals.
7. Identify and describe the internal and external anatomy of a fish.
8. Identify and describe the basic structure and internal anatomy of crustaceans.
9. Identify and describe the basic structure and internal anatomy of an oyster or mussel.
10. Describe the basic morphology of aquatic plants.

C. Marketing Aquaculture

1. Describe some scientific skills required to maintain the quality fish and fish products. 2. Recognize that development of a marketing plan and strategy requires research. 3. Describe processing.
4. Describe the grading process.
5. List factors to consider when exploring marketing alternatives.
6. Identify food fish processing cuts and forms with their correct descriptions.

D. Aquatic Management Practices

1. Describe ways seeds are produced for different species.
2. Explain how sex is determined in fish.
3. Discuss methods of controlling reproduction in fish.
4. Describe procedures in reproducing aquatic animals.
5. Describe the sexual reproduction processes of aquatic animals.
6. List salmonids that could be or are cultured.
7. Describe the reproduction and life cycle of crayfish.
8. Describe the reproduction and life cycle of shrimp.
9. Distinguish between red swamp and white river crayfish.
10. Describe the commercial production of hybrid striped bass.
11. Identify popular baitfish species.
12. Describe aquatic species and their current culture or potential for culture.
13. Demonstrate a familiarity with the scientific names for different aquatic animals.
14. Describe breeding systems and their purposes.

AG. 560 AQUACULTURE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

E. Fundamentals of Nutrition in Aquaculture

1. Identify the parts of the digestive system.
2. Explain the role of the digestive system in absorption.
3. Explain how anatomy and behavior affect feeding.
4. List factors that influence energy requirements.
5. List three sources of energy.
6. Identify factors that affect the digestibility of fat.
7. Explain the role of essential fatty acids and essential amino acids.
8. Name ten essential amino acids.
9. Name two essential fatty acids.
10. List the fat-soluble and water-soluble vitamins.
11. Describe ten effects of vitamin deficient diets.
12. Name the macrominerals and the microminerals.
13. List ten functions of minerals.

F. Health of Aquatic Animals

1. Define terms associated with disease conditions.
2. Discuss disease resistance.
3. Define terms associated with severity of disease or conditions.
4. Discuss the role of stress in fish diseases.
5. Describe the immunization of fish.
6. List signs of stress and disease.
7. Discuss common diseases caused by pathogenic viruses.
8. Discuss common diseases caused by pathogenic bacteria.
9. Describe a fungal infection.
10. Name and describe a common pathogenic protozoan parasite.
11. Name and describe a common pathogenic crustacean parasite.
12. Describe a grub or fluke infection.
13. Name and describe a common pathogenic worm parasite.
14. List noninfectious diseases and give examples.
15. Describe an infection of lice.

G. Water Requirements for Aquaculture

1. Describe the properties of water.
2. List cations and anions found in water.
3. Describe how and why aquatic solutions change.
4. Explain how changes in water affect aquatic life.
5. Match compounds and elements with their chemical.
6. Discuss the importance of oxygen in water quality management.
7. Discuss the role of temperature in oxygen management.

AG. 560 AQUACULTURE SCIENCE
UNITS OF INSTRUCTION AND OBJECTIVES

H. Aquatic Structures and Equipment

1. Identify species for pond, cage, raceway, tank or silo culture.
2. List steps in determining a site's water quality.
3. Determine whether soil is suitable for pond construction.
4. Describe the biological concerns in a recirculating or closed system.
5. Compare some of the biological concerns with cages and closed systems.

I. Federal, State, and International Agencies and Regulations

1. Identify agencies that support scientific research in aquaculture.
2. Provide examples of research conducted by government agencies.
3. Give the location of the aquaculture research programs.
4. Name four programs and agencies that provide research information and data to aquaculture.
5. Name five environmental issues addressed by the EPA.

J. Career Opportunities in Aquaculture

1. Identify the careers that require a science background.
2. Discuss what research studies indicate about basic skills and thinking skills for the workplace.

