Agricultural Sciences

www.coas.siu.edu/ kezo@siu.edu

COLLEGE OF AGRICULTURAL SCIENCES

Graduate Faculty:

AbuGhazaleh, Amer A., Professor, Ph.D., South Dakota State University, 2002; 2004.

Akamani, Kofi, Assistant Professor, Ph.D., University of Idaho, 2011; 2015.

Altman, Ira J., Associate Professor and *Chair,* Ph.D., University of Missouri, 2005; 2006.

Apgar, Gary A., Associate Professor, Ph.D., Virginia Polytechnic Institute and State University, 1994; 1998.

Arthur, Robert, Professor, *Emeritus*, Ph.D., University of Missouri, 1970; 1977.

Ashraf, Hea-Ran L., Professor, *Emerita*, Ph.D., Iowa State University, 1979; 1980.

Asirvatham, Jebaraj, Assistant Professor, Ph.D., University of Illinois, 2011; 2015.

Atkinson, Rebecca L., Associate Professor, Ph.D., University of Wyoming, 2006; 2006.

Banz, William J., Professor and *Chair*, Ph.D., University of Tennessee, 1995; 1995.

Beaulieu, Jeffrey R., Associate Professor, *Emeritus*, Ph.D., Iowa State University, 1984; 1983.

Beck, Roger J., Associate Professor, *Emeritus*, Ph.D., Pennsylvania State University, 1977; 1984.

Bond, Jason P., Professor, Ph.D., Louisiana State University, 1999; 2000.

Carver, Andrew, Professor, Ph.D., Purdue University, 1998; 1998

Choudhary, Ruplal, Associate Professor, Ph.D., Oklahoma State University, 2009,2009.

Chong, She-Kong, Professor, *Emeritus*, Ph.D., University of Hawaii, 1979; 1979.

Cook, Rachel, Assistant Professor, University of North Carolina, 2012.

Davis, Jeremy, Associate Professor, Ph.D., Iowa State, 2008; 2008.

Diesburg, Kenneth L., Assistant Professor, *Emeritus*, Ph.D., Iowa State University, 1987; 1989.

Eberle, Phillip R., Associate Professor, *Emeritus*, Ph.D., Iowa State University, 1983; 1983.

Endres, Jeannette M., Professor, *Emerita*, Ph.D., St. Louis University, 1972; 1980.

Fakhoury, Ahmad M., Associate Professor, Ph.D., Purdue University, 2001; 2003.

Gastal, Eduardo L., Associate Professor, Ph.D., University of Wisconsin-Madison, 1999, 2009.

Groninger, John W., Professor, Ph.D., Virginia Polytechnic Institute and State University, 1995; 1997.

Harris, Kim S., Associate Professor, *Emeritus*, Ph.D., University of Illinois, 1985; 1984.

Hausler, Carl L., Associate Professor, *Emeritus*, Ph.D., Purdue University, 1970; 1970.

Henry, Paul H., Associate Professor, Ph.D., North Carolina State University, 1991; 1992.

Holzmueller, Eric J., Associate Professor, Ph.D., University of Florida, 2006; 2007.

Jones, Karen L., Professor and *Chair*, Ph.D., Texas A&M, 1999; 1999. Animal biotechnology.

Kammlade, W. G., Jr., Associate Professor, *Emeritus*, Ph.D., University of Illinois, 1951; 1954.

Kantartzi, Stella, Associate Professor, Ph.D., Aristotle University of Thessaloniki, 2006; 2008. Soybean breeding and genetics.

King, Sheryl S., Professor, *Emerita*, Ph.D., University of California, Davis, 1983; 1983.

Klubek, Brian P., Professor, *Emeritus*, Utah State University, 1977; 1978.

Kraft, Steven E., Professor, *Emeritus,* Ph.D., Cornell University, 1976; 1980.

Kroening, Gilbert H., Professor, *Emeritus*, Ph.D., Cornell University, 1965; 1969.

