

Current Information:

- I. A.) COURSE NUMBER, and TITLE: PLS 3004C Principles of Plant Science
- B.) CREDIT HOURS: 3 C.) PREREQUISITES: None
- D.) CURRENT CLASSIFICATION
1. General Education Code: ☐ B ☐ C ☐ D ☐ H ☐ M ☐ N ☐ P ☐ S ☒ None
 2. Writing Requirement: ☐ E2 ☐ E4 ☐ E6 ☐ None
 3. Math Requirement: ☐ M ☐ None

Requests:**II. GENERAL EDUCATION**

- A.) Requested Classification: ☒ B ☐ C ☐ D ☐ H ☐ M ☐ N ☐ P ☐ S
- B.) Effective Date: ☒ Fall ☐ Spring ☐ Summer 2011 (year)
- Or
- ☐ 1-time Approval _____ (year)

III. WRITING REQUIREMENT ☐**MATH REQUIREMENT** ☐

- A.) Requested Classification ☐ E2 ☐ E4 ☐ E6
- B.) Effective Date: ☐ Fall ☐ Spring ☐ Summer _____ (year)
- Or
- ☐ 1-time Approval _____ (year)
- C.) Assessment:
- 1.) What type of feedback will be provided to the student (in reference to writing skill)?
 Grade Corrections Drafts Other
 - 2.) Will a published rubric be used?

IV. ATTACH A DETAILED SYLLABUS

V. SYLLABUS CHECKLIST

Courses that offer students General Education and/or Writing Requirement credit must provide clear and explicit information for the students about the classification and requirements.

A.) For courses with a **General Education** classification, the syllabus should include:

- ☒ Statement of the General Education Purpose of the Course with attention to the General Education Classification requested
- ☒ List of assigned General Education Student Learning Outcomes
- ☒ List of any other relevant Student Learning Outcomes
- ☒ List of required and optional texts
- ☒ Weekly course schedule with sufficient detail (e.g. topics, assigned readings, other assignments, due dates)

B.) For courses with **Writing Requirement (WR)** classification, the syllabus should include:

- ☐ "The Writing Requirement ensures students both maintain their fluency in writing and use writing as a tool to facilitate learning."
- ☐ "Course grades now have two components: To receive writing credit, a student must receive a grade of "C" or higher and a satisfactory completion of the writing component of the course."
- ☐ A statement or statements indicating that the instructor will evaluate and provide feedback on the student's written assignments with respect to grammar, punctuation, usage of standard written English, clarity, coherence, and organization
- ☐ Assignment word counts, page lengths, submission deadlines and feedback dates

Additionally, the syllabus must clearly show that the course meets the WR to

- ☐ Evaluate [2,000/4,000/6,000] written words in assignments during the semester
- ☐ Provide all feedback on assignments prior to the last class meeting

Important note: The following types of writing assignments **CANNOT** be used to meet the WR: teamwork, exam essay questions, take-home exams, and informal, ungraded writing assignments.

VI. SUBMISSION AND APPROVALS

- A.) Submitted by (Signature of Instructor): Rosalie L. Koenig
Print Name Rosalie L. Koenig Date May 19, 2011
- B.) Department Approval (Signature): Maria Gallo
Print Name Maria Gallo Date 5/19/11
- C.) College Approval (Signature): R. Elaine Turner
Print Name R. Elaine Turner Date 7-6-11
- D.) Committee Action: ☐ Approved ☐ Denied ☐ Tabled Date _____

PLS 3004C: Principles of Plant Science

Credit: 3 Credit Hours

Meeting Times: Tuesday 4, Thursday 4-5 McCarty Hall A Room 1142

Instructor: Rose Koenig, Ph.D.

Office Location: Agronomy Department, 2181 McCarty Hall A

Phone: 273-3422

E Mail: rlkoenig@ufl.edu

Consultation Policy: My office hours are Tuesdays (9-10:15) and Thursdays (9-10:15) but you will need to make an appointment by sending me a request to meet using my email (rlkoenig@ufl.edu).