AG. 570 EQUINE SCIENCE

(TO BE INSERTED AT A LATER DATE)

AG. 660 AGRICULTURAL BUSINESS AND ECONOMICS

COURSE DESCRIPTION: A course designed to introduce the student to agribusiness management in the free enterprise system. It includes a study of economic principles, budgeting, record keeping, finance, decision making, risk management, business law, marketing and careers in agribusiness.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Agricultural Careers	188
Agricultural safety Management	235
Basics of Agricultural business Management	235
Government Organizations Affecting Agriculture	94
Basic Economic Principles	376
Agricultural Credit	188
Agricultural Records	470
Budgeting	141
Cash Flow	94
Machinery and Equipment Management	188
Taxes	141
Insurance	188
Marketing	235
Purchasing	141
Agricultural Law	188
Real Property Ownership	141
Estate Planning	141
Decision Making	188
Using Micro Computers	470
Consumer Rights, Responsibilities, and Spending	94
National and International Economy and Trade	94
TOTAL MINUTES	4,230

AG. 660 AGRICULTURAL BUSINESS AND ECONOMICS
UNITS OF INSTRUCTION AND OBJECTIVES

A. Agricultural Careers

1. Identify and describe careers in agriculture
2. Describe how to prepare for a career in agriculture
3. Describe the career opportunities available in agriculture
4. Develop and survey the agricultural careers in the community
5. Conduct a survey of a specific agribusiness occupation
6. Compare agricultural careers to non-agricultural careers

B. Agricultural Safety Management

1. Match terms associated with agricultural safety management to their correct definitions
2. List in decreasing order of importance the three factors which contribute to agricultural accidents
3. Describe management's responsibility in agricultural safety
4. List sources of safety information
5. Describe steps in developing a agricultural safety plan or checklist
6. Describe how to train a new worker so that safety precautions are observed
7. List examples of personal protective equipment recommended for agricultural safety
8. Describe how to prepare for an emergency
9. Describe safety practices that should be followed for livestock
10. Describe safety practices that should be followed for farm machinery
11. Select safety practices that should be followed when storing farm materials
12. Develop and carry out a agricultural safety plan
13. Develop an emergency plan for a farm and/or school shop
14. Teach someone how to safely use a piece of equipment and how to follow the safety plan

C. Basics of Agricultural Business Management Organizations

1. Describe agribusiness management
2. Distinguish among the main characteristics of individual proprietorships, partnerships and corporations
3. Select the characteristics of a cooperative
4. Design a partnership agreement
5. Explain how the factors of production are allocated
6. Define productivity

D. Government Organizations Affecting Agriculture

1. Identify and describe the primary agencies involved with agriculture and the services they provide
2. List the major objectives of the United States Department of Agriculture
3. List the methods used by the government to support prices
4. Describe the primary service provided by the Soil Conservation Service
5. List the primary government agencies involved with agricultural credit
6. Describe the services provided by the Cooperative Extension Service
7. Describe the creation, purpose and funding of the agricultural commodity commissions

AG. 660 AGRICULTURAL BUSINESS AND ECONOMICS
UNITS OF INSTRUCTION AND OBJECTIVES

E. Basic Economic Principles

1. Describe the basic economic factors that affect farm and agribusiness management decisions
2. Select the basic beliefs of capitalism
3. Write the main characteristics of pure competition
4. List the functions of money
5. Describe how supply and demand affect prices
6. List factors that affect prices other than supply and demand
7. Describe the reasons price cycles occur
8. Distinguish among supplementary, complementary, competitive and independent enterprises
9. List the advantages of diversification and specialization
10. Define the basic economic systems - traditional, common market and mixed
11. Know the motivating force behind each system
12. Categorize world economics correctly

F. Agricultural Banking and Credit

1. Discuss the role of credit in agriculture
2. Define two specific kinds of credit
3. List factors to consider in selecting a source of credit
4. Match sources of credit to a list of advantages and disadvantages
5. List factors affecting repayment capacity
6. Distinguish among various types of assets and liabilities
7. Select factors that affect cost of credit
8. Determine the true annual interest rate
9. Calculate interest expense
10. Determine net worth and solvency ratio
11. Define money and explain its functions
12. Identify different types of banking institutions
13. Understand the federal reserve system
14. Be able to fill out a check, deposit slip, endorse a check and balance a checkbook
15. Understand the impact of savings on our national economy
16. List advantages and disadvantages of various saving and investment programs

G. Agricultural Records

1. List reasons for keeping records
2. Distinguish between the two methods of accounting
3. Describe the two basic systems of keeping books
4. Describe, complete and use inventory and depreciation schedules
5. Distinguish among the straight-line, declining balance, and sum-of-the-years digit methods of calculating depreciation, and government regulations
6. List the purposes of an inventory
7. Describe the use of the computer for agricultural record keeping