Latour, **Mickey**, Professor and *Dean*, Ph.D. Mississippi State University.

Legacy, James, Professor, *Emeritus*, Ph.D., Cornell University, 1976; 1977.

Lightfoot, David A., Professor, Ph.D., University of Leeds, 1984; 1991.

Long, Sara, Professor, *Emerita*, Ph.D., Southern Illinois University Carbondale, 1991; 1991.

McGuire, James M., Professor, *Emeritus*, Ph.D., North Carolina State University, 1961; 1993.

Meksem, Khalid, Professor, Ph.D., University of Cologne, Germany, 1995; 2000.

Midden, Karen L., Professor and Associate Dean, M.L.A., University of Georgia, 1983; 1988. Landscape design.

Minish, Gary L., Professor, *Emeritus*, Ph.D., Michigan State University, 1966; 2004.

Moon, Wanki, Professor, Ph.D., University of Florida, 1995; 2000

Nielsen, Clayton, Professor, Ph.D., Southern Illinois University Carbondale, 2001; 2009.

Olsen, Farrel J., Professor, *Emeritus*, Ph.D., Rutgers University, 1961; 1971.

Park, Logan, Associate Professor, Ph.D., Virginia Polytechnic Institute and State University, 2009; 2009.

Pense, Seburn L., Associate Professor, Ph.D., Oklahoma State University, 2002; 2003.

Preece, John E., Professor, *Emeritus* Ph.D., University of Minnesota, 1980; 1980.

Rendleman, C. Matthew, Associate Professor, Ph.D., Purdue University, 1989; 1994.

Ruffner, Charles M., Professor, Ph.D., Pennsylvania State University, 1999. 1999.

Sanders, Dwight R., Professor, Ph.D., University of Illinois, 1999; 2000.

Schmidt, Michael, Associate Professor, *Emeritus*, Ph.D., Southern Illinois University Carbondale, 1994; 1979.

Schoonover, Jon E., Associate Professor, Ph.D., Auburn University, 2005; 2006.

Secchi, Silvia, Associate Professor, Ph.D., Iowa State, 2000; 2008.

Shoup, W. David, Professor, *Emeritus*, Ph.D., Purdue University, 1980; 1999.

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Smith, Sylvia F., Associate Professor, Ph.D., University of Tennessee, 2007; 2007.

Stucky, Donald J., Professor, *Emeritus*, Ph.D., Purdue University, 1963; 1970.

Taylor, Bradley H., Associate Professor, Ph.D., Ohio State University, 1982; 1982.

Tweedy, James A., Professor, *Emeritus*, Ph.D., Michigan State University, 1966; 1966.

Varsa, Edward C., Professor, *Emeritus*, Ph.D., Michigan State University, 1970; 1970.

Venable, Erin R., Assistant Professor, Ph.D., University of Missouri-Colombia, 2010.

Walters, S. Alan, Professor, Ph.D., North Carolina State University, 1997, 1998.

Watson, Dennis, Associate Professor, Ph.D., Michigan State University, 1987; 2002.

Welch, Patricia, Professor, *Emerita*, Ph.D., Southern Illinois University, 1982; 1982.

Williard, Karl W. J., Professor, Ph.D., Pennsylvania State University, 1999; 1999.

Wolff, Robert L., Professor, *Emeritus*, Ph.D., Louisiana State University, 1971; 1972.

Young, Anthony W., Professor, *Emeritus*, Ph.D., University of Kentucky, 1969; 1980.

Zaczek, James J., Professor and *Chair*, Ph.D., Pennsylvania State University, 1994; 1997.

Doctor of Philosophy in Agricultural Sciences

The College of Agricultural Sciences offers a graduate program leading to the Doctor of Philosophy degree. This degree is designed to provide students with an interdisciplinary doctoral education in the physical, biological and social sciences that enhances, regulates and sustains agriculture, food and forestry producers, industries and agencies. This degree will prepare Ph.D. graduates to teach and conduct research and outreach at universities and community colleges, and for careers in the corporate, private and government sectors.

