

# APPLIED BIOLOGICAL SYSTEMS TECHNOLOGY (ABT)

College of Agricultural & Environmental Sciences

## ABT 015 – Wood Properties & Fabrication (2 units)

*Course Description:* Study of wood properties and techniques for fabrication with wood. Gain experience working with various woods and woodworking tools for specific applications.

*Learning Activities:* Lecture/Discussion 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Visual Literacy (VL).

## ABT 016 – Metal Properties & Fabrication (2 units)

*Course Description:* Study of metal properties and of techniques for fabricating in metal. Physical principles, design considerations, effects of techniques on quality and appearance, and evaluation procedures. Experience in working with metal.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## ABT 017 – Plastic Properties & Fabrication (2 units)

*Course Description:* Study of the properties of plastic materials and the fundamentals of fabrication techniques. Experience in working with common plastics, with applications to biological systems.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## ABT 049 – Field Equipment Operation (2 units)

*Course Description:* Operation, adjustment, and troubleshooting of farm tractors and field equipment. Principles of operation, equipment terminology and uses of tilling, cultivating, thinning, and planting equipment. Typical sequences in cropping practices.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## ABT 052 – Field Equipment Welding (2 units)

*Course Description:* Intermediate welding to include hardfacing and inert gas welding. Class projects on repair and fabrication by welding. Troubleshooting and major repair of field equipment.

*Prerequisite(s):* ABT 016; or consent of instructor.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## ABT 060 – Introduction to Unmanned Aerial Systems for Agriculture & Environmental Science (4 units)

*Course Description:* Operation, use and impact of Unmanned Aerial Systems (UAS) for applications in agriculture and environmental assessment. Principles of unmanned flight, vehicle systems, safety, and airspace regulations for communicating spatial relationships. UAS sensors, data acquisition, management, processing, visualization and analysis. Ethics and professional responsibilities in operations and public communication, and potential impacts for agricultural and environmental policy.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s), Discussion 1 hour(s).

*Enrollment Restriction(s):* Pass One restricted to College of Agricultural & Environmental Sciences students.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## ABT 098 – Directed Group Study (1-5 units)

*Course Description:* Directed group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## ABT 099 – Special Study for Lower Division Students (1-5 units)

*Course Description:* Special study for lower division students.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

## ABT 101 – Engine Technology (3 units)

*Course Description:* Principles of 2-stroke cycle, 4-stroke cycle gasoline and 4-stroke cycle diesel engine construction and operation. Engine systems, performance, troubleshooting, and overhaul.

*Prerequisite(s):* Upper division standing or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

## ABT 110 – Irrigation Systems & Water Management (4 units)

*Course Description:* Soil and plant aspects of irrigation and drainage. Soil-water principles including water storage and movement, plant response to irrigation, water use by crops, irrigation systems (i.e., micro-irrigation, sprinkler irrigation and surface irrigation), and related salinity and water quality impacts.

*Prerequisite(s):* PHY 007A; SSC 100 recommended.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Cross Listing:* ESM 110, HYD 110.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL).

### **ABT 110L – Experiments in Food Engineering (2 units)**

*Course Description:* Use of temperature sensors; measurement of thermal conductivity and heat transfer in foods; refrigeration, freezing, concentration and dehydration of foods.

*Prerequisite(s):* FST 110B (can be concurrent).

*Learning Activities:* Laboratory 6 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL); Writing Experience (WE).

### **ABT 121 – Animal Housing & Environment Management (2 units)**

*Course Description:* Optimal structures and environments for animal growth and comfort; heat and moisture transfer principles; heating, cooling, ventilating principles and equipment; animal housing design; environmental regulations and waste management practices.

*Prerequisite(s):* ANS 001 or ANS 002.

*Learning Activities:* Lecture 2 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE).

### **ABT 142 – Equipment & Technology for Small Farms (2 units)**

*Course Description:* Types and characteristics of agricultural equipment and technologies appropriate for small commercial farming. Adjustment and calibration of equipment. Selection of and budgeting for equipment.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Cross Listing:* IAD 142.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

### **ABT 150 – Introduction to Geographic Information Systems (4 units)**

*Course Description:* Basic concepts, principles, and methods of GIS are presented. Data structures, database design, GIS data creation, GPS, and spatial analysis. May be taught abroad.

*Learning Activities:* Lecture 3 hour(s), Laboratory 3 hour(s).

*Enrollment Restriction(s):* Pass One restricted to Landscape Architecture and Sustainable Environmental Design majors.

*Credit Limitation(s):* Not open for credit to students who have completed ABT 180/PLS 180 or ABT 181N.

*Cross Listing:* LDA 150.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Visual Literacy (VL).

### **ABT 161 – Water Quality Management for Aquaculture (3 units)**

*Course Description:* Basic principles of water chemistry and water treatment processes as they relate to aquacultural systems.

*Prerequisite(s):* BIS 001B; MAT 016B; CHE 002B.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

### **ABT 163 – Aquaculture Systems Engineering (3 units)**

*Course Description:* Design of aquacultural systems: design methodology, principles of fluid mechanics, site selection and facility planning, management operations, computer modeling.

*Prerequisite(s):* ABT 161.