Please try to make an appointment during my office hours. I can meet with students at other times but you will need to send me an e-mail (rlkoenig@ufl.edu) requesting an appointment so that we can find a time that works. Please contact me via e-mail or phone if you have a question or need to discuss something.

Course Catalog Description:

Introduction to the principles and practices of plant production systems. An overview of plant evolution, anatomy, physiology, improvement, pest, water and nutrient management as applied to a variety of plant production systems.

Course Purpose:

The purpose of this course is to prepare students with specific competencies needed for a fundamental understanding of plant biology and production. The course is designed to provide the student with basic knowledge of plant anatomy, genetics, physiology, soils, plant diseases and production practices of various crops. Upon completion of this course, the student will possess an understanding of plant production systems.

Course Format: The course includes readings, discussion, class activities, quizzes, written assignments, and two exams.

General Education Statement:

This course satisfies a general education requirement in the biological sciences "B". Students will learn the basic concepts, theories and terminology in the plant sciences. Students will learn how to apply the scientific method to construct their understanding of the plant sciences. Inquiry based learning will be used to engage students in the analyses of data, problems and scenarios designed to develop their critical thinking skills. Students will communicate their understanding of the plant sciences through both oral and written class work and assignments.

General Objectives:

By the end of this course the student should be able to:

- 1) Discuss the theory of evolution and evaluate evolutionary concepts in the plant kingdom.
- 2) Identify the principles of genetics that have enabled humans to domesticate and improve crops.
- 3) Identify the major parts of a plant and explain the functional role of each.
- 4) Explain photosynthesis, respiration, transpiration and water movement in plants and predict how agricultural practices impact these processes.

- 5) Apply the theoretical knowledge covered in the course to production situations and make scientifically sound recommendations.
- 6) Understand management practices (soil, water, pest, rotations, crop and variety selection, marketing, overall plant production system) and interpret how they affect plant production.
- 7) Formulate hypotheses about the processes that impact plant growth and development.
- 8) Communicate in both oral and written forms about key scientific concepts related to plant anatomy, plant genetics, plant physiology, soils and crop production practices.

Approach and Expectations

Various reading material will be available via the Sakai website. You should read the materials **before** we cover them in class. This will provide you with a foundation of knowledge that will help you in class when we do in class activities and discuss important concepts. In class we will do activities that develop critical thinking skills. The activities are developed under the assumption that you have kept up with the reading assignments. In class you will be required to apply your knowledge through problem solving activities and this work will be done in groups. This combination of assigned readings and class room activities should enable you to develop a more comprehensive understanding of the subject matter.

General Course Expectations

- ☐ Students arrive to class on time
- ☐ Students convey superior work ethic and perform to high standards
- ☐ Students share their questions and ideas in and out of class
- ☐ Students keep an open mind
- ☐ Students respect one another
- ☐ Students turn off all electronic devices
- ☐ Computers are only allowed for note taking and to access the class activities. Abuse of this policy will result in not allowing in class computer use for the particular student

Attendance Policy: You are expected to attend every class and be on time. A portion of your class grade will be based on in class activities. If you miss class you will lose points towards your final grade. Quizzes will be administered in the beginning of class and only a set amount of time will be allocated for each quiz. If you are late for class you will not be able to make up a quiz or get extra time to complete the quiz. Consult the UF attendance policy for examples of excused absences. If you have an excused absence you will not lose points towards your final grade. Exams and written assignments will be based on readings, class lectures and class activities. If you miss a class it is **YOUR RESPONSIBILITY** to talk with another student to discuss what was covered in class. You will be responsible for home work assignments given during an absence. Late assignments will be accepted but points are deducted (see below). You will not be able to make up the in class activities or quizzes if you are absent.