Admission

All applications to the program must include a Graduate School On-Line Application available at gradschool.siu.edu, a statement of interest, college transcripts, three letters of recommendation, GRE scores including verbal and quantitative, and may include a financial assistance form. In addition, this Program requires a non-refundable \$65.00 application fee. Criteria for admission include an official transcript, letters of recommendation, grade point average (must meet the SIU Graduate School minimum 3.25 GPA in graduate work), and GRE scores. The Graduate Committee of the College must approve admission to the Ph.D. in Agricultural Sciences program. Ph.D. students will be selected on a national and international competitive basis.

Students may be admitted to the doctoral program with a Bachelor's, a Master of Science or a Master of Arts degree in Agriculture, a discipline within the SIUC College of Agriculture Sciences, or a closely related field (such as Biology, Botany, Natural Science, Rural Sociology, Economics, or Environmental Science). Upon nomination of the master's committee and upon approval by the College of Agricultural Sciences doctoral program committee. Exceptional M.S. students may be allowed accelerated entry to the Ph.D.

Students admitted under direct or accelerated entry to the Ph.D. program are subject to all existing requirements for the doctoral degree; the admission/advisory committee for the student may add extra requirements based on the student's background.

Doctor of Philosophy Degree Program

Each doctoral student in the College of Agricultural Sciences must successfully complete a common core of research methodology courses, including a two semester sequence of graduate level statistics courses for 4-5 credit hours each, followed by a 3-4 credit hour graduate level experimental design course. Students also will be required to take a three-credit course in Research and Teaching Communications, two semesters of graduate seminar, and 24 hours of dissertation credits. There will be an additional minimum of 20 hours of structured courses appropriate for each student's area of emphasis. The student's graduate advisory committee must approve these courses. Emphasis areas include Agricultural Economics, Agricultural Systems Technology, Agricultural Education, Animal Science, Crop Science and Environmental Management, Food and Nutrition, Forestry, and Horticulture.

All Ph.D. students in the program will be required to teach or assist in teaching at least two courses within the College of Agricultural Sciences while in the program. This requirement is regardless of the form of stipend of the student, i.e. if a student is on a research assistantship throughout their tenure in the program, they will still be required to teach or assist in teaching courses.

There is no minimal credit-hour requirement beyond the core, the area of emphasis, and the Graduate School's residency and dissertation requirements. A student in consultation with their major professor will prepare a program of study, including courses in the student's area of emphasis, by the end of the second semester of residency. This plan of study, when approved by the student's advisory committee, will be filed with the Director of Graduate Studies for the College.

Ph.D. Candidacy

By the end of the second semester in residence, students must have chosen an area of emphasis and formed a graduate advisory committee to approve their coursework and oversee their dissertation research. The graduate advisory committee will consist of at least five graduate faculty members, with the majority from within the College of Agricultural Sciences and no more than three members from one department. The committee chair will be the student's major professor and must be a member of the College of Agricultural Sciences faculty.

To be admitted to candidacy, the student must have completed the Graduate School's 24 credit hours residency requirement within four calendar years, plus the core and emphasis area coursework that was approved by their graduate advisory committee. This should take the student three to four semesters, depending on whether they had any graduate-level research methodology courses during their Master's degree. At this time, they will take both written and oral preliminary examinations designed and administered by the student's graduate advisory committee. These exams will each have two parts. One will focus on the student's knowledge of the research methodology core and the second part will focus on the student's

chosen area of emphasis. If the preliminary examinations are not passed, a student must wait a minimum of three months for the second and final attempt to pass the exam.

After passing the written and oral preliminary exams and with an approved dissertation proposal, the student will be admitted to candidacy. The Graduate School requires that Ph.D. students fulfill all degree requirements within five years of admission to candidacy or they may have to retake their preliminary exams.

