This is the Programs, Premajors, and College Information and Policies sections of the 1996-1999 University of Minnesota College of Agricultural, Food, and Environmental Sciences Bulletin.
The College of Agricultural, Food, and Environmental Sciences (COAFES) views each of its majors as a four-year program that integrates liberal education courses, preparation or foundation courses, and professional courses in areas of special expertise. The program information below details the requirements for each of the college’s majors. The liberal education requirements are outlined in the box to the left. Students will need to consult with their adviser and the quarterly printed Class Schedule to determine which University courses have been approved to meet the liberal education core and designated theme requirements.

Note: Several courses listed under the designation of foundation and professional courses in each major will also meet the liberal education requirements.

Students enrolled in a degree program before 1994 at the University of Minnesota–Twin Cities Campus, and who have been following the general education requirements designated as areas A-D, have the option of completing their COAFES degrees using those requirements. Please consult with your academic adviser, or the COAFES Student Services Office for a summary of the requirements and a complete list of courses to fulfill these requirements.

All other transfer students will be held to the current University of Minnesota–Twin Cities campus liberal education requirements. The number of credits required for graduation is dictated by the liberal education program you follow. Students in the environmental science major must complete the current University liberal education requirements.

Students should work closely with their adviser to make efficient use of their time in meeting both major and liberal education requirements.

Program Requirements—Students assume the program requirements for their major that are in effect the quarter they enter the college. COAFES Student Services Office provides students with a current program sheet or Academic Progress Audit System Report at orientation/registration.

Students can choose to move to newer program requirements as the program changes in subsequent years or quarters, but they must assume the new requirements in total. To move to a newer program, students file a Change of Major form, available in the COAFES Student Services Office. Upon processing the Change of Major, the Student Services Office will provide students an updated program sheet. The student and his/her adviser should follow those requirements for graduation. The final degree clearance will be processed using the student’s declared major.
Agricultural and Food Business Management

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The agricultural and food business management major is offered jointly by COAFES and the Carlson School of Management. The agricultural and food business management curriculum emphasizes the use of concepts and methods from economics and business management in the identification, analysis, and solution of management problems related to food, agriculture, natural resources, and economic development. The program provides a balance between applied economics and business administration studies, with a limited amount of agricultural science. Students may elect a variety of courses in their junior and senior years to accommodate special interests and career goals.

Graduates of this curriculum are prepared for a wide range of employment opportunities in the food system and other agribusiness. Examples of employment areas include commodity trading and analysis, finance, management, farm input marketing, marketing food products, sales management, administration, public and industrial relations, production management, economic and statistical analysis, managerial accounting, and transportation analysis.

Students completing this program may also pursue graduate studies in preparation for research, teaching, or continuing education positions in academic institutions, government agencies, and industry.

Admission to the Major

Students are admitted to the major after satisfactory completion of a pre-agricultural and food business management program. Admission standards are developed in conjunction with the Carlson School of Management. Application deadlines are June 15 for fall quarter, October 15 for winter quarter, and January 15 for spring quarter.

To be considered for admission to the agricultural and food business management major you must meet the following requirements:

1) Complete or have in progress coursework to total 85 credits by the time of admission.
2) Complete the following management “tool” courses on an A-F grading basis by the time you enter the program:
   - Acct 1050 or ApEc 1250
   - ApEc 1101, 1102 or Econ 1101, 1102
   - BA 1550
   - Math 1142 or 1251
3) Earn a minimum GPA of 2.80 in all coursework.
4) Earn a minimum GPA of 2.5 in the tool courses and at least a C in each course.

COAFES students planning to major in agricultural and food business management who have not completed the pre-agricultural and food business management program are assigned a faculty adviser but retain a pre-major status until they are accepted into the program.

Additional information about admission to the program and application materials can be obtained from the major coordinator for the agricultural and food business management program in 316 Classroom-Office Building, or from the COAFES Student Services Office, 120 Biosystems and Agricultural Engineering.

Major Requirements

Agricultural and food business management students must complete the requirements listed below. Consult with your adviser to determine a suitable sequence for completing the required courses. Course substitutions in the professional requirements can be made only with the approval of your adviser and the agricultural and food business management major coordinator.

Liberal Education—See the liberal education requirements on page 8 and information at the beginning of this section. Students who enrolled in a degree program at the University of Minnesota–Twin Cities campus before fall 1994 see the liberal education requirements on page 8.

Foundation Requirements

Communication
- Rhet 1101—Writing to Inform and Persuade (4)
- Rhet 1104—Library Research Methods (1)
- Rhet 1151—Writing in Your Major (4)
- Rhet 1222—Public Speaking (4)
- Rhet 3562—Writing in Your Profession (4)

Mathematics and Science
- Biol 1009—General Biology (5)
- Chem 1001—General Principles of Chemistry (4)
  or Chem 1051 Chemical Principles I(4)
- Math 1142—Short Calculus (5)
  or Math 1251—One-Variable Differential and Integral Calculus (4)
- Plus one from the following:
  - BioC 1401—Elementary Biochemistry (4)
  - Biol 1103—General Botany (5)
  - Biol 1106—General Zoology (5)
  - Chem 1002—Elementary Organic Chemistry (4)
  - Chem 1052—Chemical Principles II(4)

Professional Requirements

From the College of Agricultural, Food, and Environmental Sciences
- ApEc 1000—Orientation to Agricultural and Applied Economics (1)
- ApEc 1101—Principles of Microeconomics (4)*
- ApEc 1102—Principles of Macroeconomics (4)*
- ApEc 3001—Applied Microeconomics: Consumers and Markets (4)
- ApEc 3002—Applied Microeconomics: Managerial Economics (4)
- ApEc 3240—Strategic Management of Agribusiness (4)
- ApEc 3260—Operations Management of Agribusiness (4)
- ApEc 3400—Markets, Marketing, and Prices (4)
- ApEc 3500—Agribusiness Finance (4)

* History and Social Science—Students must complete two additional courses beyond the minimum 12 credits required for liberal education. The courses must come from the list of approved courses for the History and Social Sciences category of the liberal education curriculum.
Agricultural & Food Business Management

Plus two elective courses in agricultural economics (an internship or special project is encouraged).

An additional 16 credits is required in agricultural science.
At least one course must be 3xxx or 5xxx. Courses in agricultural education, fisheries and wildlife, landscape architecture, rhetoric or physical and biological sciences may not be used to meet this requirement. In agricultural engineering, only AgET 3025 and AgET 5410 may be used.

Students choosing the food processing wholesaling and retailing emphasis who want to develop technical expertise in food processing are encouraged to complete 16 credits from:
- FScN 1020—Introductory Microbiology (4)
- AnSc 1510—Consumer Meat Science (2)
- FScN 1102—Technology of Food Processing (4)
- FScN 3102—Introduction to Food Processing (4)
- FScN 3135—Food Processing I (4)
- FScN 3136—Food Processing II (4)

Students interested in a technical expertise in food wholesaling and retailing are encouraged to complete 16 credits from:
- FScN 1020—Introductory Microbiology (4)
- AnSc 1510—Consumer Meat Science (4)
- FScN 1612—Principles of Nutrition (4)
- FScN 3472—Food Selection Principles (4)
- FScN 5390—Introduction to Food Law (4)

Students choosing an emphasis in business management, commodity and farm input marketing, finance and banking, or the individualized area of emphasis should contact the major coordinator for a list of courses that can be used to fulfill the agricultural science requirements.

From the Carlson School of Management
- Acct 1050—Introduction to Financial Reporting (4)
- Acct 3001—Introduction to Management Accounting (4)

BA 1550—Business Statistics (4)
Mgmt 3001—Fundamentals of Management (4)
Mktg 3000—Principles of Marketing (4)
Plus three elective courses in the Carlson School of Management.

Emphasis Areas (16 credit minimum)

1. **Business Management**
   - BFin 3100—Financial Management (4)
   - Choose additional credits from the following:
     - Acct 3201—Intermediate Management Accounting (4)
     - ApEc 3450—Agricultural Input Marketing Economics (4)
     - ApEc 3920—Agricultural Law (4)
     - ApEc 5440—Cooperatives and Agribusiness Organization (4)
     - BLaw 3058—Introduction to Law, Law of Contracts and Sales Contracts (4)
     - IR 3002—Personnel and Industrial Relations (4)
     - IR 3010—The Individual and the Organization (4)
     - Mgmt 3002—Psychology in Management (4)
     - Mgmt 3008—Entrepreneurship and the Smaller Enterprise (4)
     - OMS 3056—Production and Inventory Management (4)

2. **Commodity and Farm Input Marketing**
   - ApEc 5480—Futures Markets and Prices (4)
   - LM 3000—Introduction to Logistics Management (4)
   - Choose additional credits from the following:
     - ApEc 3300—Agricultural and Food Sales (3)
     - ApEc 3420—Grain Marketing Economics (4)
     - ApEc 3430—Dairy Marketing Economics (4)
     - ApEc 3440—Livestock and Meat Marketing Economics (3)
     - ApEc 3450—Agricultural Input Marketing Economics (4)
     - ApEc 5750—Agricultural Trade and Commercial Policies (3)
     - LM 5020—Advanced Logistics Management (4)

3. **Finance and Banking**
   - ApEc 5500—Financial Markets and Agricultural Credit Institutions (4)
   - BFin 3100—Financial Management (4)
   - Choose additional credits from the following:
     - Acct 3201—Intermediate Management Accounting (4)
     - Acct 5160—Financial Statement Analysis (4)
     - ApEc 3920—Agricultural Law (4)
     - ApEc 5480—Futures Markets and Prices (4)
     - BFin 3300—Securities Analysis and Portfolio Management (4)
     - BFin 3400—International Financial Management (4)
     - BFin 3601—Financial Management of Depository Institutions (4)
     - BLaw 3058—Introduction to Law, Law of Contracts and Sales Contracts (4)
     - Econ 5432—International Finance (4)
     - Ins 5100—Risk Management and Insurance (4)

4. **Food Processing, Wholesaling and Retailing**
   - ApEc 5550—Food Marketing Economics (4)
   - Mktg 3080—Marketing Strategy (4)
   - Choose additional credits from the following:
     - ApEc 3300—Agricultural and Food Sales (3)
     - ApEc 5480—Futures Markets and Prices (4)
     - ApEc 5750—Agricultural Trade and Commercial Policies (3)
     - BFin 5241—Retail Promotion (4)
     - BFin 5242—Managerial Decision Making (4)
     - Mktg 3010—Buyer Behavior and Market Analysis (4)
     - Mktg 3030—Sales Management (4)
     - Mktg 3050—Marketing Communications (4)
     - Mktg 3065—Retail Management (4)

5. **Individualized Area of Emphasis**
   - Students preparing for career opportunities that emphasize skills such as communication, law, or information systems may use this alternative to design an area of emphasis. A program of study under this emphasis must be approved by the adviser and the major coordinator. At least 12 of the 16 credits must be completed after receiving approval.
   - Electives to reach 180 credits required for graduation with a B.S. degree. Students following the old general education distribution of Areas A-D must have 192 credits for graduation.
Agricultural Education

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The undergraduate major in agricultural education, offered jointly by COAFES and the College of Education and Human Development (CEHD), is for students who plan to teach agriscience, agriculture, horticulture, agribusiness, food systems, or natural resource management education in public schools, technical colleges, or community colleges, or for those who plan to work in educational positions in agricultural development and in various agricultural-related organizations. The program provides comprehensive education for those preparing for teaching; extension work; local, national, and international development; other professional careers in sales and marketing; financial management; or production agriculture. The program requires a broad study of agriculture and permits emphasis in animal science, crop science, agricultural economics, agricultural business, horticulture, soils, natural resources, and agricultural engineering technology. The agricultural education and the natural and managed environmental systems specializations offer special preparation in education necessary to qualify for licensure in agricultural education for teaching agribusiness, agriscience education, horticulture, and natural resources.

Admission Procedures

Students may enter a pre-agricultural education major in COAFES as freshmen or transfer students. Students must earn 90 credits in the pre-agricultural education major before transferring to CEHD.

Students should apply for admission to the college in the final quarter of their sophomore year. This application may be completed with the faculty of Agricultural Education, 325 Vocational and Technical Education Building. Students must complete the application requirements as directed by the agricultural education staff. Applications must be submitted within the first three weeks of the quarter preceding the desired quarter of admission.

The Natural and Managed Environmental Systems Specialization and the Agricultural Education Specialization—Students in these specializations will be eligible to teach agriculture, horticulture, natural resources, forestry, agribusiness, agriscience, food systems, and agricultural mechanics at the secondary or postsecondary levels and adult farm business management education with the agricultural education specialization provided they have the appropriate work experience to accompany their degree. In addition, graduates from this specialization may seek employment in all of the other areas listed in the general features section.

Applicants for teaching licensure must have the appropriate work experience.

To be eligible for admission to the natural and managed environmental systems or the agricultural education specializations in CEHD, students must have a minimum overall GPA of at least 2.50. Before admission, students will be required to complete the Praxis I: Pre-Professional Skills Tests (PPST) which is a test of basic reading, writing, and mathematics knowledge. Students must maintain a GPA of 2.50 to be eligible for student teaching.

The Agricultural Development Specialization—

Students in this specialization will be eligible for a wide range of positions in agricultural development. They will guide the process of change for improving an individual, organization, community, or society within the context of agriculture. They may seek employment in all fields listed in the general features section except teaching. This specialization provides an emphasis in experiential education in both the production and agribusiness phases of agriculture.

To be eligible for admission to the agricultural development specialization in CEHD, you must have a minimum overall GPA of at least 2.30.

Transfer students who have completed less than two years of college work apply for admission to COAFES. These students will then apply to CEHD in the quarter in which they complete their sophomore year.

Transfer students who have completed two or more years of college work apply for admission to the College of Agricultural, Food, and Environmental Sciences, Office of the Registrar—St. Paul, University of Minnesota, 130 Coffey Hall, 1420 Eckles Avenue, St. Paul, MN 55108.

COAFES reviews the application and evaluates the credits earned. During the first quarter of enrollment in COAFES, students apply for admission to CEHD.

Student Teaching Internship Experience—In the natural and managed environmental systems and the agricultural education specializations, students must have an overall GPA of 2.50 to be eligible for the student teaching experience.

Graduation Requirements—Students must have an overall GPA of 2.50 to meet graduation requirements in the natural and managed environmental systems and agricultural education specializations. They must have an overall GPA of 2.30 to graduate from the agricultural development specialization.

Work Experience—To obtain a teaching license, students must have a baccalaureate degree and satisfactory relevant work experience in any of the broad emphasis areas of agriculture. When applying for a license, students will be expected to verify at least 2,000 hours of work experience in any of a broad range of emphasis areas relevant to agriculture for a secondary license and 4,000 hours for adult farm management institutions. Special rules apply for work experience for adult teaching.
Major Requirements—Students majoring in agricultural education must complete the liberal education requirements listed below. Changes in the liberal education requirements require the approval of the University’s Council on Liberal Education. Changes in any of the foundation areas such as composition, psychology, mathematics, or biological and physical sciences require the approval of your adviser and COAFES. Changes in the agriculture and natural resources categories may be made with the adviser’s recommendation and approval of the agricultural education coordinator.

Liberal Education Diversified Core and Designated Themes—See the liberal education requirements on page 8 and information at the beginning of this section. Students who enrolled in a degree program at the University of Minnesota–Twin Cities campus before fall 1994 see the liberal education requirements on page 8.

Foundation Requirements
Two writing courses (8) (At least one at the 3xxx level)
Two oral communication courses (8)
One mathematics course—check specialization
Psy 1001—Introduction to Psychology (4)
Biol 1009—General Biology (5)
Phys 1041—General Physics (5)
Chem 1001, 1002—General Principles of Chemistry (4,4)
Biol 1103—General Botany (5)
or Biol 1106—General Zoology (5)
BioC 1401—Elementary Biochemistry (4)
or Chem 3301—Organic Chemistry I (4)

Professional Requirements
AgEd 1001—Introduction to Agricultural Education (1)
AgEd 1002—Principles of Career Planning in Agriculture (1)
AgEd 3029—Directed Experience in Agricultural Education (1)

Emphasis Areas
1. Agricultural Education (Teacher Licensure Program)
   Math 1031—College Algebra and Probability (4)
   General Education
   EPsy 5119—Learning and Cognitive Foundations of Education (4)
   EPsy 5139—Building a Learning Community (4)
   EPsy 5229—Classroom Assessment Methods (2)
   EdPA 5090—School and Society (3)
   Kin 5530—Biological and Physical Foundations of Education (2)
   CI 5300—Technology for Teaching and Learning (2)
   PubH 3004—Basic Concepts in Personal and Community Health (5)
   or PubH 3001—Personal and Community Health (3)
   and PubH 3003—Fundamentals of Alcohol and Drug Abuse (2)
   Agricultural Education
   AgEd 5028—Teaching Methods in Agricultural Education (5)
   AgEd 5049—Agricultural Education for Adults (3)
   AgEd 5061—Program Planning and Evaluation (3)
   AgEd 5072—Practicum: Agricultural Business and Industry (3)
   WCFE 5602, 5603, 5604—Student Teaching Internship (2,2,8)
   WCFE 5300—Philosophy and Practice of Vocational Education (3)
   WCFE 5330—Coordination Techniques in Cooperative Education (3)
   Animal Science (14 credits)
   AnSc 1100—Introduction to Animal Science (5)
   or AnSc 3131—Live Animal Performance and Selection (3)
   AnSc 3200—Animal Breeding (4)
   or AnSc 3301—Systemic Physiology (6)
   or GCB 3022—Genetics (4)
   AnSc 3401—Principles of Animal Nutrition (4)
   Applied Economics/Business (20 credits)
   ApEc 1101—Principles of Microeconomics (4)
   ApEc 3300 Agricultural and Food Sales (3)
   or BIE 3060—Professional Sales Management (3)
   or GC 1537—Professional Selling (3)
   plus 13 additional credits in marketing, management (1 course), and accounting (1 course)

Teaching about agriculture also involves community outreach, such as helping a youngster plant a tree.
Mechanical Technology and Environment (6 credits)
AgEd 1042—Current Technical Competencies (3)
AgEd 5042—Agricultural Mechanics (3)
Natural Resources (9 credits )
Plant Science/Plant Pathology or Entomology (12 credits)
Soil Science (5 credits)
Soil 1020—The Soil Resource (5)
or Soil 3125—Basic Soil Science (5)
Electives to complete the 198 credits required for a bachelor of science degree.

2. Agricultural Development
Math 1031—College Algebra and Probability (4)

Agricultural Education
AgEd 5401—Adult Learning and Development Through the Life Span (3)

Agricultural Education
AgEd 5010—Rural Development Leadership (3)
AgEd 5021—Education Through Extension Methods (3)
AgEd 5023—Methods for Change in Developing (3)
WCFE 5025—Extension Program Development (3)
AgEd 5055—Methods in Farming Systems Research and Extension (3)

Plus 10 credits from the following:
AgEd 3001—Experiential Learning: Production Agriculture (0-10)
AgEd 3002—Experiential Learning: Agricultural Business (0-10)

Development
Two from the following:
ApEc 3070—Agriculture and Economic Growth in Developing Countries (4)
AgEc 5790—World Food Problems (3)
Econ 5401—International Economics (4)
Pol 3477—Political Development (4)
Pol 3835—The International System (4)

Two from the following:
ApEc 3007—Applied Microeconomics: Trade, Policy and Development (4)
Econ 5301—Economic Development (4)
Econ 5307—Comparative Economic Systems (4)
FScn 1102—Technology of Food Processing (4)
FScn 1612—Principles of Nutrition (4)

Animal Science (7 credits)
Agricultural Economics (18 credits)
ApEc 3300 Agricultural and Food Sales (3)
or BIE 3060—Professional Sales Management(3)
or GC 1537—Professional Selling (4)
ApEc 1250—Principles of Accounting (4)
or Acct 1100—Principles of Accounting (4)
ApEc 3810—Principles of Farm Management (4)

Plus select two courses from the following:
ApEc 3420—Grain Marketing Economics (4)
ApEc 3430—Dairy Marketing Economics (4)
ApEc 3440—Livestock and Meat Marketing Economics (3)
ApEc 3450—Agricultural Input Marketing Economics (4)

Mechanical Technology and Environment (5 credits)
Natural Resource Management (6 credits)
Plant Science or Plant Pathology or Entomology (12 credits)
Soil Science (5 credits)
Soil 1020—The Soil Resource (5)
or Soil 3125—Basic Soil Science (5)

Electives to complete the 198 credits required for a bachelor of science degree.