Communication: With the exception of setting up appointments to meet with me during office hours or at another time, all other communication with me should be done using the mail function in Sakai. I will use the announcement and mail functions of Sakai to communicate messages to students when necessary. This allows a record to be kept of all course mail messages to students. Students should use the mail function in Sakai to communicate with me. However, if I have not answered a message that you sent via the mail function in Sakai within 24 hours, you may contact me using my UF e-mail (rlkoenig@ufl.edu). Students will access Sakai using their Gatorlink address.

Assessments and Grading:

How your grade is calculated:

In class assignments: 15% of grade

Homework: 15% of grade

2 exams: 20% each; 40% of grade

Quizzes: 7 @ 5% each but I will drop the lowest quiz grade; so quizzes make up 30% of the grade

In class assignments: All in class assignments must be done "in class". These assignments cannot be made up if you miss a class and an absence will result in a 0 for the assignment. Your peers will grade your participation in group assignments which will be tallied to compute your class assignment grade. Each in class group assignment will be worth 10 points. The grade given by your peers (those in your group only) will be based on the total number of points you earn from all peer evaluations for each lesson. Every individual will be given a total of 30 points to distribute to other group members at the end of each lesson. On the self evaluation form that I will provide for each lesson, you will be given the opportunity to evaluate the contribution of each member of your group. If everyone participated in the work, it would make sense to give each student 10 points each. If someone was not prepared and did not participate, you may not want to give them any points. Therefore, after each lesson each person can earn a total of 0-90 points. The following scale is how I will assign the peer group points for each lesson.

<u>Total of peer points</u>	<u># of points earned</u>
30-90	10
27-29	9
24-26	8
21-23	7
18-20	6
15-17	5
11-14	4
8-10	3
5-7	2
1-4	1
0	0

Individual Homework Assignments

Assignments will be posted on the Sakai site under the assignment tab. If you miss a day when homework is assigned, you may still do the assignment. However, it must be submitted to the Sakai site at the beginning of class on the date the assignment is due. These assignments are individual assignments and I will provide the criteria that I will use to evaluate your performance on these assignments. Each assignment will be worth a certain number of points based on the difficulty level (easier assignments are worth less). You may hand in an assignment late by submitting it to the Sakai site after the beginning of the class period when the assignment is due. However, I will deduct 10 points for each day the assignment is late after the due date. I will deduct 5 points if the assignment is turned in the day it is due. I encourage students to make a copy of the homework assignment write up for the lesson and bring it to class. You will have the opportunity to get clarification and ask questions about the assignment in class or you may send me a message using the mail function in Sakai.

Exams:

Two exams (including the non-comprehensive final): Each exam is worth 100 points each.

Quizzes:

A total of seven (20 points each) quizzes will be given at random times over the semester. These are tools that allow me to make sure you understand the material and will help you perform well on the exams. I will drop the lowest quiz grade to compute your quiz average. Each quiz is worth 5% towards your total grade. Many of the quiz questions will come in class assignment, lecture notes or the reading material. You will be given a specified period of time to complete the quiz in class (5 to 10 minutes depending on the quiz). If you are late and miss the quiz you will receive a 0 on the quiz. If you are late and I am still administering the quiz you may take it but you will not be given extra time to complete the quiz.

Course Grading Scale:

For University of Florida grading policy see:

<http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>

The following grading scale will be used in this class.

A=100-90%

B+=89-87%

B=86-80%

C+=79-77 %

C=76-70%

D+=69-67%

D=66-60%

E<60%

Make-Up Policy:

Late assignments are accepted but points are deducted.

Missed in class work cannot be made up at a later date.

Exams cannot be taken after the scheduled date without prior written consent from the professor.

Only cases of serious illness, bereavement or activities that fall under the Twelve -Day Rule will be considered for make-up. You must provide official documentation for all cases.

Readings: There is no required text. Various readings will be assigned and posted at the Sakai site. Specific references are listed on the topical outline. Students should read the assignment prior to attending class.