AG. 660 AGRICULTURAL BUSINESS AND ECONOMICS
UNITS OF INSTRUCTION AND OBJECTIVES

H. Budgeting

1. List the purposes of budgeting
2. List the different types of budgets
3. Arrange in order the steps in developing a budget
4. Distinguish between fixed and operating costs
5. Demonstrate the ability to complete an enterprise budget for an agribusiness

I. Cash Flow

1. Describe the components of a cash flow statement
2. Describe benefits of cash flow planning
3. List methods for altering cash flow
4. Complete a cash flow statement

J. Machinery and Equipment Management

1. List ways machinery can be obtained for use on the farm
2. Select general rules concerning field efficiency
3. Distinguish between types of costs of machinery ownership
4. Calculate estimated salvage value of a farm machine
5. Calculate estimated fixed cost, repair cost, fuel and lubrication, and variable cost for a farm machine
6. Calculate overall cost per acre for farm machinery
7. List ways preventive maintenance can help get the most out of your equipment
8. Describe economic advantages of preventive maintenance
9. Identify factors for economical and safe machine operation
10. Describe the most basic rule of safety

K. Taxes

1. Describe the purposes of taxes
2. Describe the purposes of tax planning
3. List records and information helpful for tax management
4. Describe time requirements in income tax payment
5. Distinguish between taxable and non-taxable items
6. List deductible business expense
7. Describe types of tax credits
8. Prepare federal and state income tax forms with supporting forms and schedules

AG. 660 AGRICULTURAL BUSINESS AND ECONOMICS
UNITS OF INSTRUCTION AND OBJECTIVES

L. Insurance

1. Write the basic purpose of insurance
2. List the types of insurance
3. List three questions to answer in deciding whether to insure against a loss
4. Describe the types of health insurance
5. Distinguish between the two basic types of life insurance
6. Select times that influence the cost of property insurance

M. Marketing

1. Describe key factors involved in marketing
2. Describe types of markets
3. Describe the importance of grades and standards
4. List characteristics of price cycles
5. List factors affecting product quality and price
6. List points to consider when forward contracting
7. Distinguish between hedging and speculation
8. Select characteristics of the futures market
9. Develop a marketing plan for a commodity
10. Describe purpose and function of local markets
11. Identify the market structures of pure competition, oligopoly, monopoly, and monopolistic competition
12. List the characteristics of a free enterprise system

N. Purchasing

1. List advantages and disadvantages of purchasing new vs. used equipment
2. List advantages and disadvantages of leasing
3. List factors involved with leasing and renting land or equipment
4. List procedures in leasing public domain land
5. List factors to consider in purchasing seed, fertilizer, fuel, repairs, and other services
6. List the types and benefits of agricultural professional services
7. Select among purchasing new equipment, purchasing used equipment, leasing equipment and using custom services

O. Agricultural Law

1. Identify major agricultural laws and their purposes
2. List the purposes and components of a farm lease
3. Describe the characteristics of common fence law
4. Describe the steps in establishing and maintaining water rights
5. Describe the steps in establishing and maintaining mineral rights
6. List the characteristics regarding liability laws in agriculture
7. Describe health and safety regulations governing agriculture
8. Describe the property rights of agricultural landowners

AG. 660 AGRICULTURAL BUSINESS AND ECONOMICS
UNITS OF INSTRUCTION AND OBJECTIVES

P. Real Property Ownership

1. Describe the purposes of the legal instruments involved in real property ownership
2. List the types of real property descriptions
3. Demonstrate the procedure of describing real property
4. List the reasons for appraising land and buildings
5. Compare methods of purchasing real property
6. List the factors to consider when purchasing real property
7. List the types and components of rental agreements
8. Identify factors necessary to determine real property values

Q. Estate Planning

1. Describe the importance of estate planning
2. List the major estate planning laws
3. Describe how the types of property ownership affects estate planning
4. Describe the procedures necessary to transfer property
5. Identify the required records for property transfer
6. List the components of a will
7. List the laws which govern property transfer
8. Compare the cost of property transfer