3. Natural and Managed Environmental Systems
(Teacher Licensure Program)
Math 1142—Short Calculus (5)
or Math 1251, 1252—One-Variable Differential and Integral Calculus I, II (4, 4)
Stat 3011—Statistical Analysis (4)
or Agro 3060—Field Plot Design in Agronomy (4)
Geol 1001—The Dynamic Earth: An Introduction to Geology (4)
or Geol 1012—Planet Earth (4)
or Geos 1701—Faces of the Earth (4)
Biol 3008—Ecology and Evolution (4)

General Education
EPhy 5139—Interpersonal and Personality Effects on Learning (4)
EPhy 5229—Classroom Assessment Methods (2)
EdPa 5090—School and Society (3)
CI 5300—Technology in Education (2)
Kin 5530—Biological Foundations of Education (2)
PubH 3004—Basic Concepts in Personal and Community Health (5)
or PubH 3001—Personal and Community Health (3) and PubH 3003—Fundamental of Alcohol and Drug Abuse (2)

Agricultural Education
AgEd 5028—Teaching Methods in Agricultural Education (5)
AgEd 5061—Program Planning and Evaluation (3)
AgEd 5072—Practicum: Agricultural Business and Industry (3)
WCFE 5602, 5603, 5604 Student Teaching Internship (2,2,8)
WCFE 5300—Philosophy and Practice of Vocational Education (3)
WCFE 5330—Coordination Techniques in Cooperative Education (3)

Animal Science (6 credits)
AnSc 3401—Principles of Animal Nutrition (4)

Select two from the following:
AnSc 1301—Management Technique: Swine (1)
AnSc 1302—Management Technique: Sheep (1)
AnSc 1303—Management Technique: Beef (1)
AnSc 1304—Management Technique: Dairy (1)
AnSc 1305—Management Technique: Poultry (1)

Soil and Plant Science (25 credits)
Soil 1020—The Soil Resource (5)
or Soil 3125—Basic Soil Science (5)
Soil 3202—Soil Conservation and Land Use Management (4)
or Soil 3416—Soil Fertility (4)
Soil 4250—Introduction to Meteorology (4)
or Geog 1425—Introduction to Meteorology (4)
AnPi 3010—Environment and World Food Production (4)
or AnPi 5060—Integrated Management of Cropping Systems (4)
Agro 1010—Principles of Agronomy (5)
or Hort 1021—Woody Plant Materials (5)
or FR 1100—Dendrology (4)
Agro 3020—Growth and Development of Field Crops (4)
or Hort 3001—Growth Regulation of Horticulural Plants (5)

Natural Resources and Environment Studies (15 credits)
One from the following:
NRES 1010—Issues in the Environment (3)
or FR 1201—Conservation of Natural Resources (3)
or FW 1002—Wildlife: Ecology Values, and Human Impact (3)
or FW 1101—Ethics and Values in Research Management (3)
or FW 3052—Introduction to Fisheries and Wildlife (3)
or PIPA 3004—Air Pollution, People and Plants (3)

Each of the following:
NRES 3001—Colloquium in Natural Resources and Environmental Studies (1)
NRES 3060—Water Quality in Natural Resource Management (3)
or AgET 5410—Hydrology and Water Quality (5)
NRES 5100—Problem Solving in Natural Resources and Environmental Studies (5)
NRES 5210—Survey, Measurement, and Modeling Methods for Natural Resource Analysis (3)

Mechanical Technology and Environment (6 credits)
AgEd 1042—Current Technical Competencies (3)
AgEd 5042—Agricultural Mechanics (3)

Agricultural Economics/Business (8 credits)
ApEc 1250—Principles of Accounting (4)
or ApEc 3810—Principles of Farm Management (4)

Electives to reach 198 credits required for graduation with a bachelor of science degree.
Agricultural Industries and Marketing

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Industries related to modern agriculture include the manufacturers and distributors of farm production inputs (such as equipment, structures, animal feed, health products, seeds, fertilizers, and crop protection products), and the assemblers, processors, manufacturers, and distributors of products originating from farms (such as meat, milk, eggs, wool, grains, fruits, vegetables, nursery crops, flowers, and turf) and the finance and insurance industries providing agricultural credit. These agribusiness industries employed about 18 million workers in 1988 and created nearly 16 percent of the U.S. Gross National Product that year. “Agribusinesses,” such as these, regularly search for individuals who have a broad education in the scientific aspects of agriculture, effective work and communication skills, and the ability to competently use quantitative methods to solve business problems.

All departments in COAFES contribute to and are represented by the agricultural industries and marketing (AIM) major. This educational program achieves two objectives. It

1) provides a broad-based educational program reflecting the academic strengths of COAFES and the University at large, and
2) prepares students for a challenging career in agricultural industries.

The scientific knowledge and technical skills necessary to become an effective agribusiness professional are provided through requirements in the basic and agricultural sciences and are strengthened by selection of an area of emphasis in one of five areas: animal industries, horticultural industries, crops/soils industries, food industries, or an individualized emphasis.

Certified advisers assist students with course selection in their area of emphasis, identify appropriate internships or practicum experiences, and select electives to develop breadth and depth in their undergraduate programs.

In addition, this major emphasizes development of oral and written communication skills in various interactive settings. Courses in business methods and economic analysis help students recognize and solve fiscal, marketing, and managerial problems in the modern agribusiness world.

The cross-disciplinary AIM major requires that students become involved in “real-world” experiences (industry internships) and/or in marketing problem solving (marketing practicum). As students progress through the program, regular meetings with faculty, agribusiness leaders, student organizations, alumni, and fellow students are a part of the educational experience.

Major Requirements

All students in the AIM major must complete the requirements listed below. Faculty advisers assist students in selecting required courses, the use of electives, and the professional project (internship or practicum).

Liberal Education Diversified Core and Designated Themes—See the liberal education requirements on page 8 and information at the beginning of this section. Students who enrolled in a degree program at the University of Minnesota–Twin Cities campus before fall 1994 see the liberal education requirements on page 8.

Foundation Requirements

Quantitative Foundations
Math 1142—Short Calculus (5)
or Math 1251—One-Variable Differential and Integral Calculus (4)
ApEc 1250—Principles of Accounting (4)
or Acct 1050—Introduction to Financial Reporting (5)

Plus one from the following:
Stat 3011—Statistical Analysis (4)
BA 1550—Business Statistics (4)
Agro 3060—Field Plot Design in Agronomy (4)

Science Foundations
Biol 1009—General Biology (5)
Chem 1001—General Principles of Chemistry (4) and
Chem 1002—Elementary Organic Chemistry (4)
or Chem 1051—Chemical Principles (4) and
BioC 1401—Elementary Biochemistry (4)

Professional Requirements

Experiential
AgEd 1002—Principles of Career Planning in Agriculture (1)

One from the following:
GC 1537—Professional Selling (4)
or BIE 3060—Professional Sales Management (3)
or ApEc 3300—Agriculture and Food Sales (4)

Communication
Rhet 1101—Writing to Inform and Persuade (4)
Rhet 1104—Library Research Methods (1)
Rhet 1151—Writing in Your Major (4)
Rhet 1222—Public Speaking (4)
Rhet 3562—Writing in Your Profession (4)

Two from the following:
Rhet 3254—Advanced Public Speaking (4)
Rhet 3266—Communication, Discussion in Small Groups (4)
or Spch 3411—Small Group Communication Process (4)
Rhet 5258—Interviewing (4)

Business
ApEc 1101—Principles of Microeconomics (4)
ApEc 3001—Applied Microeconomics: Consumers and Markets (4)
ApEc 3002—Applied Microeconomics: Managerial Economics (4)
ApEc 3920—Agricultural Law (4)
ApEc 3400—Markets, Marketing, and Prices (4)

One from the following:
ApEc 3420—Grain Marketing Economics (4)
ApEc 3430—Dairy Marketing Economics (4)
ApEc 3440—Livestock and Meat Marketing Economics (3)
ApEc 3450—Agricultural Input Marketing Economics (4)

* For Professional Experience Program (PEP) registration, use the four-character designator (xxx) that represents your PEP adviser’s department (e.g., Agro 5000 or Hort 5000).
Agricultural Industries and Marketing

- ApEc 5480—Futures Markets and Prices (4)
- ApEc 5550—Food Marketing Economics (4)
- FScN 5474—Food Marketing Economics (4)

One from the following:
- ApEc 3500—Agribusiness Finance (4)
- ApEc 5440—Cooperatives and Agribusiness Organization (4)
- GC 1513—Small Business Fundamentals (4)
- Spch 3441—Communicating Organizations (4)

Jour 3201—Principles of Advertising (4)

Agriculture
- AnSc 1100—Introduction to Animal Science (5)
- AgET 3025—Engineering Principles and Applications (4)
- or FScN 1102—Technology of Food Processing (4)

One from the following:
- Agro 1010—Principles of Agronomy (5)
- or Hort 1036—Plant Propagation (5)

One from the following:
- Soil 3125—Basic Soil Science (5)
- FScN 1612—Principles of Nutrition (4)

Emphasis Areas
Contact: Leslie Hansen, Animal Science, 130 Haecker Hall

1. Animal Industries

Biol 1106—General Zoology (5)

or Biol 3011—Animal Biology (5)

or Biol 1103—General Botany (5)

or Biol 3012—Plant Biology (5)

AnSc 3220—Principles of Animal Breeding (5)

AnSc 3301—Systemic Physiology (6)

AnSc 3401—Principles of Animal Nutrition (4)

One from the following:
- AnSc 5401—Swine Nutrition and Feeding (4)
- AnSc 5403—Ruminant Nutrition (4)
- AnSc 5405—Poultry Nutrition (3)

2. Crops/Soils Industries

Contact: Vernon B. Cardwell, Crops/Soils, 307 Agronomy

Biol 1103—General Botany (5)

or Biol 3012—Plant Biology (5)

Agro 3020—Growth and Development of Field Crops (4)

Soil 3416—Plant Nutrients in the Environment (4)

Plus at least 7 credits from the following:
- Agro 3030—Harvest, Storage and Utilization of Field Crops (4)
- Agro 3060—Field Crop Design in Agronomy (4)
- Agro 3120—Grain Grading and Crop Utilization (2)
- Agro 3150—Advanced Seed and Grain Evaluation (4)
- Agro 3200—Seminar (1)
- Agro 5020—Introduction to Plant Breeding (4)
- Agro 5301—Weed Control (5)
- Agro 5500—Management Technology For Crop Production (4)
- AnPi 3010—Environment and World Food Production (4)
- AnPi 5060—Integrated Management of Cropping Systems (4)
- Ent 1000—Economic Entomology (4)
- PiPa 3001—Management and Control of Field Crop Diseases (4)
- Soil 3220—Soil Conservation and Land-Use Management (4)
- Soil 3417—Plant Nutrients in the Environment Laboratory (1)
- Soil 5104—Computer Applications in Soils (2)
- Soil 5510—Field Study of Soils (1)
- Soil 5240—Microclimatology (3)
- Soil 5610—Soil Biology (4)

3. Horticultural Industries

Contact: Bradley Pedersen, Horticulture, 454 Alderman Hall

Hort 1021—Woody Plant Materials (5)

Hort 3001—Growth Regulation of Horticultural Plants (5)

Hort 3002—Horticultural Cropping Systems (5)

Plus four courses from the following:
- Hort 3003—Plant Genetics and Improvement (4)
- Hort 3004—Applications of Plant Biotechnology (4)
- Hort 3072—Turf Management (4)
- Hort 5026—Landscape Management (4)
- Hort 5030—Landscape Design of Residential and Small Commercial Sites (4)
- Hort 5031—Temperate Fruit Production (4)
- Hort 5034—Commercial Vegetable Agriculture (5)
- Hort 5041—Landscape Design and Implementation (5)

4. Food Industries

Contact: Elaine Asp, Food Science and Nutrition, 261 Food Science and Nutrition

FScN 3102—Introduction to Food Science (4)

FScN 3400—Food Communication Techniques (3)

FScN 3472—Food Selection Principles (4)

FScN 3730—Quantity Food Production Management (3)

FScN 5732—Lecture in Quantity Food Production Management (2)

Plus at least 8 credits from the following:
- FScN 3112—Food Analysis (4)
- FScN 5550—Food Marketing Economics (4)

Electives to reach 180 credits required for graduation with a B.S. degree. Students following the old general education distribution of areas A-D must have 192 credits for graduation.
Animal and Plant Systems

Dr. Tony Seykora, Major Coordinator
130 Haecker Hall
1364 Eckles Avenue
St. Paul, MN 55108
612/624-3448
E-mail: seyko001@tc.umn.edu

The animal and plant systems major prepares students to work as managers and technical advisers for animal and plant production systems, maintenance and sales. This curriculum provides a science-based agricultural education with an applied principle emphasis. Students majoring in animal and plant systems are prepared to pursue careers in animal, plant, and environmental industries through a curriculum that increases their understanding of agriculture, science, mathematics, business, and social science. Quality performance in this curriculum also allows students to pursue graduate studies in animal- and plant-related specializations. The following requirements are common for all students in the major.

Liberal Education Diversified Core and Designated Theme Requirements—See the liberal education requirements on page 8 and information at the beginning of this section. Students who enrolled in a degree program at the University of Minnesota—Twin Cities campus before fall 1994 see the liberal education requirements on page 8.

Foundation Requirements

ApEc 1101 or Econ 1101—Principles of Microeconomics (4)
BioI 1009—General Biology (5)
BioI 1106—General Zoology (5)
or BioI 1103—General Botany (5)
or BioI 3011—Animal Biology (5)
or BioI 3012—Plant Biology (5)
BioC 1401—Elementary Biochemistry (4)
Chem 1051—Chemical Principles I (4)
or Chem 1001—General Principles of Chemistry (4)
and Chem 1002—Elementary Organic Chemistry (4)
Phys 1041—Introductory Physics (5)
or Phys 1001,1005—The Physical World, Lab (4,1)
Rhet 1101—Writing to Inform and Persuade (4)
Rhet 1104—Library Research Methods (1)
Rhet 1151—Writing in Your Major (4)
Rhet 1222—Public Speaking (4)
or Spch 3431—The Role of Persuasion in the Modern World (4)
Rhet 3562—Writing in Your Profession (4)
Math 1031—College Algebra and Probability (4)

Professional Requirements

AgEd 1002—Principles of Career Planning in Agriculture (1)
xxxx 5000*—Professional Experience Program (4)
Soil 1020—The Soil Resource (5)
or Soil 3125—Basic Soil Science (5)
AgET 3025—Engineering Principles and Applications (4)
or NRES 3060—Water Quality in Natural Resource Management (3)

One from the following:
Ent 1005—Economic Entomology (4)
Ent 3005—Insect Biology (3)
Ent 5250—Forest Entomology (4)
Ent 5280—Livestock Entomology (4)

Major Requirements

Students majoring in animal and plant systems select an area of emphasis based on their interests and career goals. The four areas available are outlined in detail below. They are animal production, crops and soils/horticultural food, integrated pest management and environmental horticulture.

All students in animal and plant systems must complete the requirements listed below. All course substitutions and/or waivers must have the approval of the student’s adviser and the Coordinating Committee for Animal and Plant Systems and the COAFES Office.

1. Animal Production

Contact:
Department of Animal Science,
Dr. Tony Seykora, 130 Haecker Hall, 624-3448

Animal Production prepares students for careers in farm animal and poultry production. Career opportunities include farming, farm management, county extension work, dairy production, meat packing, farm supply, genetic and nutritional consulting, appropriate government positions, and artificial insemination.

Liberal Education Diversified Core and Designated Theme Requirements—See the liberal education requirements on page 8 and information at the beginning of this section. Students who enrolled in a degree program at the University of Minnesota—Twin Cities campus before fall 1994 see the liberal education requirements on page 8.

Foundation Requirements

ApEc 1101 or Econ 1101—Principles of Microeconomics (4)
BioI 1009—General Biology (5)
BioI 1106—General Zoology (5)
or BioI 1103 General Botany (5)
or BioI 3011—Animal Biology (5)
or BioI 3012—Plant Biology (5)
or BioI 3125—Basic Soil Science (5)
BioC 1401—Elementary Biochemistry (4)
Chem 1051—Chemical Principles I (4)
or Chem 1001 General Principles of Chemistry (4)
and Chem 1002—Elementary Organic Chemistry (4)
Phys 1041—Introductory Physics (5)
or Phys 1001,1005—The Physical World, Lab (4,1)
Rhet 1101—Writing to Inform and Persuade (4)
Rhet 1104—Library Research Methods (1)
Rhet 1151—Writing in Your Major (4)
Rhet 1222—Public Speaking (4)
or Spch 3431—The Role of Persuasion in the Modern World (4)
Rhet 3562—Writing in Your Profession (4)
Math 1031—College Algebra and Probability (4)

Professional Requirements

AgEd 1002—Principles of Career Planning in Agriculture (1)
xxxx 5000*—Professional Experience Program (4)
Soil 1020—The Soil Resource (5)
or Soil 3125—Basic Soil Science (5)
AgET 3025—Engineering Principles and Applications (4)
or NRES 3060—Water Quality in Natural Resource Management (3)

One from the following:
Ent 1005—Economic Entomology (4)
Ent 3005—Insect Biology (3)
Ent 5250—Forest Entomology (4)
Ent 5280—Livestock Entomology (4)

* For Professional Experience Program (PEP) registration, use the four-character designator (xxxx) that represents your PEP adviser’s department (e.g., Agro 5000 or Hort 5000).
Animal Production Emphasis Courses*
Agro 1010—Principles of Agronomy (5)
AnSc 1100—Introductory Animal Science (5)
AnSc 1510—Consumer Meat Science (2)
AnSc 3220—Principles of Animal Breeding (5)
AnSc 3301—Systemic Physiology (6)
AnSc 3401—Principles of Animal Nutrition (4)
CAPS 3502—Animal Health and Disease (5)

One from the following:
AnSc 5401—Swine Nutrition and Feeding (4)
AnSc 5403—Ruminant Nutrition (4)
AnSc 5405—Poultry Nutrition (3)

One from the following:
AnSc 5601—Swine Production (4)
AnSc 5602—Sheep Production (4)
AnSc 5603—Beef Cattle Production (4)
AnSc 5604—Dairy Farm Management (4)
AnSc 5605—Poultry Production (4)

One from the following:
Biol 5003—Genetics (4)
GCB 3022—Genetics (4)
Hort 3003—Plant Genetics and Improvement (4)

One from the following:
Agro 3060—Field Plot Design in Agronomy (4)
BA 1550—Business Statistics (4)
Stat 3011—Statistical Analysis (4)

Two from the following:
ApEc 3001—Applied Microeconomics:
Consumers and Markets (4)
ApEc 3002—Applied Microeconomics:
Managerial Economics (4)
ApEc 3430—Dairy Marketing Economics (4)
ApEc 3440—Livestock and Meat Marketing Economics (3)
ApEc 3810—Principles of Farm Management (4)
AnPl 3010—Environment and World Food Production (4)
GC 1513—Small Business Fundamentals (4)
GC 1537—Professional Selling (4)

* Students interested in poultry study should inquire about courses available through the Midwest Poultry Consortium. Check with your adviser, the Department of Animal Science, or COAES.
Electives to reach 180 credits required for graduation with a B.S. degree. Students following the old general education distribution of Areas A-D must have 192 credits for graduation.

2. Crops and Soils/ Horticultural Food Production

Contacts:
Department of Agronomy and Plant Genetics,
Dr. Lee Hardman, 411 Borlaug Hall, 625-8700
Department of Horticultural Science,
Dr. Emily Hoover, 160 Alderman Hall, 624-6220
Department of Soil, Water, and Climate,
Dr. Gary Malzer, 401 Soils, 625-6728

Crops and soils/horticultural food production prepares students for careers in the production and improvement of field crops, vegetables, and fruits. Career opportunities include positions as technical representatives of agricultural chemical and seed companies, field specialists for crops, environmental protection specialists, state and federal crop regulatory agents, grain buyers and merchandisers, storage elevator operators, farm managers, field agronomists and horticulturists for production consulting firms, soil and water specialists, and conservationists.