Course Website: None. Sakai is used <http://lss.at.ufl.edu>

Teaching Philosophy: I believe learning occurs in an environment where students feel comfortable about expressing their opinions and where they are not afraid to ask any question. I believe that learning is an active process that involves not only providing knowledge but more importantly allowing students to integrate and synthesize the knowledge into their own understanding of a particular subject. Teaching is not just providing facts and information to students in a lecture. It requires incredible creativity and ingenuity because the teacher must present a subject matter in multiple ways so that individuals with a diversity of skills, experiences and intellect can understand and integrate the information. The most effective teaching occurs when the teacher is able to teach on a number of levels such that all students leave the classroom learning something new.

Electronic Device policy: The use by students of cellular telephones, messaging devices and other electronic devices during lecture and labs is prohibited. In class, students are required to put phones and

messaging on silent mode and turn off other devices. All electronic devices must be stowed in a backpack or equivalent during class.

University of Florida Student Honor Code (Rule 6C1-4.017)

When you enroll at the University of Florida you pledge to hold yourself and your peers to the standards of high honor required by the student honor code. You are expected to uphold your pledge to honesty and integrity in class. Academic misconduct in any form will not be tolerated. University of Florida procedures will be followed to discipline offenders. There will be no warnings and sanctions will occur on the first offense. Visit: <http://regulations.ufl.edu/chapter4/4017.pdf> to read the Student Honor Code, learn about conduct that constitutes academic dishonesty, and sanctions. As a result of completing the registration form at the University of Florida, every student has signed the following statement:

"I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the university."

University of Florida Software Use Policy:

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.

Campus Helping Resources:

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575,*

www.counseling.ufl.edu/cwc/

Counseling Services

Groups and Workshops

Outreach and Consultation

Self-Help Library

Training Programs

Community Provider Database

- *Career Resource Center, First Floor JWRU, 392-1601, www.crc.ufl.edu/*

Students with Disabilities Act:

The Dean of Students Office coordinates the needed accommodations of students with disabilities. This includes the registration of disabilities, academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services, and mediating faulty-student disability related issues.

Dean of Students Office, 202 Peabody Hall, 392-7066, www.dso.ufl.edu.

The professor reserves the right to make changes in the assignments and syllabus as needed.
Notification will be via E-Learning mail or course list-serve and class announcements

Course Topical Outline

Lesson 1: Introduction to course, expectations, overview of subject

In Class Activities:

Learning about how we are going to learn

Lesson 2: What are plants and how they “fit” into the Kingdoms of life

Readings:

- Berg, L. (2007). *Introductory Botany: Plants, People, and the Environment*, 2nd Edition. Belmont, CA: Thomson Brooks/Cole. Chapter 25: Continuity through Evolution, The Evolution of Species and Populations, The Classification of Plants and Other Organisms, and The Plant Kingdom: Flowering Plants.
- Bruns, H.A. (2009). A Survey of Factors Involved in Crop Maturity. *Agronomy Journal*, 101(1): 60–66.
Online: <http://ddr.nal.usda.gov/bitstream/10113/26824/1/IND44158395.pdf>

In Class Activities:

1. Plant Evolution
2. Classification of Organisms
3. Scientific Method

Lesson 3: The origins of Agriculture- what we grow and why we grow it

Readings:

- Hawkes, J.G. (1997). Part 1. Centers of Origins of Crop Plants and Agriculture. *A Symposium on the Origins of Agriculture and Domestication of Crop Plants in the Near East*. Aleppo, Syria: International Center for Agricultural Research in the Dry Areas.
Online:
http://www2.bioversityinternational.org/publications/Web_version/47/ch06.htm

In Class Activities:

1. Flowering Plant Classification
2. Agricultural Angiosperms
3. Plant Domestication

Homework 1:

Plant Domestication Homework

Lesson 4: Plant Selection and Improvement: From the wild side to designer plants

Readings:

- Butler, J.D. and Oebker, N.F. Plant Breeding as a Hobby.
Online: http://www.aces.uiuc.edu/vista/html_pubs/PLBREED/pl_breed.html
- Gepts, P. (2002). A Comparison between Crop Domestication, Classical Plant Breeding, and Genetic Engineering. Crop Sci. 42: 1780-1790.