*Learning Activities:* Lecture 3 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Oral Skills (OL); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

### **ABT 165 – Irrigation Practices for an Urban Environment (3 units)**

*Course Description:* Basic design, installation, and operation principles of irrigation systems for turf and landscape: golf courses, parks, highways, public buildings, etc. Emphasis on hardware association with sprinkler and drip/trickle systems.

*Prerequisite(s):* PHY 001A.

*Learning Activities:* Lecture/Discussion 2 hour(s), Project.

*Cross Listing:* SAF 165.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Visual Literacy (VL).

### **ABT 181N – Concepts & Methods in Geographic Information Systems (4 units)**

*Course Description:* Data representation and analysis in geographic information systems (GIS). Creation of spatial data sets from analog and digital sources such as aerial photography and maps; data structures, data management, database design, georeferencing, georectification, surface models, analysis, and spatial data visualization.

*Prerequisite(s):* LDA 150 or ABT 150; or consent of instructor.

*Learning Activities:* Lecture/Lab 8 hour(s).

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Scientific Literacy (SL); Visual Literacy (VL).

### **ABT 182 – Environmental Analysis Using GIS (4 units)**

*Course Description:* Ecosystem and landscape modeling with emphasis on hydrology and solute transport. Spatial analysis of environmental risk analysis including ecological risk assessment, natural resource management. Spatial database structures, scripting, data models, and error analysis in GIS.

*Prerequisite(s):* ABT 150 or LDA 150; or equivalent GIS experience and skills; general biology and/or ecology courses recommended.

*Learning Activities:* Lecture 2 hour(s), Laboratory 4 hour(s).

*Cross Listing:* HYD 182.

*Grade Mode:* Letter.

*General Education:* Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

### **ABT 190C – Research Conference for Advanced Undergraduates (1 unit)**

*Course Description:* Research conferences for specialized study in applied biological systems technology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ABT 192 – Internship in Applied Biological Systems Technology (1-5 units)**

*Course Description:* Supervised internship in applied biological systems technology.

*Prerequisite(s):* Consent of instructor; upper division standing; approval of project prior to period of internship.

*Learning Activities:* Internship 3-15 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ABT 197T – Tutoring in Applied Biological Systems Technology (1-5 units)**

*Course Description:* Tutoring individual students, leading small voluntary discussion groups, or assisting the instructor in laboratories affiliated with one of the department's regular courses.

*Prerequisite(s):* Consent of instructor; upper division standing.

*Learning Activities:* Tutorial.

*Repeat Credit:* May be repeated when topic differs.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ABT 198 – Directed Group Study (1-5 units)**

*Course Description:* Directed group study. May be taught abroad.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ABT 199 – Special Study for Advanced Undergraduates (1-5 units)**

*Course Description:* Special study for advanced undergraduates.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Pass/No Pass only.

*General Education:* Science & Engineering (SE).

**ABT 212 – Path to Zero Net Energy (4 units)**

*Course Description:* Zero Net Energy concepts and social, technical, economic, and environmental considerations. Multidisciplinary research and analysis for clients.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Lecture 3 hour(s), Term Paper/Discussion 1 hour(s).

*Enrollment Restriction(s):* Open to upper division or graduate students.

*Grade Mode:* Letter.

**ABT 233 – Pest Control Practices (3 units)**

*Course Description:* Practical and theoretical considerations of pest control systems and techniques. Design, selection, and use of mechanical systems for field, orchard, greenhouse, and vector control use. Biological, legal, and environmental considerations in pest control and pesticide application.

*Prerequisite(s):* Graduate standing or consent of instructor.

*Learning Activities:* Lecture 2 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.

**ABT 289A – Selected Topic in Applied Biological Systems Technology: Agricultural & Natural Resources (1-5 units)**

*Course Description:* Special topic.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**ABT 289B – Selected Topics in Applied Biological Systems Technology: Biotechnology (1-5 units)**

*Course Description:* Special topic.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**ABT 289C – Selected Topics in Applied Biological Systems Technology: Food Technology (1-5 units)**

*Course Description:* Special topic.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable 1-5 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Letter.

**ABT 290C – Graduate Research Conference (1 unit)**

*Course Description:* Research problems, progress, and techniques in applied biological systems technology.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Discussion 1 hour(s).

*Repeat Credit:* May be repeated.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ABT 298 – Group Study (1-5 units)**

*Course Description:* Group study.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ABT 299 – Research (1-12 units)**

*Course Description:* Research.

*Prerequisite(s):* Consent of instructor.

*Learning Activities:* Variable.

*Grade Mode:* Satisfactory/Unsatisfactory only.

**ABT 317 – Teaching Agricultural Mechanics (2 units)**

*Course Description:* Preparation of the teacher to plan, organize, and conduct an agricultural mechanics program in secondary schools. Development of and presentation of lesson plans and teaching aids. Review of subject matter in metal fabrication, power and machinery and agricultural structures areas.

*Prerequisite(s):* A course in physics; 6 units related to agricultural mechanics; enrolled in Agricultural Education Teacher Credential Program.

*Learning Activities:* Lecture 1 hour(s), Laboratory 3 hour(s).

*Grade Mode:* Letter.