Liberal Education Diversified Core and Designated Theme Requirements—See the liberal education requirements on page 8 and information at the beginning of this section. Students who enrolled in a degree program at the University of Minnesota–Twin Cities campus before fall 1994 see the liberal education requirements on page 8.

Foundation Requirements
ApEc 1101 or Econ 1101—Principles of Microeconomics (4)
Biol 1009—General Biology (5)
Biol 1103—General Botany (5)
or Biol 3012—Plant Biology (5)
BioIC 1401—Elementary Biochemistry (4)
Chem 1021—Chemical Principles I (4)
or Chem 1001—General Principles of Chemistry (4)
and Chem 1002—Elementary Organic Chemistry (4)
Phys 1041—Introductory Physics (5)
or Phys 1001,1005—The Physical World, Lab (4,1)
Rhet 1101—Writing to Inform and Persuade (4)
Rhet 1104—Library Research Methods (1)
Rhet 1151—Writing in Your Major (4)
Rhet 1222—Public Speaking (4)
or Spch 3431—The Role of Persuasion in the Modern World (4)
Rhet 3562—Writing in Your Profession (4)
Math 1031—College Algebra and Probability (4)

Professional Requirements
AgEd 1002—Principles of Career Planning in Agriculture (1)
xxxx 5000*—Professional Experience Program (4)
Soil 1020—The Soil Resource (5)
or Soil 3125—Basic Soil Science (5)
AgET 3025—Engineering Principles and Applications (4)
or NRES 3060—Water Quality in Natural Resource Management (3)

One from the following:
Ent 1005—Economic Entomology (4)
Ent 3005—Insect Biology (3)
Ent 5250—Forest Entomology (4)
Ent 5280—Livestock Entomology (4)

* For Professional Experience Program (PEP) registration, use the four-character designator (xxxx) that represents your PEP adviser’s department (e.g., Agro 5000 or Hort 5000).

Crops and Soils/Horticultural Food Production Emphasis Requirements
Agro 5030—Weed Control (5)
AnPl 5060—Integrated Management of Cropping Systems (4)
Hort 1036—Plant Propagation (5)
or Agro 3130—Seed Technology (2)
Soil 3416,3417—Plant Nutrients in the Environment and Lab (4,1)

One from the following:
Agro 3200—Growth and Culture of Field Crops (4)
Hort 3001—Growth Regulation of Horticultural Plants (5)
PBio 3131—Survey of Plant Physiology (4)

One from the following:
Agro 3030—Harvest, Storage and Utilization of Field Crops (4)
Agro 5020—Introduction to Plant Breeding (4)
Hort 5001—Harvest to Market of Horticultural Crops (3)

One from the following:
Biol 5003—Genetics (4)
GCB 3022—Genetics (4)
Hort 3003—Plant Genetics and Improvement (4)

One from the following:
Agro 3060—Field Plot Design in Agronomy (4)
BA 1550—Business Statistics (4)
Stat 3011—Statistical Analysis (4)

One from the following:
ApEc 3420—Grain Marketing Economics (4)
ApEc 3810—Principles of Farm Management (4)
GC 1513—Small Business Fundamentals (4)
GC 1537—Professional Selling (4)

Select either sequence below: a.) Crops and Soils or b.) Horticultural Food Production
a. Crops and Soils
Agro 3200—Seminar (1)
PiPa 3001—Management and Control of Field Crop Diseases (4)
or PiPa 3002—Management of Horticultural Crop Diseases (4)
Soil 3220—Soil Conservation and Land Use Management (4)
or Soil 5510—Field Study of Soils for Environmental Assessment (4)

One course in animal science
Three from the following:
Agro 3030—Harvest, Storage and Utilization of Field Crops (4)
Agro 3150—Advanced Seed and Grain Evaluation (4)
Agro 5020—Introduction to Plant Breeding (4)

Associate Professor Deborah Allan watches a student working in the plant pathology laboratory.
3. Integrated Pest Management

Contacts:
Department of Plant Pathology,
Dr. James Percich, 495 Borlaug Hall, 625-6240
Entomology,
Dr. David Ragsdale, 219 Hodson Hall, 624-6771
Agriculture and Plant Genetics,
Dr. Lee Hardman, 411 Borlaug Hall, 625-8700
Horticultural Science,
Dr. Mark Strefeler, 305 Alderman Hall, 624-6701
Soil, Water and Climate,
Dr. Gary Malzer, 401 Soils, 625-6728

Integrated Pest Management (IPM) prepares students to identify and control major insect, weed, and disease problems on principal agronomic and horticultural crops. Students emphasizing IPM learn how the environment and various cropping systems affect pests. Students learn selection and application of the most comprehensive, cost-efficient, and environmentally safe IPM procedures. This integrated approach considers such factors as soil fertility, cultivar selection, economics, and ethical concerns. This emphasis prepares students for the following career opportunities: agricultural crop protection products sales representative, crop management consultant, plant pest regulatory official for state or federal agencies, research assistant, and applicator of agricultural crop protection materials.

Liberal Education Diversified Core and Designated Theme Requirements—See the liberal education requirements on page 8 and information at the beginning of this section. Students who enrolled in a degree program at the University of Minnesota–Twin Cities campus before fall 1994 see the liberal education requirements on page 8.

Foundation Requirements
ApEc 1101 or Econ 1101—Principles of Microeconomics (4)
Biol 1009—General Biology (5)
Biol 1103—General Botany (5)
or Biol 3012—Plant Biology (5)
BioC 1401—Elementary Biochemistry (4)
Chem 1001—Chemical Principles I (4)
or Chem 1002—General Principles of Chemistry (4)
and Chem 1002—Elementary Organic Chemistry (4)
Phys 1041—Introductory Physics (5)
or Phys 1001, 1005—The Physical World and Lab (4.1)
Rhet 1111—Writing to Inform and Persuade (4)
Rhet 1104—Library Research Methods (1)
Rhet 1151—Writing in Your Major (4)

Professional Requirements
AgEd 1002—Principles of Career Planning in Agriculture (1)
xxxx 5000*—Professional Experience Program (4)
Math 1031—College Algebra and Probability (4)

Professional Requirements
Agro 5050—Management Techniques for Crop Production in Minnesota (4)
Agro 5070—Ecology of Field Crops (3)
AnPl 3010—Environment and World Food Production (4)
NRES 3020—Plant Resource Management and the Environment (4)
Soil 5240—Microclimatology (3)
Soil 5610—Soil Biology (4)

b. Horticultural Food Production
Hort 3002—Horticultural Cropping Systems (5)
Hort 3099—Seminar (1)
Hort 5031—Temperate Fruit Production (4)
Hort 5034—Commercial Vegetable Agriculture (5)
PlPa 5002—Management of Horticultural Crop Diseases (4)
Electives to reach 180 credits required for graduation with a bachelor of science degree. Students following the old general education distribution of Areas A-D must have 192 credits for graduation.

* For Professional Experience Program (PEP) registration, use the four-character designator (xxxx) that represents your PEP adviser’s department (e.g., Agro 5000 or Hort 5000).

Whatever the season, the St. Paul campus offers plenty of quiet spots for studying.
Electives to reach 180 credits required for graduation with a B.S. degree. Students following the old general education distribution of Areas A-D must have 192 credits for graduation.

4. Environmental Horticulture

Contact:
Department of Horticultural Science,
Dr. Mark Strefeler, 305 Alderman Hall, 624-6701

Environmental horticulture prepares students for professional positions requiring a thorough understanding of the technical and managerial aspects of environmental horticulture. Career opportunities include floriculture; landscape design, installation, and management; nursery management and production; turf management; and urban horticulture. Students learn environmental enhancement and management techniques required in state, city, and county agencies as well as in private industry. Students in the environmental horticulture emphasis may supplement their program with a minor in environmental design in landscape architecture outlined on page 35.

Liberal Education Diversified Core and Designated Theme Requirements—See the liberal education requirements on page 8 and information at the beginning of this section. Students who enrolled in a degree program at the University of Minnesota—Twin Cities campus before fall 1994 see the liberal education requirements on page 8.

Foundation Requirements
ApEc 1101 or Econ 1101—Principles of Microeconomics (4)
BioI 1009—General Biology (5)
BioC 1401—Elementary Biochemistry (4)
Chem 1051—Chemical Principles I (4)
or Chem 1001—General Principles of Chemistry (4)
and Chem 1002—Elementary Organic Chemistry (4)
Phys 1041—Introductory Physics (5)
or Phys 1001,1005—The Physical World and Lab (4,1)
Rhet 1101—Writing to Inform and Persuade (4)
Rhet 1104—Library Research Methods (1)
Rhet 1151—Writing in Your Major (4)
Rhet 1222—Public Speaking (4)
or Spch 3431—The Role of Persuasion in the Modern World (4)
Rhet 3562—Writing in Your Profession (4)
Math 1031—College Algebra and Probability (4)

Professional Requirements
AgEd 1002—Principles of Career Planning in Agriculture (1)
AgEd 5000 or Hort 5000). * For Professional Experience Program (PEP) registration, use the four-character designator (xxxx) that represents your PEP adviser’s department (e.g., Agro 5000 or Hort 5000).

Soil 3416,3417—Plant Nutrients in the Environment and Lab (4,1)

Three from the following:
Acct 1050—Introduction to Financial Accounting (5)
or ApEc 1250—Principles of Accounting (4)
Acct 3001—Introduction to Management Accounting (4)
ApEc 1102—Principles of Microeconomics (4)
ApEc 3001—Applied Microeconomics: Consumers and Markets (4)
ApEc 3002—Applied Microeconomics: Managerial Economics (4)
ApEc 3007—Applied Macroeconomics: Policy, Trade, and Development (4)
ApEc 3240—Strategic Management of Farms and Agribusinesses (4)
ApEc 3260—Operations Management of Farms and Agribusinesses (4)
ApEc 3400—Markets, Marketing, and Prices (4)
BFin 3000—Finance Fundamentals (4)
or ApEc 3500—Agribusiness Finance (4)
BLaw 3058—Introduction to Law, Law of Contracts and Sales Contracts (4)
or ApEc 3920—Agricultural Law (4)
GC 1513—Small Business Fundamentals (4)
BA 1550—Business Statistics (4)
IDSC 3030—Information Systems and Information Management (4)
Ins 5100—Risk Management and Insurance (4)
IR 3002—Personnel and Industrial Relations (4)
IR 3010—Individual in the Organization (4)
IR 3022—Governing in the Work Place (4)
IR 5002—Systems of Conflict and Dispute Resolution (4)
Jour 3201—Principles of Advertising (4)
Mgmt 3001—Fundamentals of Management (4)
Mgmt 3004—Business Policy (5)
Mgmt 5101—Advanced Topics in Management: Small Business Management (4)
Mktg 3000—Principles of Marketing (4)
Mktg 3010—Buyer Behavior and Marketing Analysis (4)
NRES 3010—Ethics and Values in Resource Management (3)
OMS 3000—Introduction to Operations Management (4)
Rhet 1200—Information Technology in Scientific and Technical Professions (3)
or GC 1571—Introduction to Microcomputer Applications (5)
or GC 1572—Introduction to Computer Programming (5)
or GC 1575—Introduction to Computers (4)
or Rhet 3400—Managing Information on the Internet (4)
Rhet 3266—Communication, Discussion in Small Group Decision Making (4)
Rhet 5170—Managerial Communication (4)
Stat 3011—Statistical Analysis (4)

Select either sequence below: a.) Landscape, Nursery, and Turf or b.) Floriculture

a. Landscape, Nursery, and Turf

Hort 5030—Landscape Design of Residential and Small Commercial Sites (4)
Hort 5041—Landscape Design and Implementation (5)

Six courses from the following:
Hort 3072—Turf Management (5)
Hort 3026—Landscape Management (4)
Hort 5042—Turf Grass Science (5)
Hort 5046—Nursery Management I (4)
Hort 5047—Nursery Scheduling and Enterprise Development (2)
Hort 5048—Nursery Management II (4)
Hort 5054—Commercial Floriculture Production Practices (4) or 5055 Commercial Floriculture Production Systems (4)

b. Floriculture

Hort 5034—Applications of Plant Biotechnology (4)
or Hort 5003—Harvest to Market of Horticultural Crops (3)
Hort 5054—Commercial Floriculture Production Practices (4)
Hort 5055—Commercial Floriculture Production Systems (5)
Three additional horticultural science courses

Electives to reach 180 credits required for graduation with a B.S. degree. Students following the old general education distribution of Areas A-D must have 192 credits for graduation.
Applied Economics

Dr. Kent D. Olson, Major Coordinator
316 Classroom-Office Building
1994 Buford Avenue
St. Paul, MN 55108
612/625-7723
E-mail: kolson@dept.agecon.umn.edu

The applied economics major prepares students for careers in private industry, government agencies, agribusinesses, or for graduate work. Areas of emphasis include: management and finance; marketing; food retailing; trade and development; resources and environment; and regional and public economics as well as individualized areas of emphasis that students may design in consultation with their adviser. This curriculum offers flexibility and emphasizes both fundamental written and oral communication skills as well as development of a strong foundation in economic principles and their applications. The core group of professional courses includes basic economic principles, applied micro/macroeconomic theory, accounting, and statistics. Students may select the remainder of their courses according to their interests.

Liberal Education Diversified Core and Designated Themes—See the liberal education requirements on page 8 and information at the beginning of this section. Students who enrolled in a degree program at the University of Minnesota–Twin Cities campus before fall 1994 see the liberal education requirements on page 8.

Foundation Requirements

Writing performance courses:
Rhet 1101—Writing to Inform (4)
Rhet 1104—Library Research Methods (1)
Rhet 1151—Writing in Your Major (4)
Rhet 3562—Writing in Your Profession (4)

Speech performance courses:
Rhet 1222—Public Speaking (4)
Rhet 3254—Advanced Public Speaking (4)
or Rhet 3266—Communication, Discussion in Small Group Decision Making (4)
Math 1142—Short Calculus (5)
or Math 1251—One Variable Differential and Integral Calculus I (4)

Note: Students contemplating graduate study are encouraged to take Math 1251, 1252 (4,4)

Professional Requirements

ApEc 1000—Orientation to Agricultural and Applied Economics (1)
ApEc 1101—Principles of Microeconomics (4)*
ApEc 1102—Principles of Macroeconomics (4)*
ApEc 1250—Principles of Accounting (4)
or Acct 1050—Introduction to Financial Reporting (4)
BA 1550—Business Statistics (4)
ApEc 3001—Applied Microeconomics: Consumers and Markets (4)
ApEc 3002—Applied Microeconomics: Managerial Economics (4)

* History and Social Science—Students must complete two additional courses beyond the minimum 12 credits required for liberal education. The courses must come from the list of approved courses for the History and Social Sciences category of the liberal education curriculum. See the quarterly Class Schedule for a current list.

ApEc 3007—Applied Macroeconomics: Policy, Trade, and Development (4)
ApEc 3400—Agricultural Markets, Marketing and Prices (4)

A. Professional Application Cluster (16 credits minimum)

At least two ApEc courses plus two more courses from ApEc, Econ, or Carlson School of Management. Students are encouraged, but not required, to take 12 or more of these 16 additional credits in one of the following areas:

1. Management and Finance
ApEc 3240—Strategic Management of Agribusinesses (4)
ApEc 3260—Operations Management of Agribusinesses (4)
ApEc 3500—Agribusiness Finance (4)
ApEc 5020—Applied Linear Programming (4)

2. Marketing
ApEc 3300—Agricultural and Food Sales (3)
ApEc 3420—Grain Marketing Economics (4)
ApEc 3430—Dairy Marketing Economics (4)
ApEc 3440—Livestock and Meat Marketing Economics (3)
ApEc 3450—Agricultural Input Marketing Economics (4)
ApEc 5400—Intermediate Market and Price Analysis (4)
ApEc 5440—Cooperatives and Agribusiness Organization (4)
ApEc 5480—Futures Markets and Prices (4)
ApEc 5550—Food Marketing Economics (4)

3. Food Retailing
ApEc 3260—Operations Management of Agribusinesses (4)
ApEc 5550—Food Marketing Economics (4)
DHA 5241—Retail Promotion (4)
DHA 5242—Managerial Decision Making (4)
Mktg 3000—Principles of Marketing (4)

4. Trade and Development
ApEc 3070—Agriculture and Economic Growth in Developing Countries (4)
ApEc 5710—US Agriculture: Farm, Food, and Environmental Policy (3)
ApEc 5720—Economics of World Agriculture (3)
ApEc 5730—European Agriculture: Farm, Food, and Environmental Policy (4)
ApEc 5750—Agricultural Trade and Commercial Policies (3)
ApEc 5790—World Food Problems (3)

5. Resources and Environment
ApEc 5660—Land and Water Economics (3)
ApEc 5630—Regional Development Systems (3)
ApEc 5640—Financing State and Local Governments (4)
ApEc 5650—Economics of Natural Resource Policy (4)
Econ 5610—Resource and Environmental Economics (4)
Econ 5831—Cost-benefit Analysis (4)

6. Regional and Public Economics
ApEc 5620—Regional Economic Analysis (3)
ApEc 5630—Regional Development Systems (3)
ApEc 5640—Financing State and Local Government (3)

7. Individualized Professional Cluster
Consult with adviser to develop such a program.

B. Technical Emphasis (16 credits minimum)

Applied economists need both knowledge of economics and expertise in scientific or technical areas. With the help of an adviser, students select at least four courses from at least two departments. At least one course should be 3xxx or above. Courses selected should be consistent with career interests. For example, students interested in the food industry should take food science and nutrition courses; those interested in grain marketing, grain handling and storage courses; those interested in natural resources, soils, water, forestry, or ecology courses, etc.

Electives to reach 180 credits required for graduation with a B.S. degree. Students following the old general education distribution of Areas A-D must have 192 credits for graduation.
Environmental Science

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The environmental science (ES) curriculum is for students interested in an interdisciplinary science education that prepares them to deal with environmental problems. The basic natural resources of land, air, and water are studied in the context of protecting and sustaining the environment. Students will become knowledgeable about environmental issues and the science behind policy decisions. Students will gain an appreciation of the important role of managed and natural systems in managing the environment in a sustaining way at the local, regional, national and international levels.

As concern for the environment grows, opportunities for ES graduates increase in agencies and firms involved in control technology, regulation of environmental contamination, and remediation of contaminated sites. Recent ES graduates have found employment in areas such as: environmental consulting firms; state and local agencies such as the Minnesota Pollution Control Agency, Minnesota Office of Waste Management, Minnesota Department of Natural Resources, Minnesota Department of Health, Minnesota Department of Agriculture, and Metropolitan Council; federal agencies such as the Environmental Protection Agency, Soil Conservation Service, U.S. Forest Service, and Bureau of Land Management; waste management firms; environmental engineering firms; environmental education; and extension service-resource management.

Graduates would also be prepared to go on to professional school (law or public policy) or graduate school in selected disciplines.

All students require training in math and science, social science, humanities, communication and applied technical aspects of environmental problems. Resolving environmental problems involves working with people and therefore emphasis in oral and written communication is required. The environmental science core draws courses from atmospheric science, soil science, hydrology, and plant science.

Students in the University of Minnesota’s environmental science program:

- Have analytical skills and a broad understanding of environmental problems;
- Have demonstrated their abilities in scientific courses;
- Have worked with computers in courses and can use many current software tools;
- Have developed skills to communicate effectively with technical and non-technical audiences;

The Twin Cities campus is in the heart of a major metropolitan area, but green space abounds.
• Have practiced the necessary problem solving skills to develop creative solutions to environmental problems;
• Are highly motivated and committed to solving environmental problems.

Liberal Education Diversified Core and Designated Themes—See the liberal education requirements on page 8 and information at the beginning of this section. Students who enrolled in a degree program at the University of Minnesota–Twin Cities campus before fall 1994 see the liberal education requirements on page 8.