Dissertation and Dissertation Examination

By the beginning of the fifth semester of residence, the students will present to their graduate committee a dissertation research proposal. The student's committee must approve the proposal by the end of their fifth semester of residence. At this time, students must present their dissertation proposal verbally in the form of a graduate seminar. All faculty members in the College of Agricultural Sciences, the student's graduate advisory committee, all other graduate students in the College, and appropriate individuals from industry groups in southern Illinois will be invited to these seminars. Following the seminar, the student will meet with their graduate advisory committee and will be asked to defend the substance and methods of the proposed research.

The student's graduate advisory committee will monitor the student's progress on the dissertation. When the dissertation is completed to the satisfaction of the graduate advisory committee, the committee will administer a final oral exam that will focus on defense of the dissertation. When the dissertation and final oral exam are successfully completed, the student will be recommended to the Graduate School for the doctoral degree.

Courses (AGSC)

550-3 Research and Teaching Communications. This course in designed to teach graduate students how to communicate successfully their proposed and completed research and to teach college-level courses in the Agricultural Sciences.

581-1 to 4 (1,1,1) Seminar. Oral presentations by individual graduate students. Each Ph.D. student in Agricultural Sciences is required to present their proposed dissertation research project as a seminar and the findings of their dissertation as a seminar. All Agricultural Sciences Ph.D. students must register for at least two credits of seminar.

582-A-C (1-3, 1-3, 1-3) Colloquium in Agricultural Science. Recent developments in Agricultural Sciences will be discussed in a classroom setting; (a) Biological Science, (b) Social Sciences, and (c) Physical Sciences.

590-1 to 4 Graduate Readings in Agricultural Science. Journal articles, chapters and books relevant to a Ph.D. student's research will be read and discussed with their major professor. **591-1 to 4 Individual Research in Agricultural Science.** Directed research in approved specialized topic areas in Agricultural Sciences

592-1 to 4 Special Problems in Agricultural Science. Directed study of specialized areas of Agricultural Science, depending on the program of the student.

595-1 to 6 Instruction in Agricultural Sciences. Acquaints the student with different teaching environments and styles. Students will be expected to participate in instructing

agricultural sciences courses. Special approval needed by the instructor.

600-1 to 36 (1 to 12 per semester) Dissertation. This course is to be taken during the research and writing of the dissertation. A minimum of 24 hours must be earned for the Doctor of Philosophy degree.

601-1 Continuing Enrollment. For those Doctoral students who have not finished their degree programs and who are in the process of working on their dissertation. The student must have completed a minimum of 24 hours of dissertation research before being eligible to register for this course. Concurrent enrollment in any course is not permitted.

The following is a list of structured courses from which Ph.D. students in Agricultural Sciences may select in each of the emphasis areas. Students will not be limited to these courses, however, the majority of the courses that they may take are included.

Inferential Statistics

Multiple Regression

Experimental Design in Educational

Common Among Disciplines

QUAN 506-4

QUAN 507-4

QUAN 508-4

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DOAG FOOF	Research			
PSAS 560-5	Field Plot Technique			
ZOOL 557-4	Biostatistics			
ZOOL 558-4	Advanced Biostatistics			
Agribusiness Economics				
ABE 401-3	Agricultural Law			
ABE 402-1 to 6	Problems in Agribusiness Economics			
ABE 440-3	Natural and Environmental Resource			
	Economics and Policy			
ABE 444-3	Agricultural Development			
ABE 450-3	Advanced Farm Management			
ABE 451-3	Appraisal of Rural Property			
ABE 453-3	Agribusiness Planning Techniques			
ABE 460-3	Agricultural Price Analysis and Forecasting			
ABE 461-3	Agriculture Business Management			
ABE 462-3	Advanced Agricultural Marketing			
ABE 463-3	Managerial Strategies for Agribusiness			
ABE				
500A,B-6(3,3)	Agribusiness Economics Research			
	Methodology			
ABE 551-3	Resource Allocation in the Agribusiness			
	Firm			
ABE 552-3	Problems and Policies of the Agricultural			
	Sector			
ABE 581-1 to 4	Seminar in Agribusiness Economics			
ABE 585-1 to 6	Practicum/Internship			
BA 505	Brand Management			
BA 510	Managerial Accounting & Control Concepts			
BA 514	Ethics of Business			
BA 530	Financial Management			
BA 531	Advanced Financial Management			
BA 532	Financial Institutions and Markets			
BA 533	Investment Concepts			
BA 540	Managerial and Organization Behavior			
BA 541	Operations Research II			
BA 544	Advanced Production Planning and			