R. Decision Making

1. Describe the management-decision process
2. Write a justification in developing a farm office
3. Describe the benefits of a microcomputer in making decisions
4. List the personnel resources available to assist decision making
5. List the publications one can obtain to assist decision making
6. Describe the latest systems available for marketing crops or livestock

S. Using Micro Computers

1. Enter the following on the computer:
 - a. inventories
 - b. budgets
 - c. cash flow statement
 - d. financial statement
 - e. daily journal records
2. Demonstrate how the computer will determine efficiency factors and management decisions
3. Demonstrate the ability to use:
 - a. wordprocessing
 - b. spreadsheets
 - c. data bases
 - d. electronic mail

AG. 660 AGRICULTURAL BUSINESS AND ECONOMICS
UNITS OF INSTRUCTION AND OBJECTIVES

T. Consumer Rights, Responsibilities and Spending

1. Know the origin of the consumer movement
2. Identify the rights and responsibilities of the consumer
3. Identify private and public consumer protection agencies
4. Evaluate consumer information dealing with price supports, welfare, medicare, food stamps, minimum wage, social security, etc.
5. Demonstrate the ability to rationally use scarce resources to obtain food, clothing, housing, etc.
6. Identify how information from labels, warranties standards, grades, etc., can be used in making informed choices

U. National and International Economy and Trade

1. Recognize how the nations economic performance is measured
2. Know and analyze the cause of business cycles
3. Assess how government policies impact economic growth
4. Know the types of unemployment and inflation and the causes of each
5. List and classify different economics of the world
6. Identify and compare the characteristics of different economics
7. Understand the principles and practices of international trade
8. Identify the problems of economic growth in third world nations and their impact on the nations of the world

AG. 9800 OCCUPATIONAL AND CAREER EXPERIENCE PROGRAM
(COE AND LAND LABORATORIES)

COURSE DESCRIPTION: A course designed to provide students with the skills necessary to gain and maintain employment in the agricultural industry.

UNITS OF INSTRUCTION	MINUTES OF INSTRUCTION
Applying for a Job	141
Labor Relations and Management	141
Relationships on the Job	94
Human Relations in Leadership and Management	94
Stress Management	94
Cooperative Job Placement	235
Job Orientations	235
Cooperative Occupational Experience	
Land Laboratories	3,196
TOTAL MINUTES	4,230

AG. 9800 OCCUPATIONAL AND CAREER EXPERIENCE PROGRAM
UNITS OF INSTRUCTION AND OBJECTIVES

A. Applying for a Job

1. List five employment qualifications
2. Compare your employment qualifications with the qualifications needed for five occupations
3. List twelve different sources of job opportunities
4. Demonstrate how to fill out an application form accurately and completely
5. Prepare a letter of application and resume for a job
6. Be familiar with the components of a personal data sheet
7. Present orally the purposes of an interview and how to prepare for an interview

B. Labor Relations and Management

1. Describe important characteristics for an effective employer/employee relationship from each point of view
2. List five basic human needs that affect how people perform in a job
3. Describe an orientation program for employees
4. Select criteria for an effective incentive plan
5. Describe the workman's compensation program in Idaho as it relates to farming and other agribusiness
6. Select characteristics of unemployment insurance in Idaho
7. Describe the procedure for legally employing aliens
8. Describe reporting requirements for federal and state taxes and FICA
9. Prepare a job description for an agricultural occupation

C. Relationships on the Job

1. List and discuss attitudes which an employer desires in employees
2. List and discuss attitudes an employee desires in an employer
3. Discuss at least three factors which are necessary for good relationships among coworkers
4. Identify the major causes of co-worker relationship problems
5. List and discuss five advantages and five disadvantages of unions and professional organizations
6. Develop a set of criteria an employer could use for promoting an employee
7. List and explain the duties and responsibilities of a job supervisor
8. Describe the various methods of terminating a job

**AG. 9800 OCCUPATIONAL AND CAREER EXPERIENCE PROGRAM
UNITS OF INSTRUCTION AND OBJECTIVES**

D. Human Relations in Leadership and Management

1. Discuss the meaning of self-concept
2. Compare the four models depicting human behavior
3. Discuss Maslow's Hierarchy of Needs
4. List the different types of leaders
5. Compare the characteristics of the different types of leaders
6. Define management
7. List the five resources to be used by a manager
8. Describe the five functions of management:
 - a. planning
 - b. organizing
 - c. coordinating
 - d. divesting
 - e. controlling