Foundation Requirements

Basic Sciences
Biol 1009—General Biology (5)
Chem 1051, 1052—Chemical Principles I, II (4,4)
Phys 1041, 1042—Introductory Physics I, II (5,5)
Biol 1103—General Botany (5)
or Biol 1106—General Zoology (5)
BioC 1401—Elementary Biochemistry (4)
or Chem 3301—Elementary Organic Chemistry I (4)
Math and Statistics
Math 1251, 1252—One-Variable Differential and Integral Calculus I, II (4,4)

One from the following:
Stat 3011—Statistical Analysis (4)
Stat 3091—Introduction to Probability and Statistics (4)
Agro 3060—Field Plot Design in Agronomy (4)

Computer competency
Computer skills are necessary for today's student. As a student in COAFES, you will use computer applications in your coursework no matter which major you choose. You will be expected to have basic computer competency in word processing, spreadsheets, database management, and telecommunications. Your level of computer competency will be assessed in the advising process. If you lack needed skills, you will be given advice on which courses you will be required to take in order to learn those skills.

Writing and Speaking
Rhet 1101—Writing to Inform and Persuade (4)
Rhet 1151—Writing in Your Major (4)
Rhet 1222—Public Speaking (4)
or Rhet 3266—Communication, Discussion in Small Group Decision Making (4)

plus two other writing intensive courses (8)

History and Social Sciences
ApEc 1101—Principles of Microeconomics (4)
ApEc 1102—Principles of Macroeconomics (4)
ApEc 3610—Resource Developing and Environmental Economics (4)

Professional Requirements

Environmental Courses
ES 1001—Orientation to Environmental Science (1)
NRES 3001—Colloquium in Natural Resources and Environmental Studies (1)
ES 3050—Experience and Training in a Field Setting (1-4)
Biol 1051—Environmental Studies (4)
or Biol 3051—Environmental Studies (4)
ES 1010—Issues in the Environment (3)
or NRES 3010—Ethics and Values in Resource Management (3)
Soil 5020—Environmental Impact Assessment (4)
Soil 5100—Problem Solving in Environmental Science (5)
Land, Water, Atmosphere, and Ecology Courses
Soil 3125—Basic Soil Science (5)
Soil 3416—Plant Nutrients in the Environment (4)
Soil 5510—Field Study of Soils: Morphology (1)
AgET 5410—Hydrology and Water Quality (5)
or FR 5114—Forest Hydrology (3) and NRES 3060—Water Quality in Natural Resource Mgmt (3)
Biol 3008—Ecology and Evolution (4)
Soil 1425—Introduction to Meteorology (4)
Geo 1001—Introduction to Geology (4)
or Geo 1111—Introductory Physical Geology (5)

Soil, Plant and Animal Courses
Soil—select one from the following:
Soil 3220—Soil Conservation and Land Use Management (4)
Soil 5210—Environmental Biophysics (4)
Soil 5555—Wetland Soils (4)

Plant—select one from the following:
NRES 3020—Plant Resource Management and the Environment (4)
Agro 3200—Growth and Development of Field Crops (4)
Hort 3001—Growth and Development of Field Crops (5)
PLPa 3001—Management and Control of Field Crop Diseases (4)
PLPa 3002—Management of Horticultural Crop Diseases (4)
PLPa 5212—Diseases of Forest and Shade Trees (4)

Animal—select one from the following:
FW 3054—Biological Conservation (3)
Ent 1005—Economic Entomology (4)
AnSc 1100—Introduction to Animal Science (5)
AnSc 3113—Animal Welfare (4)

Emphasis Areas (24 credits)
There are no required courses. See major coordinator for suggested course lists. Specific courses are chosen with an adviser in such areas as:

Land and water resources: land use management, soil resources, sustainable agriculture, and water resources (hydrology and climatology)
Environmental management: bioremediation, environmental measurement, and waste management
Environmental education: natural and managed environmental systems education

Electives to reach 180 credits required for graduation with a B.S. degree.
Food Science

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Food science applies scientific principles to the manufacture, distribution, marketing, and consumer aspects of food. Food scientists apply basic principles and techniques of many disciplines, including chemistry, physics, and microbiology, to food processing and preservation and new product development. Food scientists are concerned with the theoretical and practical aspects of the food chain from the production of raw materials to the use of food products by consumers.

This curriculum balances fundamental principles and practical applications of theory within a flexible program that permits students to tailor their studies to fit personal career goals. They can develop proficiency in a related discipline through an optional area of specialization such as engineering or biochemistry or by designing their own area of emphasis in related areas such as chemistry, microbiology, or consumer issues. Graduates of the program work in a variety of technical, marketing, and promotional positions in the food industry.

The program is open to students registered in either COAFES or the College of Human Ecology. Faculty advisers are from the Department of Food Science and Nutrition, which is jointly administered by the two colleges.

Many graduates of the program seek employment after earning the bachelor of science degree, while others continue on to graduate study. Career areas include production management, product and process research and development, public health and regulatory agency service, education, marketing, management, technical sales and promotion, and quality control supervision. Admission to the food science program requires a GPA of at least 2.50.

Liberal Education Diversified Core and Designated Themes—See the liberal education requirements on page 8 and information at the beginning of this section. Students who enrolled in a degree program at the University of Minnesota—Twin Cities campus before fall 1994 see the liberal education requirements on page 8.

Foundation Requirements
ApEc 1101—Principles of Microeconomics (4)
Biol 1009—General Biology (5)
Chem 1051, 1052—Chemical Principles I, II (4,4)
Chem 3301, 3305—Organic Chemistry I and Lab (4,2)
Chem 3302, 3306—Organic Chemistry II and Lab (4,2)
BioC 3021—Biochemistry (4)
Math 1142—Short Calculus (5)
Math 1251, 1252—One Variable Differential and Integral Calculus (4,4)
Phys 1041, 1042—Introductory Physics (5,5)
Rhet 1101—Writing to Inform and Persuade (4)
Rhet 1104—Library Research Methods (1)
Rhet 1222—Public Speaking (4)
Rhet 3562—Writing in Your Profession (4)
Stat 3011, 3012—Statistical Analysis (4,4)
or Stat 5021—Statistical Analysis (5)
VPB 3103—General Microbiology (5)
or MicB 5105—Biological Microorganisms (5)

Professional Requirements
FScN 1102—Food: Safety, Risks, and Technology (4)
FScN 1612—Principles of Nutrition (4)
FScN 3102—Introduction to Food Science (4)
FScN 3112—Food Analysis (4)
FScN 3135—Food Processing I (4)
FScN 3136—Food Processing II (4)
FScN 5100—General Seminar (1)
FScN 5110—Food Chemistry (4)
FScN 5120—Food Microbiology (5)
FScN 5122—Control Systems in Food Microbiology (2)
FScN 5123—Food Fermentation and Biotechnology (3)
FScN 5135—Food Engineering Unit Operations (5)
FScN 5312—Instrumental Analysis of Foods (3)

Plus a minimum of 16 credits from the following (a maximum of 4 credits in FScN 5000/5111 may be used to meet the 16-credit requirement):
FScN 3400—Food Marketing Communications (4)
FScN 3472—Food Selection Principles (4)
FScN 5000—Professional Experience Program (4)
FScN 5111—Independent Study in Food Science and Nutrition (1-5)
FScN 5314—Physiochemistry of Foods (4)
FScN 5360—Sensory Evaluation of Food Quality (4)
FScN 5380—Food Packaging (3)
FScN 5390—Introduction to Food Law (4)
FScN 5474—Food Marketing Economics (4)
FScN 5512—Meat Technology (4)
FScN 5522—Technology of Fluid and Concentrated Milk Products (4)
FScN 5523—Technology of Fermented Dairy Products (4)
FScN 5524—Sensory Evaluation of Dairy Products (4)
FScN 5550—Grains: Introduction to Cereal Chemistry and Technology (4)
FScN 5555—Freezing and Dehydration of Foods (5)
FScN 5560—Introduction to New Product Development (3)
FScN 5562—Flavor Technology (4)
FScN 5620—Nutrition and Metabolism (5)

Emphasis Areas
Food science students may complete one of the two following areas of emphasis or design an area of emphasis that meets their own educational and career goals. Consult with your adviser about appropriate courses.

a. Physical/Biochemistry Emphasis
Students must substitute Phys 1251, 1252, and 1253 (4, 4, 4) for Phys 1041 and 1042
Chem 5501—Introduction to Thermodynamics and Kinetics (3)
Chem 5502—Introduction to Quantum Theory and Spectroscopy (3)
Math 1261—Calculus III (4)
Math 3251—Multivariable Differential Calculus (4)
Math 3252—Multivariable Integral Calculus (4)
Select 8 additional credits or more from:
BioC 5525—Physical Biochemistry: Solution Structure and Interactions of Biological Macromolecules (4)
BioC 5528—Physical Biochemistry: Enzyme Kinetics (4)
BioC 5531—Structure, Catalysis, and Metabolism in Biological Systems (4)
BioC 5533—Molecular Mechanism of Gene Action (4)

b. Engineering Emphasis
Students must substitute Phys 1251, 1252, and 1253 (4, 4, 4) for Phys 1041 and 1042
Math 1261—Calculus III (4)
Math 3251—Multivariable Differential Calculus (4)
Math 3252—Multivariable Integral Calculus (4)
Math 3261—Differential Equations with Linear Algebra (4)
ChEn 5001—Computational Methods in Chemical Engineering and Material Science (4)
ChEn 5101—Principles of Chemical Engineering I (4)
ChEn 5102—Principles of Chemical Engineering II (4)
Electives to complete the 180 credits required to graduate with a B.S. degree. Students following the old general education distribution of Areas A-D must have 192 credits for graduation.
**Nutrition**

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Nutrition explores how nutrients and the foods from which they are derived aid the body in health, growth, and development. National and international concern for how nutrition affects health and disease has generated many career opportunities for registered dietitians and nutritionists.

The nutrition major offers excellent preparation in the basic sciences and liberal education, a background in food science, and a focus on human needs related to nutrition. Each nutrition student should identify several areas of interest and develop a strong, varied portfolio of competencies and experience. At least one internship or work experience in nutrition is strongly recommended along with elective courses and extracurricular activities that develop communication and leadership skills. Graduates of this program take positions in a variety of positions related to food, nutrition, industry, community programs, and other areas.

Nutrition and dietetics is for students planning to become registered dietitians by meeting the American Dietetic Association requirements. These include completion of an approved baccalaureate program, an approved or accredited professional experience, and a national registration examination. Students transferring to the program must have a cumulative GPA of 2.80 or better (a cumulative GPA of 3.00 or higher is highly recommended). Registered dietitians work in a wide variety of health care, community, educational, and corporate positions relating to food and health. Nutrition graduates choosing not to become registered dietitians may pursue a variety of career options based on their preparation in the sciences, liberal education and nutrition.

The nutrition science option is for students expecting to apply to the Coordinated Program in Dietetics, an internship, or graduate school. Students expecting to apply to the Coordinated Program in Dietetics, an internship, or graduate school should maintain a GPA of 2.80 or better (a cumulative GPA of 3.00 or higher is highly recommended). Registered dietitians work in a wide variety of health care, community, educational, and corporate positions relating to food and health. Nutrition graduates choosing not to become registered dietitians may pursue a variety of career options based on their preparation in the sciences, liberal education and nutrition.

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**Foundation Requirements**

**Professional Requirements**

Nutrition and dietetics is for students planning to become registered dietitians by meeting the American Dietetic Association requirements. These include completion of an approved baccalaureate program, an approved or accredited professional experience, and a national registration examination. Students transferring to the program must have a cumulative GPA of 2.80 or better (a cumulative GPA of 3.00 or higher is highly recommended). Registered dietitians work in a wide variety of health care, community, educational, and corporate positions relating to food and health. Nutrition graduates choosing not to become registered dietitians may pursue a variety of career options based on their preparation in the sciences, liberal education and nutrition.

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The nutrition science option is for students planning to do graduate work in nutrition, related sciences, or professional programs such as medicine or dentistry. Students should be aware of the entrance requirements for the graduate or professional program of their choice and maintain a cumulative GPA of 3.00 or higher.

**Computer Competency**—As a nutrition student you will use computer applications in your coursework and will be expected to have basic computer competency in word processing, spreadsheets, database management, and telecommunications. Computer competency will be assessed in the advising process, and students lacking the needed skills may seek advice on courses required to learn those skills.

1. Nutrition

Liberal Education Diversified Core and Designated Themes—See the liberal education requirements on page 8 and information at the beginning of this section. Students who enrolled in a degree program at the University of Minnesota-Twin Cities campus before fall 1994 see the liberal education requirements on page 8.

**Foundation Requirements**

Biol 1009—General Biology (5) Biol/L
BioC 3021—Biochemistry (4)
CBN 3001—Elementary Anatomy (4,5)
Chem 1051, 1052—Chemical Principles I, II (4,4)
Chem 3301, 3305—Elementary Organic Chemistry I and Lab (4,2)
Chem 3302, 3306—Elementary Organic Chemistry II and Lab (4,2)
Math 1031—College Algebra and Probability (4)
Phsl 1001—Physiology: Introductory Survey for Allied Health Sciences (4)
or Phsl 3051—Human Physiology (5)
VPB 3103—General Microbiology (5)
or MicB 5105—Biology of Microorganisms (5)
or FScN 1020—Introductory Microbiology (4)
Rhet 1101—Writing to Inform and Persuade (4)
Rhet 1104—Library Research Methods (1)
Rhet 1151—Writing in Your Major (4)
Rhet 1122—Public Speaking (4)
Rhet 3562—Writing in Your Profession (4)

One from the following:

EPsy 5260—Introductory Statistical Methods (4)
PubH 5404—Introduction to Biostatistics and Statistical Decision (4)
PubH 5450—Biostatistics I (4)
Soc 3801—Sociological Methods I: Descriptive Statistics (5)
Stat 1001—Introduction to Ideas of Statistics (4)
Stat 3011—Statistical Analysis (4)
Stat 3001—Introduction to Probability and Statistics (4)
Stat 5021—Statistical Analysis I (5)

**Professional Requirements**

FScN 1612—Principles of Nutrition (4)
FScN 3102—Introduction to Food Science (4)
FScN 3112—Food Analysis (4)
FScN 3472—Food Selection Principles (4)
FScN 3610—Community Nutrition (3)
FScN 3612—Life Cycle Nutrition (4)
FScN 3730—Quantity Food Production Management (Lab) (3)
FScN 3732—Lecture in Quantity Food Production Management (2)
FScN 5100—General Seminar (1)
FScN 5612—Experimental Nutrition (2)
FScN 5620—Nutrition and Metabolism (5)
FScN 5665—Applied Medical Nutrition Therapy I (3)
FScN 5666—Applied Medical Nutrition Therapy II (3)
FScN 5667—Applied Medical Nutrition Therapy III (3)
FScN 5750—Principles of Food Service Management
LAMP 5177—Pathology for Allied Health Students: General and System Pathology (4)
or LAMP 5172—Pathology for Allied Health Students (4)
Mgmt 3001—Fundamentals of Management (4)

One from the following:

AnPl 3010—Environment and World Food Production (4)
FScN 3400—Food Marketing Communications (4)
FScN 5110—Food Chemistry (4)
FScN 5120—Food Microbiology (5)
FScN 5360—Sensory Evaluation of Food Quality (4)
FScN 5474—Food Marketing Economics (4)
FScN 5643—World Food Problems (3)
Nutrition

One from the following:
- HSU 5011—The Teaching-Learning Process in the Health Care Setting (3)
- EPsy 5114—Psychology of Student Learning (3)
- EPsy 5115—Adult Learning and Educational Practice (3)
- FScN 5614—Nutrition Education (3)

Electives to complete the 180 credits required to graduate with a B.S. degree with any of the three emphasis areas in nutrition. Students following the old general education distribution of areas A-D must have 192 credits for graduation.

2. Coordinated Program in Dietetics

The basic curriculum is similar to that specified above. However, it also includes field experience courses in which didactic and clinical phases of instruction are coordinated. A detailed plan of the coordinated program may be obtained from the Department of Food Science and Nutrition. A limited number of students are admitted to the program each year.

Minnesota law requires each student admitted to a supervised practice in dietetics to have a criminal background study conducted by the state of Minnesota. The dietetic program director arranges this check. Failure to pass the check results in dismissal from the program.

3. Nutrition Science

Students considering applying to medical school should check the social science and humanities requirements of the specific schools of interest. For example, the University Medical School requires 27 credits (non-specified courses) in Social Science and Humanities. Thus a student in Nutrition Science would need to take an 9 extra credits in these categories.

Liberal Education Diversified Core and Designated Themes—See the liberal education requirements on page 8 and information at the beginning of this section. Students who enrolled in a degree program at the University of Minnesota—Twin Cities campus before fall 1994 see the liberal education requirements on page 8.

Foundation Requirements
- BioC 3021—Biochemistry (4)
- BioC 5025—Biochemistry Lab (2)
- Biol 3009—General Biology (5)
- Biol 1106—General Zoology (5)
  or Biol 3011—Animal Biology (5)
- Biol 5003—Genetics (4)
  or GB 3922—Genetics (4)
- Chem 1051, 1052—Chemical Principles I, II (4,4)
- Chem 3301, 3305—Elementary Organic Chemistry I and Lab (4,2)
- Chem 3302, 3306—Elementary Organic Chemistry II and Lab (4,2)
- Math 1142—Short Calculus (5)
  or Math 1251, 1252—One Variable Differential and Integral Calculus I, II (4,4)
- Physics 1104, 5, 6—General Physics (4,4,4)
- Physics 1107, 8, 9—General Physics Lab (1,1,1)
- VPB 3103—General Microbiology (5)
  or MicB 5105—Biology of Microorganisms (5)

One from the following:
- Pbsl 1001—Physiology: Introductory Survey for Allied Health Sciences (4)
- Pbsl 3051—Human Physiology (5)
- AnSc 3301—Systemic Physiology (6)
- Rhet 1101—Writing to Inform and Persuade (4)
- Rhet 1104—Library Research Methods (1)
- Rhet 1151—Writing in Your Major (4)

A nutrition student examines cereal as part of her study of food analysis.

Rhet 1222—Public Speaking (4)
Rhet 3562—Writing in Your Profession (4)

One from the following:
- EPsy 5260—Introductory Statistical Methods (4)
- PubH 5404—Introduction to Biostatistics and Statistical Decision (4)
- PubH 5450—Biostatistics I (4)
- Soc 3801—Sociological Methods I: Descriptive Statistics (5)
- Stat 1001—Introduction to Ideas of Statistics (4)
- Stat 3011—Statistical Analysis (4)
- Stat 3001—Introduction to Probability and Statistics (4)
- Stat 5021—Statistical Analysis I (5)

Professional Requirements
- FScN 1612—Principles of Nutrition (4)
- FScN 3102—Introduction to Food Science (4)
- FScN 3610—Community Nutrition (3)
  or FScN 5665—Applied Medical Nutrition Therapy I (3)
- FScN 3612—Life Cycle Nutrition (4)
- FScN 5100—General Seminar (1)
- FScN 5110—Food Chemistry (4)
  or another advanced chemistry course (4)
- FScN 5612—Experimental Nutrition (2)
- FScN 5620—Nutrition and Metabolism (5)
- FScN 5623—Vitamin and Mineral Biochemistry (4)
- FScN 5624—Human Protein and Energy Utilization (4)

Electives to complete the 180 credits required to graduate with a B.S. degree with any of the three emphasis areas in nutrition. Students following the old general education distribution of areas A-D must have 192 credits for graduation.
Science in Agriculture

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Science is the basis for progress in modern agriculture. Advances in the agricultural sciences are responsible for the unprecedented growth in quantity and quality of human food, animals, feeds, plant fibers, industrial products and aesthetic plants. Science in agriculture will be critical in addressing the environmental, resource, and technological issues facing humankind into the 21st century. Students completing the science in agriculture major in COAFES will be well prepared for scientific careers of the future.

The science in agriculture major is an interdisciplinary program of seven departments in COAFES. Students in this major obtain a thorough understanding of biological/physical science and mathematics principles and their applications to food and agriculture. Students may elect an area of emphasis within the major or they may choose to construct an individualized program combining courses from several disciplines. Host departments for this major are agronomy and plant genetics, animal science, entomology, food science and nutrition, horticultural science, plant pathology, and soil science. Students in this major complete an undergraduate research thesis under the guidance of a faculty member in one of the host departments.

