

Core Courses

Economics is Everywhere! Some Key Concepts to Understanding the Agriculture Economy (All students)

Dr. Mike Ellerbrock

Students will learn how economics relates to their everyday lives and the world around them through discussions of the economic development, poverty, comparative advantage, financial planning, and the business of doing business.

Dairy Science 101: From Cow to Table (All Students)

Mr. Connor Owens and Mr. Dave Winston

In 2015 Americans consumed 627 pounds of dairy products per capita, a 16.3 percent increase in consumption since 1975. However, few understand the science and technology that are involved in producing, harvesting, processing, and marketing milk and milk products. This class will provide a basic overview of the dairy community and will cover dairy trends in production and manufacturing, physiology of lactation, and milk quality and safety. A field trip to the Virginia Tech Dairy Center at Kentland Farm will highlight precision dairy technology used to improve animal well-being and management. Educational and career opportunities will be explored.

It's Not Your Grandfather's Farm (All Students)

Dr. Bain Wilson, Dr. Dan Eversole, McCauley Vailes, Emily Williams, Antoine Ehouman, Kevin Young

Introduction to the Animal Sciences is designed to expose students to the broad scope of the animal sciences, ranging from the basics of animal husbandry to cutting edge research involving animals. Emphasis will be placed on the applied biology related to the nutrition, reproduction, genetics, and well being of domestic animals.

Natural Energy and the Environment (All Students)

Ms. Chelsea Corkins, Ms. Qualla Ketchum, Dr. Emily Bock, Dr. Tyler Keys

Provides a general introduction to biological systems engineering, sustainable agriculture, and energy, with emphasis on best management practices utilizing biomaterials and natural resources. Students will experience working as engineers, learning what an engineer actually does, and hear from recent graduate students on their research interests and career goals. This team-taught course also covers recent trends in agriculture and biological systems.

Plant Sciences Introduction: Crop production, the Environment, and the Role of Biotechnology (All Students)

Dr. Steve Hodges, Dr. Guillaume Pilot, Dr. Ryan Stewart, Dr. Bo Zhang, John Fick, & Dr. John Galbraith

In this course, we will explore the use of challenges of feeding 9.3 billion people by 2050 and deal with a changing climate. The options include using more and more land or using the agricultural land we have to produce more. To increase food supplies we must develop crop and forage varieties that are tolerant to stress, diseases, pests, weeds, and more efficient in using water and nutrients. Plant breeding relies heavily on biotechnology, including transgenic approaches for some crops. In addition, we must maintain and improve soil and water quality as agriculture intensifies. We will examine the advantages and disadvantages of these approaches with regard to environmental sustainability while exploring the production systems of important staple crops.

Core Courses

Communicating in the Scientific World (All Students)

Ms. Brittany Hoover

The purpose of the course is to develop skills in written and oral communication in the agricultural sciences. The course will specifically focus on skills in scientific writing, creating brochures, creating scientific posters, and public speaking with and without PowerPoint, and techniques for blogging.

The Value of the Library in the Digital Age (All Students)

Ms. Kyrille DeBose and Ms. Inga Haugen

It is estimated that our human knowledge (everything we know) is doubling every year, and doubling at an increasing rate. In this age of vast digital information, the library still stands as a mainstay of credible and scholarly evidence to be used to support our opinions. This course will provide techniques and strategies to use the library in today's digital environment.

Careers in Agriculture (All Students)

Mr. Jeremy Elliot-Engel

A survey of opportunities for careers in agriculture. Students will explore potential careers in agriculture and complete an assessment matching personal strengths and skills to qualifications needed for specific careers. Students will also learn about the career services available at colleges, tools available for seeking employment after graduation, and how to network with professionals in the agriculture industry.

Major Courses – Series 1

Introduction to Biological Systems Engineering (Agricultural & Biological Systems Engineering Majors Only)

Erin Ling, Chelsea Corkins, Dr. Justin Barone, Dr. Frank Gillam, and Dr. Karen Kline

Biological Systems Engineering (BSE) is the engineering discipline that applies concepts of biology, chemistry and physics, along with engineering science and design principles, to solve problems in biological systems. This course will explore a broad range of biological systems, from natural systems, such as watersheds with a focus on water resources, to built systems, such as bioreactors and bioprocessing facilities.

Introduction to Agricultural Marketing: You and Your Communication Strategy (Agricultural Economics Majors Only)

Dr. Kimberly Morgan

In this class students will complete the 20-question True Colors Personality Quiz and participate in a group activity and discussion about our findings. Students will examine the 4 P's of marketing which directly affect consumer purchasing behavior. Finally, students will select an agricultural product and develop a marketing communication strategy.

Focus on the Animal Sciences (Animal Science Majors Only)

Dr. Bain Wilson

Each day's session will focus on an aspect of the animal sciences, based on species, purpose, and/or discipline. Students will explore and apply practical concepts related to animal husbandry and survey the most recent research occurring at Virginia Tech with respect to animal science.

Food Safety for Ready-to-eat and Ready-to-heat Foods (Food Science Majors Only)

Dr. Joe Eifert

Many technologies are used in foods to prevent spoilage, ensure product safety, enhance taste, improve nutrition, reduce costs and increase convenience. Hamburgers will be used as an example to highlight the food technologies necessary to produce a ready-to-heat or ready-to-cook food. Breakfast cereals and military meals will be used as examples of ready-to-eat foods.