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	Laurentena Menegenaut	CEOC 42C 2	Environmental Diseaton Blancing
BA 545D	Inventory Management Advances in Strategic Management	GEOG 436-3 GEOG 438-3	Environmental Disaster Planning
BA 550	Marketing Management	GEOG 439-3	Applied Meteorology Climatic Change
BA 551	Product Strategy and Management	GEOG 459-3 GEOG 458-3	Analysis of Risk and Bioterrorism Using
BA 558	Promotional Strategy and Management	GEOG 456-5	GIS
BA 560	Management of Information Systems	GEOG 471-3	Environmental Impact Analysis
BA 561	Database Design and Applications		•
BA 562	Information Systems and Design	Agricultural Operations and Systems	
BA 564	Management of Marketing Information	PSAS 461-3	Programming for Agricultural Systems
BA 580	International Dimensions of Business and	PSAS 472-3	Precision Agriculture
D11 000	Management	PSAS 473-3	Agricultural Automation
BA 581	Global Marketing	PSAS 476-3	Agricultural Safety and Health
BA 582	International Finance	PSAS 483-3	Agricultural Processing Systems
BA 583	Global Operations Management	PSAS 497-2	Agricultural Operations Management
BA 584	Global Business Strategies	PSAS 560-5	Field Plot Technique
ECON 429-3	International Trade and Finance	PSAS 572-3	Current Research in Agricultural Systems
ECON 431-3	Public Finance II	PSAS 575-3	Agricultural Systems
ECON 436-3	Government and Labor	Forestry	
ECON 440-3	Price, Output and Allocation Theories	FOR 401-3	Fundamentals of Environmental Education
ECON 441-3	Contemporary Macroeconomic Theory	FOR 402-3	Wildland Hydrology
ECON 463-3	Introduction to Applied Econometrics	FOR 403-3	Agroforestry
ECON 474-3	Antitrust and Regulation	FOR 405-2	Forest Management for Wildlife
ECON 520-6 (3,3)	Economic Development Theory and Policy	FOR 408-4	Introduction to Remote Sensing and GIS
ECON 522-3	Microeconomic Foundations of Labor	FOR 409-3	Forest Resources Decision-Making
	Markets	FOR 410-3	Forest Resources Administration and Policy
ECON 530-3	Foreign Trade	FOR 411-3	Forest Resources Economics
ECON 531-3	International Finance	FOR 412-2	Tree Improvement
ECON 532-3	Economics of Human Resources	FOR 414-3	Information Management
ECON 534-3	Economics of Taxation	FOR 416-3	Forest Resource Management
ECON 540A-3	Microeconomic Theory I	FOR 417-2	Forest Land-Use Planning
ECON 540B-3	Microeconomic Theory II	FOR 418-2	Marketing of Forest Products
ECON 540C-3	Microeconomic Theory III	FOR 420-3	Park and Wildlands Management
ECON 541A-3	Macroeconomic Theory I	FOR 421-3	Recreation Land-Use Planning
ECON 541B-3	Macroeconomic Theory II	FOR 422C-4	Park and Wildlands Management Camp
ECON 541C-3	Macroeconomic Theory III	FOR 423-3	Environmental Interpretation Community Forestry
ECON 545-3	Resource Economics	FOR 428-2 FOR 429-3	Watershed Management Field Laboratory
ECON 567A-3	Econometrics I Econometrics II	FOR 430-3	Wildland Watershed Management
ECON 567B-3	Econometrics II Econometrics III	FOR 431-3	Regional Silviculture
ECON 567C-3 ECON 580A-3	Performance Measurement	FOR 451-2	Natural Resources Inventory
GEOG 401-3		FOR 452-2	Forest Soils
GEOG 401-5	Introduction to Geographic Information Systems	FOR 452L-2	Forest Soils Laboratory
GEOG 406-3	Introduction to Remote Sensing	FOR 453-2	Environmental Impact Assessment in
GEOG 408-3	Advanced Remote Sensing		Forestry
GEOG 420-3	Advanced Geographic Information Systems	FOR 454-2-8	Forest Ecology Field Studies
GEOG 120 0	GIS) Studies	FOR 460-2	Forest Industries
GEOG 422-4	Economics in Environmental Management	FOR 470-2	Wilderness Management, Policy, and Ethics
GEOG 424-4	Natural Resources Planning	FOR 480-3	Natural Resource Advocacy
GEOG 425-4	Integrated Water Management	FOR 485-3	Social Influences on Forestry
GEOG 426-4	Administration of Environmental Quality	FOR 500-2	Principles of Research
	and Natural Resources	FOR 502-3	Advanced Watershed Hydrology and
GEOG 428-3	Spatial Decision Support Systems		Management
GEOG 429-3	Geography and Organic Farming	FOR 504-2	Tree Physiology Concepts and Applications
GEOG 430-3	Environmental Systems Analysis	FOR 508-2	Historical Ecology
GEOG $431-3$	Climate	FOR 510-2	Advanced Silviculture
GEOG $433-4$	Field Methods in Weather and Water	FOR 511-2	Advanced Forest Resources Economics
	Resources	FOR 512-2	Tree Selection and Breeding
GEOG 434-4	Water Resources Hydrology	FOR 516-2	Advanced Forest Management
GEOG $435-3$	Energy Planning	FOR 520-2	Advanced Park Planning