Students pursuing the science in agriculture major should be well prepared to undertake graduate studies in the disciplines represented by the host departments and related areas, as well as in veterinary or human medicine. Students considering veterinary medicine should consult the science in agriculture/director of veterinary medicine joint degree option. The major is also excellent preparation for employment in bachelor’s degree-level research positions as field or laboratory specialists in academia, government, or industry.

The host departments for the science in agriculture major offer excellent opportunities and facilities for gaining experience in scientific research. Students may offset some costs of their education and gain valuable experience by working part-time as undergraduate technicians on research projects of the Minnesota Agricultural Experiment Station. Experience may also be gained by working on a university, government, or industry internship through the Professional Experience Program (PEP).

Major Requirements

All students in the science in agriculture major must complete the requirements listed below. A minimum of 180 credits is required for completion of the degree. Faculty academic advisers will assist students in selecting suitable courses for completion of electives. Students planning to seek admission for particular graduate programs should consult the specific admissions requirements for those programs as guidance in selecting coursework options. The academic advisers also assist students in selecting an undergraduate thesis topic and thesis mentor.

Liberal Education Diversified Core and Designated Themes—See the liberal education requirements on page 8 and information at the beginning of this section. Students who enrolled in a degree program at the University of Minnesota–Twin Cities campus before fall 1994 see the liberal education requirements on page 8.

Foundation Requirements

Basic Sciences

- Biol 1009—General Biology (5)
- Chem 1051, 1052—Chemical Principles I, II (4,4)
- Chem 3301, 3305—Elementary Organic Chemistry I and Lab (4,2)
- Chem 3302, 3306—Elementary Organic Chemistry II and Lab (4,2)
- Math 1142—Short Calculus (5)
- or Math 1251, 1252—One-Variable Differential and Integral Calculus I, II (4,4)
- Rhet 1211—Writing in Your Major (4)
- or Rhet 1212—Public Speaking (4)
- or Rhet 3562—Writing in Your Profession (4)

Math and Statistics

- Biol 1103—General Botany (4)
- Biol 1106—General Zoology (5)
- Biol 3011—Animal Biology (5)
- or Math 1131—Elementary Calculus I (5)
- or Math 1251, 1252—One-Variable Differential and Integral Calculus I, II (4,4)

Basic Sciences

- Biol 1009—General Biology (5)
- Biol 1103—General Botany (4)
- Biol 1106—General Zoology (5)
- Biol 3011—Animal Biology (5)
- or Math 1251, 1252—One-Variable Differential and Integral Calculus I, II (4,4)
- Writing and Speaking
- Rhet 1101—Writing to Inform and Persuade (4)
- or Rhet 1104—Library Research Methods (1)
- Rhet 1151—Writing in Your Major (4)
- or Rhet 1222—Public Speaking (4)
- Rhet 3562—Writing in Your Profession (4)

Arts and Humanities

One course from the approved list of liberal education courses in Arts and Humanities (4-5 cr) beyond the three courses required to meet the core curriculum requirement.

Professional Requirements

SciAg 1001—Orientation to Science in Agriculture (1)
- or AgEd 1002—Principles of Career Planning in Agriculture (1)
- or AgEd 1003—Careers in Agriculture (1)
- or AgEd 1009—Principles of Career Development (1)
- or AgEd 1102—Principles of Personal Development (1)
- or AgEd 1000—Principles of Career Development (1)

SciAg 5009—Undergraduate Research Thesis (9)
- or SciAg 5010—Research Seminar (1)
- One from the following:
  - Biol 5013—Microbiology (5)
  - VPB 3101—General Microbiology (5)
  - MCB 5105—Biology of Microorganisms (5)
  - GCB 3022—Genetics (4)
  - Biol 5003—Genetics (4)
  - Hort 3005—Plant Genetics and Improvement (4)
  - Hort 3003—Plant Genetics and Improvement (4)

A minimum of 8 credits from the following:

AnPl 3010—Environment and World Food Production (4)
AnPl 5009—Principles of Farm Animal Environment (4)
Biol 1103—General Botany (5)
Biol 1106—General Zoology (5)
Biol 3011—Animal Biology (5)
Biol 3012—Plant Biology (5)
Chem 1131—Elementary Quantitative Analysis (3)
Chem 5520—Elementary Physical Chemistry (3)
EBB 3001—Introduction to Ecology (4)
FScN 1102—Technology of Food Processing (4)
Hort 3004—Applications of Plant Biotechnology (4)
Math 3066—Elementary Differential Equations (4)
PBio 3109—Plant Anatomy (5)
PBio 3201—Introductory Plant Taxonomy (4)
PPla 5206—Biology of Fungi (4)
Emphasis Areas

**A minimum of 12 additional credits from:**
- BioC 5025—Biochemistry Laboratory (2)
- FScN 5623—Vitamin and Mineral Biochemistry (4)
- FScN 1612—Principles of Nutrition (4)

**4. Nutrition (31 credits)**
A minimum of 18 additional credits from:
- FScN 5120—Food Microbiology (5)
- FScN 5401—Swine Nutrition and Feeding (4)
- FScN 5403—Ruminant Nutrition (4)
- FScN 5405—Poultry Nutrition (3)
- AnSc 5609—Principles of Farm Animal Environment (4)

*Students interested in poultry study should inquire about courses available through the Midwest Poultry Consortium. Check with your adviser, the Department of Animal Science, or COAFES.*

**2. Climatology (35 credits)**
- AgE 5410—Hydrology and Water Quality (5)
- Agro 3020—Growth and Development of Field Crops (4)
- Geol 1601—Oceanography (4)
- Soil 5241—Climatology (4)

**5. Plant Sciences (31 credits)**
Two from the following:
- AnSc 5401—Swine Nutrition and Feeding (4)
- AnSc 5403—Ruminant Nutrition (4)
- AnSc 5405—Poultry Nutrition (3)

*Students interested in poultry study should inquire about courses available through the Midwest Poultry Consortium. Check with your adviser, the Department of Animal Science, or COAFES.*

**2. Climatology (35 credits)**
- AgE 5410—Hydrology and Water Quality (5)
- Agro 3020—Growth and Development of Field Crops (4)
- Geol 1601—Oceanography (4)
- Soil 5241—Climatology (4)

**5. Plant Sciences (31 credits)**
Two from the following:
- AnSc 5401—Swine Nutrition and Feeding (4)
- AnSc 5403—Ruminant Nutrition (4)
- AnSc 5405—Poultry Nutrition (3)

*Students interested in poultry study should inquire about courses available through the Midwest Poultry Consortium. Check with your adviser, the Department of Animal Science, or COAFES.*

**Science in Agriculture**

1. **Animal Science (32 credits)**
- AnSc 1100—Introductory Animal Science (5)
- AnSc 3220—Principles of Animal Breeding (5)
- AnSc 3301—Systemic Physiology (6)
- AnSc 3401—Principles of Animal Nutrition (4)

*Students interested in poultry study should inquire about courses available through the Midwest Poultry Consortium. Check with your adviser, the Department of Animal Science, or COAFES.*

**5. Plant Sciences (31 credits)**
- Agro 3020—Growth and Development of Field Crops (4)
- Hort 3001—Growth Regulation of Horticultural Crops (5)
- Hort 3002—Horticultural Cropping Systems (5)

**6. Soil Science (31 credits)**
- Soil 3125—Basic Soil Science (5)
- Agro 5030—Weed Control (5)
- Hort 3002—Horticultural Cropping Systems (5)

*Students interested in poultry study should inquire about courses available through the Midwest Poultry Consortium. Check with your adviser, the Department of Animal Science, or COAFES.*

**Science in Agriculture**

1. **Animal Science (32 credits)**
- AnSc 1100—Introductory Animal Science (5)
- AnSc 3220—Principles of Animal Breeding (5)
- AnSc 3301—Systemic Physiology (6)
- AnSc 3401—Principles of Animal Nutrition (4)

*Students interested in poultry study should inquire about courses available through the Midwest Poultry Consortium. Check with your adviser, the Department of Animal Science, or COAFES.*

**5. Plant Sciences (31 credits)**
- Agro 3020—Growth and Development of Field Crops (4)
- Hort 3001—Growth Regulation of Horticultural Crops (5)
- Hort 3002—Horticultural Cropping Systems (5)

**6. Soil Science (31 credits)**
- Soil 3125—Basic Soil Science (5)
- Agro 5030—Weed Control (5)
- Hort 3002—Horticultural Cropping Systems (5)

*Students interested in poultry study should inquire about courses available through the Midwest Poultry Consortium. Check with your adviser, the Department of Animal Science, or COAFES.*
Science in Agriculture majors enjoy excellent opportunities and facilities for gaining experience in scientific research.

7. Science in Agriculture/Doctor of Veterinary Medicine Joint Degree (64 credits)

The science in agriculture/doctor of veterinary medicine joint degree is a cooperative program between COAFES and the University’s College of Veterinary Medicine (CVM). Students satisfying the specified curriculum requirements will earn a B.S. degree in science in agriculture from COAFES and, later, a doctor of veterinary medicine from CVM.

New entering freshmen students enrolling in COAFES’ science in agriculture major will have the option of completing three years of undergraduate coursework and then applying to CVM. Upon being accepted into CVM and successfully completing the courses specified in the first quarter of the veterinary medicine curriculum, students will earn the B.S. degree from COAFES.

This program gives highly qualified students the opportunity to earn both a B.S. degree and a D.V.M. degree in seven years. It also allows integration of a significant set of animal science courses into the student’s preparation for veterinary education.

This program is only available to students who enter COAFES with no previous coursework and start in fall quarter. The science in agriculture/D.V.M. curriculum is very structured and the COAFES portion must be completed in three academic years. COAFES students enrolled in this program must meet CVM application standards and admission is competitive. COAFES students applying under this agreement will receive special consideration because of the animal knowledge and experience gained in the animal science courses required in the curriculum. Application to CVM must be made in the junior year. Students not admitted to CVM are expected to complete the normal science in agriculture requirements for the B.S. degree. Students can also reapply to CVM or any other college of their choice at a later date.

AnSc 1100—Introductory Animal Science (5)
AnSc 3220—Principles of Animal Breeding (5)
AnSc 3301—Systemic Physiology (6)
AnSc 3401—Principles of Animal Nutrition (4)
AnSc 3305—Reproductive Physiology, AI, and Lactation (5)
AnSc 5401—Swine Nutrition and Feeding (4)
AnSc 5403—Ruminant Nutrition (4)
AnSc 5405—Poultry Nutrition (3)
AnSc 5609—Principles of Farm Animal Environment (4)

Plus one from the following:
AnSc 5601—Swine Production (4)
AnSc 5603—Beef Production (4)
AnSc 5604—Dairy Farm Management (4)
AnSc 5605—Poultry Production (4)

Plus fall quarter, first-year veterinary courses (20)

Note: Successful completion of the first quarter of the University’s College of Veterinary Medicine will constitute the fourth year of the animal science/D.V.M. joint program and will lead to bachelor’s degree in science in agriculture from COAFES.

8. Individualized area of emphasis

Students wanting to design a program with an emphasis different from these options should consult their adviser. Individualized programs must be approved by the major coordinating committee and have a minimum of 31 credits.

Electives to reach 180 credits required for graduation with a degree. Students following the old general education distribution of Areas A-D must have 192 credits for graduation.
Scientific and Technical Communication

Dr. Laura Gurak, Major Coordinator
201 Haecker Hall
1364 Eckles Avenue
St. Paul, MN 55108
612/624-3773
World Wide Web: http://rheteoric.agoff.umn.edu/

Scientific and technical communicators apply modern techniques and technologies to the distribution of knowledge in industry, business, education, and government. They write for audiences ranging from scientists to management to the consumer of technological products and services. To accomplish their objectives, scientific and technical communicators must first be generalists, well acquainted with the basic principles of science, engineering, the social sciences, and management practices. In addition, they must be familiar with and able to apply the principles of writing and editing, visual communication, communication technology, communication research and theory, and oral communication. The interdisciplinary curriculum combines the necessary theory and practical experience in a program flexible enough to allow you to plan a course of study appropriate to your career goals.

As a graduate of the program, you may be employed in government, education, and organizations in such fields as agriculture, communication, computer science, health sciences, research and development, and natural resources. You may pursue a career as a writer-editor, extension specialist, corporate trainer, or media specialist.

If you plan to pursue a graduate program in scientific and technical communication, you should consult with your adviser about selection of appropriate coursework early in your program.

Admission Requirements—Admission to COAFES does not automatically admit you to major status in the Scientific and Technical Communication (STC) program; students enter at pre-major status. To move from pre-major to major status, students must meet the following prerequisites.

Completion of the following coursework (with a minimum GPA of 2.50):
• 8 credits in basic rhetoric, English, or composition
• 8 credits in physical and biological sciences
• 8 credits in social science
• 8 credits in math, computer science, or engineering
• 4 credits of rhetoric at the 3xxx level

For suggested course lists, contact the Department of Rhetoric.

To apply for major status, students must submit the following information to the STC Program:
• application form—available in 201 Haecker Hall
• pre-major checklist—available in 201 Haecker Hall
• college transcripts
• letter of intent
• portfolio

A portfolio consists of documents showing written work, examples of graphic display and design (e.g., projects from art, drafting, or design classes, or photographs, slides, or videos), and a résumé.

Deadlines for submitting applications are: fall quarter admission, April 15; winter quarter admission, October 15; spring quarter admission, January 27.

Note: Although you only need a 2.00 GPA to be admitted to COAFES, a 2.50 GPA is required in the 36 required credit hours for acceptance to the major.

Students will retain pre-major status until they are formally accepted into the major program. Keep in mind that you cannot graduate from COAFES unless you are officially enrolled in a major in the college. In addition to meeting COAFES residency requirements, as a degree candidate in scientific and technical communication, you must earn at least 30 of your last 45 credits in the major following the quarter you are accepted into the major. For more information, contact the STC Program secretary, pre-major adviser, or major coordinator, 201 Haecker Hall (612/624-4761).

Major Requirements

Students majoring in the undergraduate program in Scientific and Technical Communication must complete requirements in each of the areas listed below. Required classes are listed. Course substitutes require program and/or COAFES Student Services Office approval. Your adviser can offer guidance when you plan your schedule.

Liberal Education Diversified Core and Designated Themes—See the liberal education requirements on page 8 and information at the beginning of this section. Students who enrolled in a degree program at the University of Minnesota—Twin Cities campus before fall 1994 see the liberal education requirements on page 8.

Foundation Requirements
Rhet 1101—Writing to Inform and Persuade (4)
Rhet 1104—Library Research (1)
Rhet 1151—Writing in Your Major (4)
Rhet 1222—Public Speaking (4)
Rhet 3266—Communication, Discussion in Small Group Decision Making (4)
Rhet 3562—Writing in Your Profession (4)

Professional Requirements
Writing and Editing (14 credits minimum)
Rhet 3565—Writing for Publication (4)
Rhet 5560—Editing for Technical Communication (4)

Two from the following:
• Rhet 3572—Procedures and Policies Manual (3)
• Rhet 5573—Grant Proposal (3)
• Rhet 3575—Newsletter (3)
Students, faculty, and staff can relax inside and outside the St. Paul Student Center.

Recommended:
- Comp 3014—Writing in the Social Sciences (4)
- Comp 3015—Writing About Science (4)
- Comp 3027—Advanced Expository Writing (4)
- EngW 5401—Introduction to Professional Editing (4)

Oral Communication (8 credits minimum)
- Rhet 3257—Scientific and Technical Presentations (4)
- Rhet 5258—Interviewing: Dynamics of Face-to-Face Communication (4)

Recommended:
- Rhet 3254—Advanced Public Speaking (4)
- Spch 3201—Introduction to Broadcasting Production (4)
- Spch 3411—Small Group Communication Processes (4)

Communication Systems (8 credits minimum)
- Rhet 5170—Managerial Communications (4)

One from the following:
- Rhet 5165—Studies in Organizational Communication, Conflict, and Change (4)
- Rhet 5400—Communications Program Planning and Evaluation (4)
- Rhet 5600—Transfer of Technology (4)

Recommended:
- Spch 3111—Leadership Communication (3)
- Spch 3441—Communicating in Organizations (4)

Information Design and Management (14 credits minimum)
- Rhet 1200—Information Technology in Scientific and Technical Professions (3)
- Rhet 3574—Publications Management (3)
- Rhet 3670—Visual Rhetoric: Theories and Applications (4)
- Rhet 5581—Document Design (4)

Recommended:
- ArtS 1401 Color (4)
- BIE 1000—Technical Drawing (3)
- BIE 1101—Technical Design and Product Development (3)
- BIE 1120—Communication Technology (3)
- BIE 1122—Photography (3)
- BIE 3121—Graphic Communication (3)
- DHA 1300—Introduction to Design (3)
- Rhet 3101—Functional Photography (4)
- Rhet 3105—Corporate Video for Technical Communicators (4)

Rhet 3400 Managing Information on the Internet (3)

Communication Theory and Research (7 credits minimum)
- Rhet 1220—Principles of Human Communication (4)
- Rhet 3700—Rhetorical Theory: Persuasion and the Literature of Science (3)

Recommended:
- Engl 3851—The English Language (4)
- Engl 3852—Aspects of the English Language (4)
- Engl 5815—History of English Language (4)
- Engl 5831—Development of American English (4)
- EPsy 5115—Psychology of Adult Learning (4)
- EPsy 5240—Principles and Methods of Evaluation (3)

Our 1001—Introduction to Mass Communication (4)
- Ling 3001—Introduction to Linguistics (5)
- Psy 3011—Introduction to Psychology of Learning (4)
- Rhet 5500—Research in Communication Strategies (4)
- Rhet 5531—Scientific and Technical Communication Course Development: Philosophy and Methodology (4)
- Rhet 5562—Theory and Practice in International and Intercultural Communication (4)

Spch 3421—Role of Persuasion in the Modern World (4)
- Spch 3601—Approaches to Public Discourse (4)

Culture, Values and Technology (10 credits minimum)
- Rhet 3390—Technology, Self, and Society (4)
- Rhet 3582—Senior Seminar (3)

One from the following:
- Rhet 3690—Scientific Controversy (3)
- Rhet 5680—Gender and the Rhetoric of Science and Technology (4)
- Rhet 1303—Science, Religion, and the Search for Human Nature (4)

Recommended:
- HMEd 5400 or 5401 or 5402—Introduction to the History of Medicine (4)
- HSci 1711 or 1712 or 1713—Technology and Western Civilization (4)
- HSci 1811 or 1812 or 1813—Introduction to History of Science (4)
- Hum 1003—Humanities in the Modern World III (4)
- Phil 3601—Scientific Thought (4)
- Phil 560X—The Philosophy of Science (4)
- Rhet 3395—in Search of Nature (4)

Internship (4 credits minimum)
- Rhet 5180—Internship in Scientific and Technical Communication (2-6)

This course may only be taken S-N. Students can earn credits in two-credit increments, but no more than six internship credits can be applied toward the scientific and technical communication program. The internship cannot be completed until you are officially enrolled as a major. For the internship, you must complete the following:
- Internship proposal, including duration, hours, duties
- Internship journal of work experiences
- Final internship report
- Evaluation letter from the internship supervisor

Science and Technology Emphasis (20 credits minimum)
While scientific and technical communicators need a general knowledge of math, science, and technology, they also must develop expertise in a scientific and technical area. With the help of an adviser, students will select at least five additional classes in a scientific and technological area. Eight credits must be at the 3xxx level or above. Possible areas of emphasis are:
- Agricultural science: animal
- Agricultural science: plant
- Health sciences
- Human ecology
- Biological science
- Mathematics
- Management information systems
- Cognitive science/psychology
- Computer science
- Natural resources
- Engineering
- Physical science
- Food science/nutrition
- Vocational education

The areas listed above are not your only options. Students also have the option of designing their own area of emphasis. All classes in the area of emphasis do not need to be from the same department. Electives to reach 180 credits required for graduation with a B.S. degree. Students following the old general education distribution of areas A-D must have 190 credits for graduation.
The College of Agricultural, Food, and Environmental Sciences offers five pre-major programs for students intending to complete the coursework needed to enter an upper division college or professional program: pre-biosystems and agricultural engineering; pre-biological sciences; pre-landscape architecture; pre-medicine or pre-dentistry; and pre-veterinary medicine.