Plant Sciences Introduction: The Big Data Revolution in Agriculture (Plant Science Majors Only)

Dr. Song Li, Dr. David Haak, Dr. Pratap Tokekar, and Dr. Wade Thomason

Students will explore how genomic data can be used to improve crop production by decoding genome evolution and characterizing domestication process. Student will learn how selective breeding and biotechnology can be used to identify genes underlying stable resistance traits. The challenges and opportunities of implementing precision agriculture in Virginia will be discussed. During field trip, students will learn to use drones and ground robots to collect crop phenotypes.

Major Courses – Series 2

Orientation to Biological Systems Engineering (Agricultural & Biological Systems Engineering Majors Only)

Erin Ling, Chelsea Corkins, Dr. Ryan Senger, Dr. Warren Ruder, Dr. Laura Hanzly, Qualla Ketchum and Teneil Sevills

Learn about watershed science and engineering through hands-on activities. Students will conduct an experiment using a rainfall simulator to examine the effects of land cover on runoff volume and pollutant loss. An introduction to the field of Metabolic Engineering will be given followed by hands-on applications with cyanobacteria that draw CO₂ out of the atmosphere, plants engineered to produce valuable chemicals, and three-dimensional computer models that demonstrate the intersection of biology and mathematics. Students will then visit the StREAM Lab, a living, learning outdoor laboratory in and on Strouble's Creek in Blacksburg.

Choosing Wisely: What Economics Has to Offer (Agricultural Economics Majors Only)

Dr. Mike Ellerbrock

Students will learn in the basics of economic decision-making and how markets operate. Students will participate in microeconomic applications by investigating what can be done to successfully manage our natural resources.

Animal Reproduction

Mr. Nicholas Wege Dias

How animals reproduce is both a fascinating topic and critically important for good animal management. The basic principles of male and female reproduction are explained. Main factors influencing fertility, the technologies used in the field and the impact of reproduction on production system, focused on the beef chain is explained.

Food Science: Fermented Foods and Food Additives (Food Science Majors Only)

Sihui Ma, Dr. Sean O'Keefe

In this class we will study the fascinating world of fermented foods. Our ancestors thousands of years ago had no refrigeration and no stores, and they used fermentation to save and process foods, improving nutritional value along the way. We will also look at additives used by the food industry, what they are, why they are used and what regulations they follow.

Global Food Security (Plant Science Majors Only)

Dr. Steven Hodges, Dr. Ozzie Abaye, Dr. Tom Thompson, and Dr. Takeshi Fukao

This course will explore what food security means, why it is important, and how plant sciences can help solve global food security to assist in feeding the world's billions of people. Different approaches will be explored, including food systems, a deeper look at crop improvement and molecular breeding, and perspectives from the developing world.

Elective Courses

Week 4

Aesthetic Horticulture: Combining Art and Science in Floral Design

Rachel Mack and Dr. Barbara Leshyn

Application of design elements and principles in creation of a variety of floral designs for the home, including bud vases, centerpieces, and a special party design. Additional info includes obtaining and preparing flowers, working with containers and design aids, design evaluation, and maintaining flower quality. No previous experience needed.

Medicine Across the Species

Mel Kegley, Dr. Sherrie Clark-Deener, Dr. Carling Sitterley, Dr. Stefanie Demonaco, and Dr. Valerie Ragan

Each day's session will focus on an aspect of veterinary medicine, based on species, purpose, and/or discipline. Topics include: companion animal care and prevention, food animal health care, preventing and treating toxicities in animals, and imaging in the dark.

The Meat We Eat

Course Description: This course is designed to give students a glimpse of the global meat industry, food safety, and consumer driven markets. Furthermore, this course will integrate topics of muscle biology, growth and development, and the mechanism that control the conversion of muscle to meat. Specifically, students will focus on understanding meat quality attributes that drive the consumer market, such as meat color, flavor, and tenderness. These goals will be achieved through lecture and lab components that will allow students to be exposed to meat fabrication, packaging, retail display, food safety, and the innovations behind these components that has continued to move the meat industry forward.

Restoring Community Food Sheds

Steven Haring and Dr. Susan Clark

Introduction to the economic, social, and ecological foundations of civic agriculture. Topics include localized food systems and citizen participation in civic agriculture. Emphasis will be given to a range of civic agriculture models, strategies, and hands-on approaches to establish, retain and strengthen community-based food and agriculture systems.

Cultivating Health, Wellness, and Safety for Agricultural Sustainability through a Sociotechnical Approach

Dr. Kim Niewolny, Crystal Kyle, Roberto Franco

The complexities that shape our food and agricultural systems are immense. For instance, farmers too often sustain injuries or illnesses, or have a physical or emotional disability that impedes their ability to work safely and productively. In this course, students will be introduced to AgrAbility Virginia, a statewide program that uses a sociotechnical approach to help address the health, wellness, and safety of farmers and farmworkers, while, at the same time, addressing the issues of agricultural sustainability from farm-to-field. We will illustrate how we integrate the fields of mechanical engineering, health and occupational safety, and community education to improve the quality of life of farmers as our primary goal. The course will include: 1) an overview of AgrAbility Virginia and the community-university partnerships that make-up our technical assistance and educational delivery system; 2) a field trip to the Terrestrial Robotics Engineering & Controls (TREC) Lab in the Department of Mechanical Engineering to demonstrate how robotics are used as an emergent assistive technology in agriculture; and 3) a local farm visit focused on identifying real-life health and safety issues and solutions.