FOR 521-2	Recreation Behavior in Wildlands	PSAS 424-4	Floriculture
	Environments	PSAS 425A-5	Advanced Plant Pathology
FOR 523-2	Advanced Resource Interpretation		(same as PLB 425a)
FOR 530-2	Forest Site Evaluation	PSAS 425B-5	Advanced Plant Pathology
FOR 531-2	Disturbance Ecology	DC 4 C 400 4	(same as PLB 425B)
FOR 585-3	Human Dimensions of Natural Resource	PSAS 426-4	Genomic and Bioinformatics
COC 544 (9)	Management	PSAS 428-3	Advanced Landscape Design I
SOC 544 (3) SOC 555 (3)	Sociology of Gender Social Movements and Collective Action	PSAS 429-3 PSAS 430-4	Advanced Landscape Design II Plant Propagation
SOC 555 (5) SOC 514 (4)	Qualitative Research Methods	PSAS 430-4 PSAS 432-4	Garden Center and Nursery Management
POLS 446 (3)	Museum Administration	PSAS 433-4	Introduction to Agricultural Biotechnology
POLS 549 (3)	Administration of Nonprofit Organizations	1 0110 100 1	(same as PLB 433)
PSYC 529 (3)	Structural Equation Modeling with LISREL	PSAS 434-3	Woody Plant Maintenance
PSYC 563 (3)	Research in Attitude and Persuasion	PSAS 436-4	Fruit Production
REC 500 (3)	Modern Concepts of Leisure	PSAS 437-4	Vegetable Production
	-	PSAS 441-3	Soil Morphology and Classification
Human and Ani	mal Systems	PSAS 442-3	Soil Physics
ANS 409-4	Equine Science	PSAS 443-3	Soil Management
ANS 415-4	Advanced Animal Nutrition	PSAS 445-3	Irrigation Principles and Practices
ANS 419-4	Stable Management	PSAS 446-3	Soil and Water Conservation
ANS 421-2	International Animal Production	PSAS 447-3	Fertilizers and Soil Fertility
ANS 430-4	Dairy Cattle Management	PSAS 448-2	Soil Fertility Evaluation
ANS 431-4	Reproductive Physiology	PSAS 454-4	Soil Microbiology
ANS 433-4	Introduction to Agricultural Biotechnology	PSAS 455-3	Biology of Plant-Microbe Interactions
ANS 434-4	Physiology of Lactation	PSAS 468-3	Weeds – Their Control
ANS 455-2	Animal Waste Management	PSAS 470-2	Post Harvest Handling of Horticultural
ANS 465-4	Swine Management	Commodities	
ANS 485-4 ANS 500-3	Beef Cattle Management Research Methods in Agricultural Sciences	PSAS 475-4	Golf Course Green Installation and
ANS 500-3 ANS 506-3	Instrumentation M in Agricultural Science	1 DAD 410-4	Maintenance