**Pre-Biosystems and Agricultural Engineering**

*(College of Agricultural, Food, and Environmental Sciences)*

For additional information contact:
Dr. Chuck Clanton, P. E.
Department of
Biosystems and Agricultural Engineering
213 Biosystems
and Agricultural Engineering Building
1390 Eckles Avenue
St. Paul, MN 55108
612/625-7733
E-mail: clant001@maroon.tc.umn.edu
Fax: 612/624-3005

You can learn more about the program, faculty and students of the Department of Biosystems and Agricultural Engineering by visiting [http://www.bae.umn.edu](http://www.bae.umn.edu) on the World Wide Web.

Students interested in becoming biosystems and agricultural engineers may start their coursework in COAFES. Benefits include having a biosystems and agricultural engineering faculty member as an adviser, being eligible for the COAFES scholarship program, the advantages of a small college, and the St. Paul campus. In addition you’ll find the pre-biosystems and agricultural engineering track provides you the opportunity to be part of the department community and to get to know other students in the program.

After you satisfactorily complete lower division courses, you take upper division courses in Institute of Technology (IT). You continue to work with an adviser from the biosystems and agricultural engineering department while you complete your last two years of courses as an IT student. You graduate from IT but are invited to join the alumni societies of both IT and COAFES.

Engineers use mathematics, science, creativity, and design to create solutions that meet people’s needs. These solutions must satisfy constraints of time and money while considering health, safety, environmental, political, and social issues.

Biosystems and agricultural engineers integrate engineering, biology, and computing to:
- design efficient, economical processes to improve the quality and safety of food products for consumers,
- design safe, efficient machines and processes for biological systems.

The biosystems and agricultural engineering curriculum can be completed in four years by earning a minimum of 190 credits. Emphasis is on the physical, biological and engineering sciences, and engineering design. Students also study communications, social science, and humanities to provide a liberal education and prepare to work effectively with professionals in many disciplines (see page 8 for liberal education requirements). The program provides students with a background for continued professional growth and prepares them to contribute to an ever-changing society.

The curriculum includes emphases in environment, agricultural systems, and biological systems. Students, with the assistance of an adviser, plan a curriculum tailored to their individual interests in one of these three emphases.

Engineering internships are available to supplement classroom instruction by providing practical education and experience with an employer. Students may begin their internships in the summer following either their first or second year.

The biosystems and agricultural engineering program is accredited by the Accreditation Board for Engineering and Technology (ABET).

Liberal education requirements are the same for all students on the Twin Cities campus (see page 8 in this bulletin). Students must satisfy both the diversified core and designated theme requirements.

Students must apply to be admitted to upper division (junior and senior years) in IT.

Requirements for admission into upper division biosystems and agricultural engineering in IT are based on a GPA calculated using the grades from all courses taken, including repeated courses. Applications and GPA requirements are available in 105 Lind Hall.

**Lower Division (94-95 credits)**

Comp 1011—Writing Practice I (5)
or Rhet 1101—Writing to Inform and Persuade (4)
Math 1251, 1252—Differential and Integral Calculus I, II (4,4)
Math 1261—Calculus III (4)
Math 3261—Differential Equations With Linear Algebra (4)
Math 3251—Vector Differential Calculus (4)
Math 3252—Multivariable Integral Calculus (4)
Phys 1251-1252-1253—General Physics I-II-III (4,4,4)
Chern 1051-1052—Chemical Principles I-II (4,4)
Biol 1009—General Biology (5)
BAE 1060—Biosystems and Agricultural Engineering Orientation (1)
AEM 1015—Statics (4)
BAE 3031—Computations in Biosystems and Agricultural Engineering (4)
BAE 3150—Biology for Engineering (4)
AEM 3016—Deformable Body Mechanics (4)
CE 3400 or AEM 3200—Fluid Mechanics (4)
CSci 3101 or CSci 3102, or CSci 3113—Computer Programming (4)
ME 3301—Thermodynamics (4)
Liberal education electives (12)

**Upper Division (95-96 credits)**

Comp 3031—Technical Writing for Engineers (4)
or Rhet 3562—Writing in Your Profession (4)
Pre-Biological Sciences

For additional information contact:
Kathleen Peterson
Student Services—Advising and Registration
College of Biological Sciences
223 Snyder Hall
1475 Gortner Avenue
St. Paul, MN 55108
612/624-9717

Students interested in pursuing a degree in the College of Biological Sciences (CBS) may start their coursework in COAFES and transfer to CBS once admission prerequisites have been met. While in COAFES students work with a CBS adviser who assists them in selecting courses and planning for a career in biology. In addition, students are encouraged to participate in biology clubs and other CBS sponsored activities. Most pre-CBS students spend from three to six quarters in COAFES completing prerequisites before transferring to CBS. CBS and COAFES are located on the St. Paul campus providing students with the advantages of small colleges, including easy access to student services. As an added benefit, students whose academic or career plans change will find that their prerequisite courses apply to most COAFES majors.

For further information about biological sciences programs, see the College of Biological Sciences Bulletin, or contact the College of Biological Sciences.

Admission to CBS

Students may enter CBS at the beginning of their sophomore, junior, or senior year. The first years may be completed in COAFES or the College of Liberal Arts. Because CBS is an upper division college, certain requirements must be completed before admission:

- Successful completion of 84 credits (with a GPA of at least 2.00) including General Biology, Biol 1009, or 1201-1202 (or equivalent); Principles of Chemistry, Chem 1051-1052 (or equivalent) and Calculus, Math 1251-1252 (or equivalent) with grades of at least C are required for admission at the junior level.

- Students who are admitted as sophomores must have completed a minimum of 40 credits with a GPA of 2.50 or better including grades of C or better in Chem 1051-1052 (or equivalent); Math 1251, 1252 (or equivalent); and a college level biology course. During the freshman and sophomore years, students should plan to complete as a minimum the beginning English composition course, mathematics, general chemistry, and general biology. Students are encouraged to take organic chemistry during their sophomore year thereby allowing ample time for major coursework and research experience.

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Biological science majors have the opportunity to do fieldwork in diverse settings.
Pre-Landscape Architecture

For additional information contact:
Dr. Roger Martin
Department of Landscape Architecture
125 Architecture Building
89 Church Street S.E.
Minneapolis, MN 55455
612/625-6860

Freshmen or sophomores planning to complete a degree in landscape architecture should start their coursework in COAFES. COAFES offers a pre-landscape architecture track through the animal and plant systems major that prepares students to apply to the bachelor of environmental design (B.E.D.) degree program in the Department of Landscape Architecture. If your original academic and career plans change in regard to pursuing a landscape architecture degree, COAFES offers an alternative program through the environmental horticulture emphasis in the Animal and Plant Systems major. While in the pre-landscape architecture (pre-LA) students will be assisted with program planning by the director of undergraduate studies in landscape architecture.

Landscape architecture is concerned with the impact, disposition, and management of natural resources as well as the quality of experience that results from the development and management of land for specific human use.

Landscape architects are concerned with a wide range of projects: large-scale regional landscape planning; design of exterior environments for working, living, and recreation; commercial, institutional, and industrial development; transportation systems; and multiple-use areas. Projects may vary in scale from single-family residences to regional open space systems. Professional services include studies of land use feasibility, suitability, and capability; site selection studies; proposals for site layout and regional land use allocation and management; detail grading; construction drawings; and planting plans.

Regional resource planning and design, recreation planning and design, urban landscape design, and detail site-planning projects involve landscape architects, architects, planners, engineers, geographers, physical scientists, social scientists, and others. The relationship between regional or single-site qualities of terrain, soil, climate, vegetation, wildlife, orientation, visual quality, and the management or development program are studied carefully to ensure sound recommendations.

Master of Landscape Architecture (M.L.A.) Program

This program is available for students with baccalaureate degrees who wish to pursue both professional and scholarly studies in landscape architecture. The program is jointly offered by the College of Architecture and Landscape Architecture and the Graduate School. It provides professional training for the practice of landscape architecture and theoretical inquiry into the discipline.

Specific requirements for this degree are defined in the Graduate School Bulletin.

Bachelor of Environmental Design (B.E.D.) in Landscape Architecture

This nonprofessional program allows students to explore a broad range of environmental courses while preparing for the professional M.L.A. degree. After completing the B.E.D. degree requirements, students may apply to the Graduate School and, upon acceptance, receive advanced standing in the M.L.A. professional program. Graduates of the B.E.D. program may choose to pursue work in environmental design or planning that does not require an accredited degree.

A total of 180 credits are required for the B.E.D. degree. All required core courses with an LA prefix plus Hort 1021 and Hort 1022 must be completed with a minimum grade of C. It is recommended that students also complete 400 hours of summer work in landscape architecture. Individualized study programs may be arranged with faculty approval.

Admission procedures and major requirements for the bachelor of environmental design program are detailed below. For additional information about the bachelor of environmental design program, see the College of Architecture and Landscape Architecture Bulletin.

Admission Procedures

All applications for the B.E.D. in landscape architecture must be submitted by January 15 of the year of desired entry. Admission is for fall only unless advanced standing is granted. The following policies and admission procedures change periodically. Students should check with their adviser or the Department of Landscape Architecture for current admission procedures.

1. Apply to the University of Minnesota if not already a University student.
2. Complete a minimum of 90 credits of required pre-landscape architecture coursework (may include current enrollment). See the pre-environmental design curriculum below.
3. Complete the bachelor of environmental design degree application available from the Department of Landscape Architecture, University of Minnesota, 125 Architecture Building, 89 Church Street S.E., Minneapolis, MN 55455.
4. Submit a letter of intent stating the reasons for selecting landscape architecture as a profession. This letter, generally consisting of one or two pages, should give an account of the student’s reason for becoming interested in the field and in becoming a landscape architect, experience in landscape architecture or related fields (art, horticulture, natural resource management, architecture, engineering, construction), experience or participation in other interests (travel, hobbies, avocations), and perception of herself or himself in the role of a landscape architect.
5. Submit official transcripts of all college work completed to date at the University of Minnesota.
and other colleges. Generally, a student must have a GPA of 2.75 or higher for admittance.
6. Submit a portfolio of art or design work, environmental or design reports, photographs of sculptural work, slides, or similar examples of creative work. It is suggested that the portfolio be a bound 8-x-11-inch booklet. Portfolios larger than 24 x 36 inches or materials not enclosed in a carrying case will not be accepted. Slides must be submitted in an 8-x-11-inch transparent slide carrier.
Applicants are encouraged to visit the design studios, talk to students in the program, and find out as much about the profession as they can.

The landscape architecture faculty vote on each applicant. The applicant may be admitted to the program, rejected, or assigned pre-landscape architecture status. Approval for admission is based on consideration of the following: (1) the student’s academic standing and GPA; (2) the student’s maturity and experience; (3) the student’s letter of intent; (4) the estimated design potential of the student; and (5) the availability of staff and space.

Applicants will be notified by letter of the decision by May 15. Those admitted must notify the Department of Landscape Architecture by June 15 of their intention to attend or their place will be forfeited. Those not accepting the opportunity in the year for which it is offered must reapply if they wish to enter the program at a later date.

**B.E.D. Degree Requirements**

**Pre-environmental Design (91 credits)**

**Preparation for the Major** (39 credits)
- Arch 1601—Design Professions and Society (4)
- Arch 3411/3412—History of Architecture to Since 1750 (4)
- Arts 1101—Drawing (4)
- LA 1301—Introduction to Architectural Drawing (4)
- LA 1401—The Designed Environment (4)
- LA 3413—History of Landscape Architecture (4)
- Biol 1103—General Botany (5)
- Hort 1021—Woody Plant Materials (5)
- Hort 1022—Herbaceous Plant Materials (5)

**Liberal Education Requirements** (52 credits)

**Communication and Language Skills**
- Rhet 1101—Writing to Inform and Persuade (4)
- Rhet 1104—Library Research (1)
- Rhet 1151—Writing in Your Major (4)
- Rhet 1222—Public Speaking (4)

**Mathematical Thinking**
- Math 1031—College Algebra (4)

**Physical and Biological Sciences**
- Biol 1009—General Biology (5)
- Geol 1001/1002—Introduction to Geology and Lab (5)
- Soil 1020—The Soil Resource (5)

**History and Social Sciences**
- Geog 13xx-15xx—Introduction to Geography (4)
- Geog 3xxx—Regional or Topical Studies (4)

**Arts and Humanities**
- Phil 3502—Introduction to Aesthetics (4)

**Designated Themes**
- Major courses meet requirements (see below). If these particular courses are not taken, choose courses to fulfill designated themes requirements.
- Citizenship and public ethics satisfied by Arch 1601
- Cultural diversity satisfied by Rhet 1101
- Environment satisfied by Geol 1001
- Environment satisfied by Arch 1401
- Environment satisfied by Soil 1020

**Lower Division Requirements (20 credits)**

**Upper Division Requirements (89 credits)**

**Major Requirements** (20 credits)
- These courses may be taken before admission to the B.E.D. program; all are prerequisites to landscape design and technology courses.

**Writing Skills**
- Rhet 3562—Writing in Your Profession (4)

**Graphic Communication**
- LA 3311—Drawing for Design (4)
- LA/Arch 3-5xxx—Advanced Graphics course (4)

**Geography/Ecology/Geology**
- One of the following:
  - Geol 5251—Geomorphology (4)
  - Geol 5261—Glacial Geology (4)

**Landscape Design and Technology** (41 credits)
- Students must be admitted to the B.E.D. program to enroll in the following courses.

**Landscape Design**
- LA 5211—Making Landscape Space (6)
- LA 5212—Ecological Informants of Design (6)
- LA 5213—Making Landscape Types (6)
- LA 5221—Planted Form (5)

**Landscape Technology**
- LA 5201—Field Tech for Landscape Analysis (3)
- LA 5202—Landscape Ecology (3)
- LA 5571—Landscape Const: Landform Systems (4)
- LA 5572—Landscape Const: Spatial Performance (4)

**Architecture/Urban Design**
- Arch 5711—Design Princ of Urban Landscape (4)

**Electives Supporting the Major (20-28 credits)**
- Electives supporting the professional degree, selected in consultation with an adviser, to complete the 180 credits required for graduation.

**Undergraduate Minor in Environmental Design in Landscape Architecture**

An undergraduate minor in environmental design requires a minimum of 28 credits. Two courses are required; the remainder are chosen from the list of optional courses.

**Required Courses**
- LA 3413—The History of Landscape Architecture (4 cr)
- LA 5431—Landscape Architecture History: Individual Influences (4 cr)

**Optional Courses**
- Hort 1021—Woody Plant Materials (5 cr)
- LA 1024—Landscape Theory (4 cr) (UC only)
- LA/Arch 1301—Introduction to Landscape Architecture (Drawing) (4 cr)
- LA/Arch 1401—The Designed Environment (4 cr)
- LA 3098—Making Landscape Space (4 cr) (UC only)
- LA/Arch 3311—Drawing for Design (4 cr)
- LA 5202—Landscape Ecology (4 cr)
- LA 5213—Making Landscape Types (4 cr)
- LA/Geog 5562—Introduction to Geographic Information Systems (4 cr)
- LA 5571—Landscape Construction: Land Form Systems (4 cr)
- LA 5572—Landscape Construction: Spatial Performance (4 cr)
- LA 5621—Professional Practice (4 cr)

**Transfer Credits**
- A maximum of 12 transfer credits may be used for the minor. Overlapping courses taken for a major degree may also be used toward the minor.

**Grades**
- Courses for the minor may be taken S-N; however, courses taken S-N may not later be used for the B.E.D. major. A minimum grade of C (or S) is required in all courses for the minor.

**Note:** All courses may not be offered every quarter; care must be taken in scheduling.
Pre-Medicine and Pre-Dentistry

Students considering careers in the health sciences will discover most medicine and dental schools require that students entering their programs have a bachelor’s degree or a specific set of courses. Competition for admission is normally very competitive and requires that students have demonstrated high ability and achievement in the physical and biological sciences. The nutrition science track in COAFES provides pre-health science students an alternative route into medical or dental school while also providing them a bachelor of science degree option that provides an excellent background and alternative career options.

Students should enroll in the nutrition major and pursue the nutrition science emphasis. You will find the curriculum outlined on page 25. Students enrolling in the program in COAFES will have the benefit of a faculty adviser, a small college and department setting and easy access to St. Paul campus services, as well as the opportunity to be considered for COAFES scholarships. If you succeed in your academic and career goals as a health care professional, you’ll have a solid background in nutrition that will serve as a valuable tool in assisting patients to better health. If your career plans change, you will have the benefit of completing a bachelors degree in nutritional science.

Entrance requirements to graduate and professional programs are always competitive and requirements vary from school to school. Students should work closely with their adviser to meet the requirements for the school(s) they are considering. A cumulative GPA of at least a 3.00 is essential.

Pre-Veterinary Medicine

Students may complete the minimum requirements for admission to the University of Minnesota’s College of Veterinary Medicine requirements through COAFES’s pre-veterinary animal science track in the science in agriculture major. Entering freshmen may want to explore the science in agriculture/doctor of veterinary medicine degree option outlined on page 28. The joint degree program allows students to complete a bachelor’s degree in science in agriculture and, later, a doctor of veterinary medicine degree in seven years. Admission is competitive, but science in agriculture students will receive special consideration because of the animal knowledge and experience gained in University of Minnesota animal science courses.

COAFES’s pre-veterinary track is interdisciplinary, bringing the benefits of a strong science foundation along with animal science courses. Most students are able to complete their prerequisite course requirements in three years. Students can apply to veterinary medicine upon completion of those requirements or can complete their bachelor’s degree before pursuing veterinary medicine. Gaining the bachelor’s degree allows students additional academic skills and other career alternatives.

COAFES provides an excellent setting for pre-veterinary medicine preparation. Students are assigned advisers from the animal science faculty who hold joint appointments in COAFES and the College of Veterinary Medicine. Students gain the benefit of a small campus atmosphere, easy access to student services, an active pre-vet club and the opportunity to work with livestock on the St. Paul campus. The curriculum meets vet school admission requirements while increasing student animal-based knowledge and experience, enhancing chances for admission.

Competition for admission to the University’s College of Veterinary Medicine, as well as other U.S. veterinary medicine, is very keen. Students are encouraged to gain experience by working with animals in laboratory, clinic, or production situations. Most recently, the average GPA in required courses for Minnesota, South Dakota, and North Dakota residents entering the College of Veterinary Medicine was 3.49. The average GPA for students from other states admitted was 3.76. The University of Minnesota admits about 76 students each year with 80 percent being from Minnesota, South Dakota, and North Dakota.

For information on procedures and requirements for admission to the College of Veterinary Medicine, criteria for selection, degree programs and courses offered by the college, and related subjects, consult the annual College of Veterinary Medicine brochure or the Office of Student Affairs and Recruitment, College of Veterinary Medicine, University of Minnesota, 460 Veterinary Teaching Hospitals, 1365 Gortner Avenue, St. Paul, MN 55108 (612/624-4747).
Degrees Offered

Baccalaureate Degrees—The major curricula of COAFES lead to a bachelor of science degree.

Graduate Degrees—The departments in COAFES, through the Graduate School, offer the master of science and the doctor of philosophy degrees. For information about these programs, see the Graduate School Bulletin.

Admission

Requirements for admission to COAFES for high school graduates and transfer students are explained below. Information for adult special students, international and minority students, and senior citizens is also included. For more information, contact Prospective Student Services, 612/624-3045 or 1-800-866-AGRI (toll-free).

Deadlines—The Office of Admissions will typically accept applications for fall quarter beginning October 1 of the preceding year and will admit students as long as space is available. Freshman applicants who meet the admission requirements and apply by December 15 will be guaranteed space in the following fall quarter class. Final deadlines are June 1 for fall quarter; October 15 for winter quarter; and January 15 for spring quarter.

Applications for spring quarter are accepted from transfer students only.

High School Graduates—High school graduates planning to begin their studies as freshmen fall quarter 1996 or later will be expected to have completed as a minimum the following courses while in grades 9-12:

- Four years of English, with emphasis on writing, including instruction in reading and speaking skills and in literary understanding and appreciation;
- Three years of mathematics, including one year each of elementary algebra, geometry, and intermediate algebra;
- Three years of science, including one year each of biological and physical science;
- Two years of a single second language;
- Two years of social studies, including U.S. history.