E. Stress Management

1. Describe the impact of intergenerational relationships on stress
2. List factors which contribute to stress
3. List positive and negative responses to stress
4. List resource agencies to contact for stress advice/consultation

F. Cooperative Job Placement

1. Identify a particular area of interest in agriculture
2. Identify a resource person in the area of interest
3. Through contact with the resource person and instructor, identify a job of interest

G. Job Orientations

1. Identify skills necessary to perform duties in student's area of interest
2. Determine time schedule to be worked out with school instructor and employer
3. Select an approved training plan to be used during the cooperative experience
4. Schedule instructor visitation times

H. Cooperative Occupational Experience/Land Laboratories

1. Select a record keeping system to be used during the Cooperative Occupational or Land Laboratory Experience
2. Inform instructor of daily progress with COE or Land Laboratory Experience
3. Develop a summary of skills acquired during the COE or Land Laboratory Experience

AG. 9900 OCCUPATIONAL AND CAREER EXPERIENCE PROGRAM
(SAE AND SUMMER PROGRAMS)

COURSE DESCRIPTION: Most students in Agricultural Education participate in an SAE program during the summer months. In the past, most SAE programs consisted of production enterprises; however, in recent years there has been a tremendous increase in the number of placement and work experience programs. Many secondary Agriculture Education programs are offering students credit for SAE programs. There is an increased emphasis in Agricultural Education to ensure that what is taught in the classroom be tied to real problems experienced by students and must be practiced in the right setting, reinforced, supervised and organized in a sequential manner.

Because of the changes in student populations and the need to experience realistic situations, many of the practical applications of Agricultural Education occur in the summer months. They cannot be duplicated in the classroom or laboratory. The agriculture instructor must increasingly use farms and agricultural businesses to reinforce the learning taught in the classroom. The application of objectives for many problems taught must be completed on farms and in businesses, and the instructor and the agricultural industry needs to be involved in the learning process of the student.

COURSE OBJECTIVES: Students will be able:

- A. To relate classroom instruction to on-the-job experience
- B. To demonstrate livestock care and management skills
- C. To demonstrate crop production management and mechanics skills in operating tractors, tillage machinery, planting machinery, weed and insect control machinery and harvesting machinery
- D. To demonstrate ornamental horticulture and landscaping skills in caring for shrubs, trees, turf, annual and perennial flowers
- E. To demonstrate care and management skills in the areas of natural resources
- F. To describe the characteristics of agricultural jobs in production agriculture, mechanics, horticulture, natural resources, and sales and service occupational areas
- G. To prepare crops and livestock for exhibits and shows
- H. To select various types and grades of livestock
- I. To acquire experiences in various leadership skills through participation in various FFA activities.

**AG. 9900 OCCUPATIONAL AND CAREER EXPERIENCE PROGRAM
(SAE AND SUMMER PROGRAMS)**

CREDITED AGRICULTURAL EDUCATION SUMMER PROGRAM: Students meeting the following established criteria in Agricultural Education will be granted high school credit for the completion of a supervised agricultural experience program for the summer months.

- A. Student must be enrolled in the Agricultural Science program one year prior to being eligible to receive credit for SAE summer program.
- B. Each student enrolled in summer SAE program will have the opportunity to develop skills in the area of their interest.
- C. Supervision of these programs is to be provided by the agriculture instructor.
- D. Participants in the summer program must record activities concerning SAE program in the SAEP Planning and Accounting book.
- E. Definite goals and learning objectives shall be established by student, agriculture instructor, parents and cooperating agribusiness employers.
- F. Individualized and group instruction shall take place on farms, in agribusiness firms, in group meetings, on tours and during field days.
- G. A list of skills and competencies will be developed by the agriculture instructor, parent, or employer which the student must fulfill during the summer SAE program.
- K. The agriculture instructor in cooperation with parents and/or cooperating employers shall monitor and record the progress of the student toward objectives.
- I. The agriculture instructor and employer will be responsible for establishing a grade for summer SAE program credit.
- J. A minimum of three visits by the agriculture instructor will be made to monitor and check progress of student toward meeting objectives.
- K. One semester credit can be earned upon completion of SAE summer program as outlined above. A minimum of 155 hours (not more than 15 hours in any one competency) in the skill and competency development area must be completed for credit.