ANS 515-3	Energy and Protein Utilization	PSAS 518-3	Principles of Herbicide Action
ANS 516-3	Minerals and Vitamins in Animal Nutrition	PSAS 520-3	Plant Growth and Development
ANS 531A-2	Advanced Reproductive Physiology	PSAS 524-2	Advanced Plant Genetics
ANS 531B-2	Developmental Physiology		(same as PLB 524)
ANS 531C-2	Endocrine Physiology	PSAS 560-5	Field Plot Technique
HND410-3	Nutrition Education	PSAS 570-4	Genomics
HND 420-3	Recent Developments in Nutrition	PSAS 582-6	Colloquium in Plant and Soil Science
HND 425-3	Biochemical Aspects in Nutrition	PLB 400-4	Plant Anatomy
HND 470-4	Medical Nutrition	PLB 405-4	The Fungi
HND 475-3	Nutrition Through the Life Cycle	PLB 409-3	Field Mycology
HND 480-3	Community Nutrition	PLB 415-5	Morphology of Vascular Plants
HND 485-3	Advanced Nutrition	PLB 418-3	Plant Molecular Biology
HTA 445-3	Sustainable Tourism and Development	PLB 420-3	Techniques in Plant Molecular Biology
HTA 451-3	Destination Management	PLB 421-4	Botanical Microtechnique
HTA 460-4	Food Service Management	PLB 430-3 PLB 439-2	Economic Botany
HTA 461-3 HTA 465-3	Service Organization and Management Convention Management and Services	PLB 439-2	Natural Areas and Rare and Endangered
HTA 473-3	Hotel Administration	Species	
	Hotel Administration	PLB 475-3	Advanced Cell Biology
Plant Systems		PLB 500-3	Advanced Plant Anatomy
PSAS 401-2	Agricultural Plant Pathology	MBMB 421-3	Biotechnology
PSAS 403A-2	Field Crop Diseases	MBMB 425-3	Biochemistry and Physiology of
PSAS 403B-2	Horticultural Crop Diseases	MDMD 451 A/D 9/9	Microorganisms
PSAS 403C-2 PSAS 405-3	Turfgrass Diseases Plant Breeding	MBMB 451A/B-3/3 MBMB 453-3	Biochemistry Immunology
PSAS 403-3 PSAS 408-3	World Crop Production Problems	MBMB 460-3	Genetics of Bacteria and Viruses
PSAS 409-3	Crop Physiology and Ecology	MBMB 480A/B-2/2	Molecular Biology of Microorganisms
PSAS 419-3	Forage Crop Management	111111111111111111111111111111111111111	Laboratory
PSAS 420-4	Crop Pest Control	GEOL 470-3	Hydrogeology
PSAS 422-3	Turfgrass Science	GEOL 474-3	Geomorphology
PSAS 432-3	Greenhouse Management	GEOG 434-4	Water Resources Hydrology
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