Students who graduated from high school before 1987 will not be expected to meet these course requirements, although they are strongly encouraged to do so. For further information on admission requirements, please consult the current University of Minnesota Undergraduate Application Booklet.

Tuition Deposit—If you are admitted to COAFES as a freshman, you must submit a nonrefundable $50 tuition deposit to hold your place in the freshman class. When you enroll, your deposit will be applied to your first quarter’s tuition. You must pay the deposit by May 1 or within two weeks after the date on your admission notification letter. If you do not submit the deposit by the deadline, you may lose your place in the freshman class.

If you are admitted through and certified by the Office of Minority Student Affairs (i.e., as a disadvantaged or minority student), you are exempt from this requirement and do not need to pay a deposit.

Transfer Students—You may apply for admission to COAFES from other colleges or universities. You may be accepted if you meet the entrance requirements of the college and of the major you wish to enter. Transfer students who graduated from high school during 1987 or later and wish to be admitted must:

- Have passed intermediate algebra with a grade of “C” or better
- Have at least a “C” average in your transfer coursework
- Have demonstrated a solid foundation in math and science
- Completed at the high school level the following coursework:
  - Four years of English
  - Three years of science, including one year each of biological and physical science
  - Two years of a single second language
  - Two years of social studies, including U.S. history.

If you did not complete this coursework during your high school years, equivalent college coursework may be substituted. COAFES may admit some students who have not met these requirements. Students admitted lacking preparation requirements must complete all deficiencies early in their program.

If you graduated from high school before 1987, admission criterion are:

- Passed intermediate algebra with a grade of “C” or better
- Have at least a “C” average in your transfer coursework
- Demonstrated a solid foundation in math and science.

After you have applied for and been accepted as a transfer student, the Office of Admissions and COAFES will evaluate all previous college work according to the standards of the University and COAFES. You will then be provided with a Transfer Credit Evaluation showing how your previous work has been evaluated.

As a transfer student, you must complete all specific course and area distribution requirements of the college regardless of the number of credits accepted for transfer. Therefore, if you begin your degree work elsewhere intending to transfer later, you should carefully plan your pretransfer courses to meet as many COAFES requirements as possible. See the requirements for the various curricula in the Transfer Students section and take special note of the distribution requirements. Please note that a maximum of 4 internship or practical experience credits may be transferred into COAFES.

Change of College Within the University—To transfer to COAFES from another college within the University, you must meet COAFES entrance
requirements. Apply for transfer at the Office of Admissions on the campus where you are currently registered or where you last attended classes. Application deadlines are consistent with deadlines listed above.

**International Students**—International students must demonstrate competency in the English language by achieving an acceptable score on an English proficiency test. In addition, they must present evidence that they have met all admission requirements applicable to United States students and maintained a good academic record at their previous schools. International students should apply by April 1 for fall quarter admission, October 1 for winter quarter, and January 1 for spring quarter.

**Commitment to Diversity**—COAFES is committed to recruiting, enrolling, and educating a diverse population of students who represent the overall composition of our society. Advancing this commitment is a high priority for the college. A scholarship program for students with strong academic ability underscores our active recruiting effort. We invite your application.

**Adult Special Students**—The adult special category of admission in COAFES is primarily for (1) students who are pursuing course work in COAFES departments, but who are not degree-seeking students, or (2) students who are preparing for application to graduate programs offered by COAFES departments, but who still have some prerequisites to satisfy. Admission may be processed at any time prior to the first day of class. The AS category is also open to (3) staff members in COAFES departments taking courses through the Regents Scholarship Program and (4) COAFES graduates returning for course work to improve their skills.

If you enter the college as an adult special student with the intention of transferring later to the Graduate School, you should be aware that there are restrictions on the number of credits that may be transferred to a graduate program while you are registered as an adult special. Consult the Graduate School Bulletin.

**Senior Citizens**—Minnesota residents 62 years or older are admitted to all University of Minnesota classes on a space-available basis, provided they have completed specified prerequisites. If a course is taken without credit, there is no fee unless materials or other special charges are involved. If a course is taken for credit, students must pay a modest fee per credit and any materials or special charges. Eligible persons should check with the Office of the Registrar—St. Paul, 130 Coffey Hall.

**Planning to Transfer?**

Minnesota’s public colleges and universities are working to make transfer easier. You can help if you PLAN AHEAD, ASK QUESTIONS, and USE PATHWAYS created by transfer agreements.

**Preparing for Transfer**

If you are currently enrolled in a college or university:

- Discuss your plans with the campus transfer specialist in Prospective Student Services, 120 Biosystems and Agricultural Engineering.
- Call or visit your intended transfer college. You should obtain the following materials and information:
  - college catalog
  - transfer brochure
  - information on admissions criteria and on materials required for admission (e.g., portfolio, transcripts, test scores). Note that some majors have limited enrollments or their own special requirements such as a higher grade point average.
  - information on financial aid (how to apply and by what date)
- After you have reviewed these materials, make an appointment to talk with an adviser/counselor in the college or program you want to enter. Be sure to ask about course transfer and admission criteria.

If you are not currently enrolled in a college or university, you might begin by meeting with a transfer specialist or an admission officer at your intended transfer college to plan the steps you need to take.

**Understanding How Transfer of Credit Works**

- The receiving college or university decides what credits transfer and whether those credits meet its degree requirements. The accreditation of both your sending and your receiving institution can affect the transfer of the credits you earn.
- Institutions accept credits from courses and programs like those they offer. They look for similarity in course goals, content, and level. “Like” transfers to “like.”
- Not everything that transfers will help you graduate. Baccalaureate degree programs usually count credits in three categories: general education, major/minor courses and prerequisites, and electives. The key question is, “Will your credits fulfill requirements of the degree or program you choose?”
- If you change your career goal or major, you might not be able to complete all degree requirements within the usual number of graduation credits.

**Applying for Transfer Admission**

- Application for admission is always the first step in transferring. Fill out the application as early as you can prior to the deadline. Enclose the application fee.
- Request that official transcripts be sent from every institution you have attended. You might be required to provide a high school transcript or GED test scores as well.
- Recheck to be certain you supplied the college or university with all the necessary paperwork.
Most colleges make no decisions until all required documents are in your file.

- If you have heard nothing from your intended college of transfer after one month, call to check on the status of your application.
- After the college notifies you that you have been accepted for admission, your transcribed credits will be evaluated for transfer. A written evaluation should tell you which courses transfer and which do not. How your courses specifically meet degree requirements may not be decided until you arrive for orientation or have chosen a major.
- If you have questions about your evaluation, call the Office of Admissions and ask to speak with a credit evaluator. Ask why judgments were made about specific courses. Many concerns can be cleared up if you understand why decisions were made. If not satisfied, you can appeal. See “Your Rights as a Transfer Student” below.

**Your Rights as a Transfer Student**

- A clear, understandable statement of an institution’s transfer policy.
- A fair credit review and an explanation of why credits were or were not accepted.
- A copy of the formal appeals process. Usual appeals steps are: 1) Student fills out an appeals form. Supplemental information you provide to reviewers—a syllabus, course description, or reading list—can help. 2) Department or committee will review. 3) Student receives, in writing, the outcome of the appeal. 4) Student can appeal decision to Student Services, 120 Biosystems and Agricultural Engineering.
- At your request, a review of your eligibility for financial aid or scholarships. For help with your transfer questions or problems, see your campus transfer specialist.

**Residence and Reciprocity**

**Residence**—Because the University is a state institution, Minnesota residents pay lower tuition than nonresidents and, in many programs, receive priority consideration for admission. To qualify for resident status, students must reside in Minnesota for at least one calendar year before the first day of class attendance. For more information, contact the Resident Classification and Reciprocity Office, 240 Williamson Hall, 231 Pillsbury Drive S.E., Minneapolis, MN 55455 (612/625-6330), or the residency office on your campus.

**Reciprocity**—The University has reciprocity agreements with North Dakota, South Dakota, Wisconsin, and Manitoba. The University also participates in a reciprocity program with Kansas, Michigan, Missouri, and Nebraska, for students in the following undergraduate colleges: Agricultural, Food, and Environmental Sciences; Architecture and Landscape Architecture; Biological Sciences; Education and Human Development; Human Ecology; Liberal Arts; Natural Resources; Carlson School of Management; Division of Dental Hygiene; School of Nursing; and Institute of Technology. If you are a resident of any of these states or this province, you may qualify for reciprocity tuition rates, which are lower than nonresident tuition rates and, in some cases, comparable to resident rates. For more information, contact the Resident Classification and Reciprocity Office, 240 Williamson Hall, 231 Pillsbury Drive S.E., Minneapolis, MN 55455 (612/625-6330), or the residency office on your campus.

**Financial Aid**

Financial aid for students is available in the form of grants, loans, scholarships, and work-study.

To apply for financial aid through the Office of Scholarships and Financial Aid (OSFA), students must obtain an application packet and complete the Free Application for Federal Student Aid (FASFA) and all other required documents. Although applications are accepted throughout the academic year, priority consideration for the following fall is given to applications that are complete and in OSFA by April. Exact deadlines are in the application packet.

For an application packet and more information, contact the Office of Scholarships and Financial Aid. The St. Paul campus office is in 130 Coffey Hall, 1420 Eckles Avenue, St. Paul, MN 55108. The Minneapolis campus office is in 210 Fraser Hall, 106 Pleasant Street S.E., Minneapolis, MN 55455 (612/624-1665).

**Scholarships**

COAFES has an extensive scholarship program for freshmen, transfer, and continuing students. Scholarship brochures and applications are usually available in December. Students can pick them up in 120 Biosystems and Agricultural Engineering. Deadlines for applications are published in the applications and brochures.

**Disabled Students**

Wherever possible, special consideration is given to disabled students to minimize any problems. Through the COAFES Student Services Office, help is available to arrange for early registration, adviser accessibility and classroom locations for students using a wheelchair, and specific resource aids. Other services are available through the University’s Disability Services, 30 Nicholson Hall (612/626-1333, voice or TTY).

**Registration**

Each quarter you and the University complete a contract through the registration and payment process. The University agrees to provide certain instruction and facilities; you agree to attend and pay tuition and fees for the classes you have chosen.
Although changes sometimes occur in course listings, the responsibility for accurate, timely registration and payment rests primarily with you.

**Special Registration Procedures**—Certain special registration procedures allow you to audit courses, to take them as independent study or reading courses, or to take them for extra credit.

**Auditing**—Auditors attend and complete all work for a course, but do not take the final examination or receive credit. As an auditor, you must enroll officially in a course and pay regular tuition and fees. Both your adviser and the course instructor must approve your registration. Enter a course you are going to audit on your registration card with a V after the course number (e.g., Rhet 3280V).

**Independent Study**—You have two options for obtaining credit through independent study. In some University courses, you may request an examination (or other evaluation) after preparing for it in any way you choose. If you pass the examination, you will receive credit for the course. You must pay a fee for each examination attempted. Check with the COAFES Student Services Office for further information and for Request for Special Examination application forms.

A second method of independent study is to take a course without attending classes. Under this method, you pay the usual tuition and fees for the course, meet all deadlines, and take the final examination at the regular time. All usual regulations concerning grades, incompletes, and cancellations apply to students taking independent study in this manner. A course completed under independent study counts as part of the total credit load for the quarter. Check with the department offering the course concerning permission to take it for independent study. You will need approval from the course instructor on a registration override permit. Return the completed override to the Office of the Registrar—St. Paul, 130 Coffey Hall. Enter the course you are going to take by independent study on your course request form with a Y after the course number (e.g., Rhet 3280Y).

**Extra Credit**—With the course instructor’s approval, you may earn 1 to 3 additional credits for a course you are currently taking or have already taken. You may, for example, explore a course topic intensively or extend it to a related topic. You will do the extra work on your own according to standards set by the instructor.

You will need approval from the course instructor on a registration override permit. Submit the completed override along with your course enrollment request form with an X after the course number (e.g., Rhet 3280X). The usual regulations concerning tuition and fees, grades, and cancellations apply.

**Cancel/Add Procedures**—You can process your cancel/add on-line or in person at the Office of the Registrar. If you change your registration in person, use a course request form available from the Office of the Registrar—St. Paul or the COAFES Student Services Office. Make all such changes as early as possible in the quarter. Note: You must use the official course request form.

**Cancel**—When you cancel a course, you are subject to the following procedures and requirements:
- Cancellations during the first two weeks of a quarter are deleted from your record.
- Cancellations during the third through sixth weeks of a quarter require your instructor’s signature on the course request form. A W is assigned. The withdrawal (W) does not affect your GPA but does affect your coefficient of completion.
- Cancellations after the sixth week require the signatures of the adviser, instructor, and Scholastic Standing Committee representative on the course request form. Withdrawal from a course after the sixth week of a quarter is seldom approved by the Scholastic Standing Committee unless there are extenuating circumstances. (See Scholastic Requirements below for information on the effect cancellation has on your coefficient of completion.)

**Add**—No signatures are required to add a class during the first week of a quarter. You must have your instructor’s signature during the second through sixth weeks of the quarter. After the sixth week of the quarter, adding a course requires the signatures of your instructor and the Scholastic Standing Committee representative. Approval after the sixth week of the quarter is rarely granted.

**Grading Change**—A change from one grading system selected for a course to another (e.g., from A-F to S-N or Audit) must be made during the first two weeks of a quarter. The choice of grading system may not be changed after the end of the second week.

**Cancellation of Entire Registration**—If you leave the University before the end of a quarter, you must cancel your registration when you stop attending classes. Submit a course request form to the Office of the Registrar—St. Paul, 130 Coffey Hall. Cancellations are effective the day they are processed. Refunds are based on the date you officially cancel. You are entitled to a full refund if you cancel before the first day of classes. Contact the Office of the Registrar—St. Paul, 130 Coffey Hall, for current refund information.

**Petition Procedures**

To request permission to depart from usual procedures and regulations, you must complete a petition form available at the COAFES Student Services Office, 120 Biosystems and Agricultural Engineering, or at the Office of the Registrar—St. Paul, 130 Coffey Hall. Consult your adviser about writing the petition and for recommendation for approval. Present your petition to the COAFES Student Services Office for review by the Scholastic Standing Committee. You may pick up a copy of the decision about one week later.
Credits and Class Attendance

Advanced Placement—The Advanced Placement (AP) program of the College Board provides a way for high schools to offer college-level studies to their more advanced students and for such students to demonstrate satisfactory achievement in those studies. Through this program students may earn college credit, exemption from requirements, or placement in advanced courses when they enroll in college. For more information, contact the Office of Admissions, University of Minnesota, 240 Williamson Hall, 231 Pillsbury Drive S.E., Minneapolis, MN 55455 (612/625-2008).

College Level Examination Program—An alternative method of earning credit is through the College Level Examination Program (CLEP). Inquire at the COAFES Student Services Office for details.

Course Load—Graduation in four years requires an average course load of 15 credits per quarter. The typical course load per quarter is 14 to 18 credits. A credit requires an average of three hours of work each week. To carry more than 18 credits, a C average (that is, a cumulative grade point average of not less than 2.00) is required. To carry more than 21 credits, a B average (3.00 GPA) in work of the previous quarter and permission from the Scholastic Standing Committee are required. Undergraduates must carry at least 12 credits each quarter to be considered full-time students. In some cases, financial aid programs stipulate credit minimums. Consult the Office Scholarships and Financial Aid for more information.

Class Attendance—Attendance for certain classes in COAFES is compulsory because of the nature of such classes. If you miss a class for a valid reason, you may request the instructor’s assistance in making up the work missed. Instructors are under no obligation to give assistance if the absence is not justifiable.

The following three situations are accepted by instructors as justifiable reasons for absence from class and for a request for assistance in making up work: (a) illnesses certified by Boynton Health Service or by your family physician; (b) emergencies caused by a death or serious illness in your immediate family; (c) participation, certified by the Office of Student Affairs (130 Coffey Hall), in University-approved, cocurricular activities.

To make up classwork, you should confer directly with instructors concerning the reason for the absence and the possibility and ways of completing work missed. The Scholastic Standing Committee intervenes as an appeal agency only when emergencies are involved.

Use of Elective Credits—With the approval of your adviser and the Scholastic Standing Committee, you may request that some elective courses you have completed be omitted from the list of courses counted toward your degree. A maximum of 10 credits of elective courses may be withheld to raise your GPA, but only to satisfy the graduation requirement of a 2.00 GPA. When a course is withheld from the undergraduate record, it can be reinstated only by an examination for credit or by repeating the course.

Students in agriculture are not required to take courses in physical education or music.

Students who wish to use excess credits earned as an undergraduate for credit in the Graduate School should consult the Graduate School Bulletin for current policies or the Graduate School Office, University of Minnesota, 316 Johnston Hall, 101 Pleasant Street S.E., Minneapolis, MN 55455.

Special Study Opportunities

Several study opportunities that allow you to earn credits in special ways are described below. In addition to these programs, many majors offer internship or work-study opportunities. Check with your adviser.

Honors Program—The COAFES Undergraduate Honors Program provides a special educational opportunity for all COAFES students who qualify and accept the challenge of broadening, deepening, and enriching their education. The program is designed to give COAFES students and faculty from diverse areas of interest and expertise the opportunity to interact with each other academically and socially. Honors students explore broad and varied aspects of agriculture through a COAFES Honors Colloquium Course Series (Agri 1000H) and enhance their backgrounds through a COAFES Honors Experience Course (Agri 3100H). The honors experience is student-designed to meet their special interests and is supervised by experienced COAFES faculty. The college-wide honors program leads to the cum laude degree designations in all COAFES majors.

Check with the COAFES Student Services Office for more information and an application.

Study Abroad—COAFES encourages students to study in another country as part of their degree program. Options range from a few weeks to an entire academic year. Study in English is possible at a number of sites. If a University of Minnesota program does not meet a student’s needs, many other options are also available.

Identifying Study Abroad Opportunities—The International Study and Travel Center and the Global Campus together form a work/study/travel abroad advising center in 102 Nicholson Hall. You can learn about the many opportunities from an options adviser (612/626-9000). After identifying one of many options of interest, students should see a program adviser (612/625-3379) for detailed
program information and credit and financial aid planning. Program information is also available at http://www.isp.acad.umn.edu/ on the World Wide Web.

Study Abroad Opportunities in COAFES—
Two types of study abroad that can especially enhance degree work in COAFES are field study and integrated classroom study. Minnesota Studies in International Development (MSID) is a field study program offering two-quarter winter/spring grassroots internships in Ecuador, India, Jamaica, Kenya, Morocco, or Senegal, preceded by on-campus preparatory courses in the fall; some sites require no prior language study. The Student Project for Amity and Nations (SPAN) consists of summer overseas research on a topic of the student’s choosing, preceded by a year’s on-campus preparation and followed by project write-up in the fall; the four destinations change from year to year. Students may also seek directed or independent study credit from COAFES departments for academic projects arranged as a part of a MAST International Outbound experience (see below).

Integrated classroom study programs permit students to take regular university courses alongside host-country nationals. The University’s student exchanges and consortium memberships provide access to universities in many countries. Agriculture curricula taught in English are available in Australia, Fiji, Finland, and the United Kingdom. Students with sufficient language fluency may instead choose to study in Dutch (the Netherlands), Finnish (Finland), French (France, Togo), German (Germany), Korean (South Korea), Spanish (Argentina, Dominican Republic, Honduras, Mexico). For students majoring in Applied Economics the range of options is even greater.

Other Study Abroad Opportunities—COAFES encourages study abroad for language acquisition or cultural learning. The resulting credits can often be used as electives. The University and other institutions sponsor a broad range of intensive language programs and area studies programs. Contact your adviser for more information.

Credit and Financial Aid—Advance planning and COAFES endorsement are essential to assure that credit from study abroad fits smoothly into the student’s degree program. Students who enroll in a University of Minnesota program will receive procedural information from the sponsoring office on campus. Students seeking other options should make an appointment with a study abroad program adviser (104 Nicholson Hall, 612/625-3379) as early as possible to discuss credit procedures and obtain a Foreign Study Checklist. Through the checklist, the COAFES Student Services Office for Student Affairs, 120 Biosystems and Agricultural Engineering, will record agreements concerning credit. The checklist also helps maintain students’ enrollment status and financial aid eligibility while abroad.

For nearly all study abroad programs, students can arrange to retain their University financial aid eligibility and/or to defer past loans. Additional financial aid is available for some programs. Contact a study abroad options adviser (102 Nicholson Hall, 612/626-9000) for more information. Some scholarships are available through COAFES to help defray costs of overseas study-travel. A written report is required. Preference is given to proposals from non-English speaking countries. You must initiate and plan the project yourself with the aid of a faculty adviser. Contact the COAFES Career Services Office, 120 Biosystems and Agricultural Engineering (612/624-2710), for more information.

MAST International Outbound—The MAST International Outbound program provides qualified individuals the opportunity to broaden their agricultural/horticultural skills and knowledge as well as develop or improve international language skills. Practical training programs of 3 to 12 months are available to individuals between the ages of 18 and 30. Participants will gain a cross-cultural experience by living and working with a host family in one of fifteen countries—Australia, Austria, Brazil, Denmark, Finland, France, Germany, Italy, the Netherlands, New Zealand, Sweden, Switzerland and the United Kingdom. Departure dates are in January, April, June and September each year. For more information, contact the MAST International office, 240 Vocational and Technical Education Building (612/624-3740).

Undergraduate Research Opportunities Program (UROP)—The University of Minnesota’s Undergraduate Research Opportunities Program offers financial awards to undergraduates for research, scholarly, or creative projects undertaken in partnership with a faculty member.

UROP affords undergraduates the unique educational experience of collaborating with a faculty member on the design and implementation of a project. Faculty also have the opportunity to work closely with students and receive valuable assistance with their own research or professional activity. UROP adds a new dimension to the undergraduate experience. It encourages students to conduct research and pursue academic interests outside of their regular courses by employing them to work on special projects. To qualify you must be a full-time undergraduate student at the University of Minnesota in good academic standing.

For more information and an application packet, contact the COAFES Career Services Office, 120 Biosystems and Agricultural Engineering (612/624-2710).

Professional Experience Program (PEP)—Junior and senior students enrolled in curricula offered by COAFES may participate in the Professional Experience Program (PEP). This program is designed for students who wish to reinforce their academic experience by working in an area related to their course of study. Students work full time either fall, winter, or spring quarter or during the summer. They earn 4 credits for satisfactory
completion of a PEP program and may enroll in two PEP programs for a total of 8 credits. Salaries are paid by the cooperating businesses, industries, producers, and agencies participating in the program. For more information, consult your adviser or the COAFES Career Services Office, 120 Biosystems and Agricultural Engineering (612/624-2710). Registration is arranged by the Career Services Office through University College only.

Minors

COAFES offers three minor concentrations designed to enhance the major programs of students in agriculture or non-agriculture areas. For assistance in planning a minor, contact the COAFES Student Services Office, 120 Biosystems and Agricultural Engineering (612/624-7254).

International Agriculture (30 credits)—The international agriculture minor is an interdisciplinary program that deals with the political, social, and cultural background against which agriculture and agricultural technology must operate throughout the world. Students gain insight into the problems of production, distribution, and consumption of food, feed, fiber, and domestic animals and attempted solutions in specific geographical areas. At least 30 credits are required, of which 5 must be for either an approved work/study experience or a major literature review, and 1 for a seminar in international agriculture. Students must develop their course of study in cooperation with an adviser in one of the departments of COAFES.

Required Courses (24 credits minimum)
Courses in agriculture outside the major (14 credits)
Courses in language, cultural aspects, geography, and history of an area of special interest (10 credits)
These courses should form a planned, coherent program that develops competencies in a geographical area of interest to the student.

Research Paper (5 credits minimum)
Select one of the following:
1. Field experience including work/study in some area of international agriculture. Students should keep a log book.
2. Extensive literature review in some area of international agriculture. Students should work with a faculty member who has international experience in an area of interest to them.

Seminar
Seminar in International Agriculture—1 credit (Agri 3000)

Sustainable Agriculture (30 credits)—Agricultural systems are complex and dynamic. In recent years, questions have been raised regarding the sustainability of energy and resource intensive agricultural systems. While all agriculturally oriented majors of the college consider issues of sustainability in agriculture, the Sustainable Agriculture minor provides a concentration of courses giving students greater understanding of scientific, technological, and socioeconomic factors affecting the viability of agriculture. Students examine ecological features of agriculture and work through decision-making case studies involving integrated management of specific agricultural systems. The minor provides a degree of flexibility and individuality through several elective options. Students should develop their course of study in consultation with an adviser in one of COAFES major programs.

Required Courses (12 credits)
AgET 5027—Appropriate Technology for International Development (4)
AnPi 5060—Integrated Pest Management of Cropping Systems (4)
Ent 5320—Ecology of Agriculture (4)
Remaining 18 credits must be taken from at least three of the following four areas. Students should consult a COAFES major adviser in selecting these courses.

Pest Control
Agro 5030—Weed Control (5)
Ent 5210—Insect Pest Management (4)
Ent 5280—Livestock Entomology (4)
Pipa 3001—Management and Control of Field Crop Diseases (4)
Pipa 3002—Management of Horticultural Crop Diseases (4)

Crops, Soils, and Water
AgET 5410—Hydrology and Water Quality (5)
Soil 3416, 3417—Plant Nutrients in the Environment and Lab (4,1)
Soil 5610—Soil Biology (4)

Applied Economics
ApEc 3420—Grain Marketing Economics (4)
ApEc 3430—Dairy Marketing Economics (4)
ApEc 3440—Livestock and Meat Marketing Economics (3)
ApEc 3450—Agricultural Input Marketing Economics (4)
ApEc 3810—Principles of Farm Management (4)

Integration of Agriculture and Society
ApEc 5790/Agro 5200/FScN 5643—World Food Problems (3)
AgEd 5055—Methods in Farming Systems Research and Extension (3)
AnSc 3113—Animal Welfare (4)
Biol 3052—Environmental Health and Toxicology (4)
Pol 3970—Ethics and the Environment (4)
Rhett 3390—Technology, Self, and Society (4)

Agriculture for Non-COAFES Students—This minor is for non-COAFES students who wish to explore some technical aspects of agriculture so they are better prepared as future leaders. The minor will help prepare them to:
• Understand the interdependence of rural and urban societies.
• Better manage the natural resources used by agriculture for the benefit of humanity.
• Understand the factors regulating supply and demand and the policies which determine the economics of food and fiber production.
• Understand the production practices used by agricultural producers and the environmental and social consequences of these practices.
• Understand the scientific basis of modern agriculture.

The college also offers minor concentrations in seven areas of agriculture to complement the studies of students in non-agriculture programs. Students currently pursuing a University of Minnesota major outside of COAFES may pursue minors in agricultural and applied economics, agronomy, animal science, entomology, horticulture, scientific and technical communication, and soil science. Contact the COAFES Student Services Office, 120 Biosystems and Agricultural Engineering (612/624-7254), for details and applications. COAFES students with an interest in one of these areas may want to incorporate it into an area of emphasis in their major. Consult your major adviser.
Grading

Academic progress in COAFES is evaluated by one of two grading systems: the letter grade (A-F) system or the satisfactory-no credit (S-N) system. A-F System—Under the A-F (A-B-C-D-F) system, each letter grade carries the following meaning:

A—Represents achievement that is outstanding relative to the level necessary to meet course requirements.
B—Represents achievement that is significantly above the level necessary to meet course requirements.
C—Represents achievement that meets the basic course requirements in every respect.
D—Represents achievement that is worthy of credit even though it does not fully meet the basic course requirements in every respect.
F—Represents performance that fails to meet basic course requirements. No credit is earned.

The GPA is determined by dividing the sum of the grade points earned (A=4.00, B=3.00, C=2.00, D=1.00, F=0.00) by the sum of the credits attempted. A cumulative average of 2.00 (C) is required for graduation. Additional GPA requirements may be found under the individual curricular listings.

S-N System—The S-N system is an alternative to the traditional grading system and encourages students to seek greater breadth in their educational experience.

Under the S-N system, the grade S stands for satisfactory and the grade N for no credit. The S represents achievement that is satisfactory to the instructor, for the program in which you are registered. This definition is intended to imply that the standards for S may vary from one program to another. The instructor is obligated to define to a class in its early meetings, as explicitly as possible, the performance necessary to earn an S. An N is assigned if you do not earn an S.

The following principles have been adopted as a guide for using the grading system by COAFES students:
• Courses identified by number and title as being required must be taken under the A-F system. Prerequisites for required courses and courses in the major must also be taken under the A-F system, unless exceptions are established. Generally, you may take under the S-N system only elective courses and courses used to satisfy all-college requirements that are not specified by number and title for your major requirements.
• All courses open to undergraduate students (those numbered below 8000) may be taken S-N or A-F, except where specifically restricted by the department offering the course or by the college, in the case of distribution requirements. Consult the course descriptions section for courses with restricted grading.
• Candidates for the baccalaureate degree from the college may present a maximum of 25 percent of the residence credits offered for graduation in courses in which they received grades of S.
• The grading system may be selected by students of the college regardless of their academic standing.
• The choice of grading must be declared at the time of registration and may be changed only up to the opening day of the third week of classes.

Your adviser or staff members in the COAFES Student Services Office can answer questions concerning the use of the grading system.

Other Symbols—The following symbols may be assigned under either grading system:
I—Assigned by an instructor to indicate incomplete work, in accordance with provisions announced in class at the beginning of the quarter, when in the instructor’s opinion there is a reasonable expectation that the student can complete successfully the work of the course. An I that is not made up by the end of the next quarter in residence becomes an F; instructors may set dates within the quarter for make up of examinations or work. When an I is changed to a grade, the I or F is removed from the record.
W—Indicates official withdrawal from a course without a grade. The W is assigned in all cases of official cancellation during the first six weeks of a quarter. After the second week, the approval of the instructor is required for withdrawal. Withdrawal from a course after the sixth week is rarely permitted unless extenuating circumstances exist. Withdrawals (W) if approved, after the sixth week of the quarter are factored into your coefficient of completion.
V—Indicates registration as an auditor or visitor, a noncredit, nongrade registration.
T—Posted on the transcript as a preceding supplement to the original grade to indicate credits transferred from another institution or from one college to campus to another within the University when reevaluation is required.
X—Reported in a two- or three-quarter continuing course in which a grade cannot be determined until the full sequence is completed. The instructor submits a grade for each X when the student has completed the sequence.

Dean’s List—The Dean’s List, published at the end of fall, winter, and spring quarters, is one way that COAFES recognizes outstanding academic performance by its students. To qualify for the COAFES Dean’s List, students must complete at least 12 credits for the quarter (day school and Continuing Education and Extension combined) with a GPA of 3.70 or better. At least one course for that quarter must be completed in day school.
Scholastic Requirements

COAFES students are expected to maintain an academic standing that will enable them to meet minimum requirements for graduation upon completion of the required number of credits in the major that they have selected. To aid in the early identification of students who are not making satisfactory progress so that appropriate assistance can be provided, the following system has been developed.

Academic Difficulty: Probation and Suspension Status—See your adviser regularly, especially if you are having difficulty in any of your courses. COAFES’ mechanism for dealing with academic difficulty is called academic probation.

There are three levels of probation: academic warning (P1), academic contract (P2) and suspension (P3). A student is placed on academic warning if his/her quarterly or cumulative GPA is less than 2.00 but 1.50 or better. A student on academic warning must see an adviser in order to register and will be issued an override to register at their normal queued time. If the student’s quarterly and cumulative GPAs at the end of the probationary quarter are 2.00, the student is removed from academic warning. If not, the student is placed on probation contract.

In addition to GPA, each student’s coefficient of completion is monitored annually. The coefficient of completion indicates the percentage of courses being completed successfully. A coefficient of .75 is considered a minimum standard. If students fail to meet the minimum of .75, they are placed on probation and their progress is monitored in the same manner detailed below.

The formula for determining this is:

\[
\frac{\text{Credits Completed with grade A, B, C, D, S}}{\text{Credits Attempted with grade A, B, C, D, S, F, N, I, W}} = \text{percentage of successful completion.}
\]

A student is placed on probation contract if his/her quarterly or cumulative GPA is less than 1.50. A student on probation contract must complete a specific contract drawn up by the college for academic performance and will not be allowed to register for subsequent quarters until grades for the probationary quarter are reviewed. If the contract goals are met quarterly and cumulative GPAs are at least 2.00, the student is removed from probation. If goals are not met, the student is placed on suspension. The period of suspension is normally one academic year.

A student who is suspended may appeal the suspension. A determination of readmittance will be made jointly by the Student Services Office and the Scholastic Affairs Committee. Readmission is not automatic; to be readmitted, a student must show evidence in writing of changes in circumstances that make it more likely that the student will succeed in the academic program. Any collegiate coursework completed while a student is suspended, including courses from the University’s Continuing Education and Extension program, must be petitioned to the COAFES Scholastic Affairs Committee for approval to be applied to student’s degree program once readmitted.

Appeal System—Decisions by the adviser, department Scholastic Standing Committee and the subcommittees of the Scholastic Standing Committee may be appealed to the COAFES Scholastic Affairs Committee whose decision in turn may be appealed to the COAFES dean.

Repeating Courses—Students may repeat, for credit, courses in which they have received grades of N or F, and only the first passing grade will be counted in the cumulative grade point average and honor point total. (The grades previously earned, however, will remain on the transcript.) Students who want to repeat courses in which they received grades of D, C, or S must petition the Scholastic Standing Committee for approval before registering for the course(s). Repeating for credit courses in which grades of A or B have been received is not permitted.

Scholastic Conduct

The college has defined scholastic misconduct broadly as any act that violates the rights of another student in academic work or that involves misrepresentation of a student’s own work. Scholastic misconduct includes (but is not necessarily limited to) cheating on assignments or examinations; plagiarizing, which means misrepresenting as a student’s own work any part of work done by another; submitting the same paper, or substantially similar papers, to meet the requirements of more than one course without the approval and consent of all instructors concerned; depriving another of necessary course materials; or interfering with another student’s work.

When a case of scholastic misconduct arises, the COAFES faculty member who is the instructor for the course may modify the grade for the exam or piece of work in question or the course grade, or refer the incident to the Scholastic Affairs Committee for disposition. In any case, the instructor must report the incident and the action taken by the instructor to the college Scholastic Affairs Committee. At the time of the action, the student is informed by the instructor of his or her right to ask for a hearing by the Scholastic Affairs Committee. Information on this process is available from the COAFES Student Services Office.

The Scholastic Affairs Committee reviews all reports of academic dishonesty filed with it by faculty members. The committee maintains confidential records of such reports for five years. These records are separate from students’ academic records and are used only by the committee and in consideration of cases of scholastic misconduct.
Graduation application deadlines are set by the COAFES Student Services Office and are two quarters before your expected graduation. The deadline will be published in the college Kiosk, an information sheet that you will receive each quarter with your registration materials. You will be responsible for knowing these deadlines. Extensions of deadlines are rarely granted. You may turn in your application with an official program sheet signed by your adviser to the Office of the Registrar—St. Paul, 130 Coffey Hall.

Residency Requirements—In addition to meeting University residency requirements, baccalaureate degree candidates must earn a minimum of 30 of their last 45 credits in professional courses in the program at the 3xxx or 5xxx level while enrolled in COAFES. Ordinarily this will include courses described in this bulletin as well as appropriate advanced courses required in intercollegiate programs.

Graduation With Honors—Graduating with honors is determined by a combination of accumulated COAFES GPA (you must have a minimum of 60 credits taken while in COAFES at the University of Minnesota) and fulfillment of the Honors Colloquia and Honors Experience requirements.

The following Latin designations are used for COAFES Honors students:
- *Cum laude*—3.4 GPA for all coursework in COAFES plus honors requirements.
- *Magna cum laude*—3.6 GPA for all coursework in COAFES plus honors requirements.
- *Summa cum laude*—3.8 GPA for all coursework in COAFES plus honors requirements.

Information and applications for all the Honors Programs are available in 120 Biosystems and Agricultural Engineering (612/624-3009).

Graduation With Distinction and High Distinction—Graduation “with high distinction” is limited to the top three percent (usually 3.80 GPA or above) of the graduating class; “with distinction” to the next seven percent (usually 3.50 GPA or above) of the graduating class.

The calculation of the GPA to determine class rank is based on the last 90 credits taken before graduation. Only graduating students who have completed at least 90 credits as students in COAFES are eligible for distinction designations, regardless of the level of their academic performance.

Career Services Office

To help you secure employment after graduation, the Career Services Office, 120 Biosystems and Agricultural Engineering, announces job opportunities and assists in arranging interviews with employers. The Career Services Office manages the recruiting activity for both full-time and internship positions. The internship program, Professional Employment Program (PEP), is
offered to juniors and seniors currently enrolled in the college. Students are encouraged to take advantage of the Career Services Office for career information beginning their freshman year.

### Student Organizations

**COAFES Student Board**—The COAFES Student Board promotes student involvement in issues related to the quality and content of education both in and out of the classroom. This purpose is achieved through channels of communication created by the board between the students, faculty, and administration of COAFES. Through the board, students participate in such matters as consideration of proposed curricula, questions related to instruction, improvement of educational facilities, development of administrative policy, and establishment of the goals of COAFES. Further information related to the board and its operation may be obtained in 120 Biosystems and Agricultural Engineering.

**St. Paul Campus Board of Colleges**—The St. Paul Campus Board of Colleges directs and coordinates student activities and encourages student leadership throughout the St. Paul campus. Its membership is drawn from the colleges of Agriculture, Biological Sciences, Natural Resources, Human Ecology, and Veterinary Medicine. The board brings questions from the student bodies to the administration of the colleges and discusses problems and reaches decisions on matters of general interest. The board cooperates with the Minnesota Student Association and the Assembly Committee on Student Affairs (ACSA).

As a student in COAFES, you may file for election to this board. Inquire at the Office for Student Affairs, 130 Coffey Hall, for more information.

**Student Center Board of Governors**—The St. Paul Student Center provides a varied program of social, cultural, and recreational activities and contributes in many ways to the educational objectives of the campus. The St. Paul Student Center Board of Governors, composed of students elected to represent the academic units on the St. Paul campus, formulates policies for operation of the student center and establishes its budget. For information about the St. Paul Student Center, its operation, and opportunities to serve on its various planning and programming committees, inquire at the information desk on the first floor of the student center.

**Agricultural Ambassadors**—This group of selected undergraduate students from COAFES volunteer their time to serve as goodwill ambassadors for the college and its students. They foster communications among the college, prospective students, and the community at large. Each ambassador gains experience in public relations and recruitment and develops valuable communications skills through public speaking engagements and small group discussions with prospective students. Agricultural Ambassadors develop leadership/management talents by participating on the executive board and special committees. For more information, contact the COAFES Student Services Office, 120 Biosystems and Agricultural Engineering.

**Student Representation on College and University Committees**—All COAFES committees and most all-University committees have student representatives. For college committees, selection is made by the COAFES Student Board. For all-University committees, watch for announcements in The Minnesota Daily and on bulletin boards around the campuses about filing for positions.

**Other COAFES Student Organizations**—Many of the undergraduate programs sponsor student clubs. Membership and participation in these organizations can add a valuable dimension to your academic program and contribute a great deal to your professional development. Check with your adviser or the COAFES Student Services Office, 120 Biosystems and Agricultural Engineering, for further information.

Other clubs affiliated with the College of Agricultural, Food, and Environmental Sciences include:

- Agricultural Education Club
- Block and Bridle
- Gopher Dairy Club
- Gopher Crops and Soils
- Food Science and Nutrition Club
- Horticulture Club
- National AgriMarketing Association, Student Chapter (NAMA)
- Environmental Studies Club
- Nutrition Club
- American Society of Agricultural Engineers, Student Branch
- Society of Technical Communicators, Student Chapter
- Students in Honors
- Frenatar: Entomology Student Association
- Pre-Vet Med Club
- The Sheep and Goat Club
- Alpha Epsilon Delta (Pre-Med and Pre-Vet)
- American Association of Bovine and Swine