In Class Activities:

1. The Effects of Genes and Environment
2. It's All About the Genes
3. Crop Improvement

Field Day 1: Genetic Variation and Breeding Demonstration

1. Comparison of traits, variability and uniformity of different varieties
2. Genotype vs. Phenotype
3. Dominant vs. Recessive traits

Lesson 5: Plant Life Cycles and Plant Anatomy-Seeds

Readings:

- Overview written by instructor

In Class Activities:

1. Plant Life Cycles
2. Key Differences between Monocots and Eudicots (Seeds)
3. Seedling Anatomy and Physiology

Lesson 6: Plant Anatomy- Reproductive Structures/Flowers

Readings:

- Ruppert, K.C. (1999). *Botany Handbook for Florida, Revised Edition*.
SSENH901. Environmental Horticulture Department, Florida Cooperative
Extension Service, Institute of Food and Agricultural Sciences, University of
Florida. Online: <http://edis.ifas.ufl.edu/mg012>.

In Class Activities:

1. Flower Anatomy
2. Key Differences Between Monocots and Eudicots (Flowers)

Lesson 7: Plant Anatomy- Vegetative Growth and Development

Readings:

- Ruppert, K.C. (1999). *Botany Handbook for Florida, Revised Edition*.
SSENH901. Environmental Horticulture Department, Florida Cooperative

Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Online: <http://edis.ifas.ufl.edu/mg012>.

In Class Activities:

1. Leaf Layers- parts and function
2. Roots- parts and function
3. Stems-parts and function

Exam 1

Lesson 8: Plant Physiology- photosynthesis, respiration, transpiration

Readings:

- Overview written by instructor
- Regalado, A. (2010, October 1). Reinventing the Leaf. *Scientific American* pp. 86-89. *Scientific American*. (2010). Reinventing the Leaf Interactive. Online: <http://www.scientificamerican.com/article.cfm?id=interactive-reinventing-the-leaf>

In Class Activities:

1. Photosynthesis
2. Respiration
3. Transpiration

Homework 2:

Photosynthesis and Solar Energy

Lesson 9: Plant Physiology-water, nutrient and sugar movement

Readings:

- Berg, L. (2007). *Introductory Botany: Plants, People, and the Environment*, 2nd Edition. Belmont, CA: Thomson Brooks/Cole. Chapter 4: Metabolism

In Class Activities:

1. How Plants Uptake Water and Nutrients
2. Why are Nutrients Important for Plant Growth?
3. Macro and Micronutrients

Lesson 10: Climatic Considerations in Plant Production

Readings:

- Overview written by instructor

In Class Activities:

1. Evapotranspiration
2. Seasonality of Different Crops

3. Day Length Response

Field Day 2: Effects of Different Mulches Demonstration

1. Evaluation of yield, soil temperature, water requirements, and weed control with different types of mulches
2. Wavelength and photosynthesis

Lesson 11: Soils Physical Properties

Readings:

- Brady, N.C. and Weil, R.R. (2008). *The Nature and Properties of Soils, 14th Ed.* Upper Saddle River, NJ: Prentice Hall Press. Chapter 4 (Soil Architecture and Physical Properties).
- Berry, W., Ketterings, Q., Antes, S., Page, S., Russell-Anelli, J., Rao, R. and S. DeGloria. (2007). Soil Texture. Agronomy Factsheet Series #29. Cornell University Cooperative Extension. Online: http://www.water.rutgers.edu/Rain_Gardens/factsheet29.pdf

In Class Activities:

1. What is Soil?
2. Soil Texture with Corn
3. Soil Texture Triangle
4. Soil Properties and Behavior Relative to Texture

Lesson 12: Soil Biological Properties and Organic Matter

Readings:

- USDA-NRCS. (2004). *Soil Biology and Land Management: Soil Quality – Soil Biology Technical Note No. 4.* Online: <http://soils.usda.gov/sqi/publications/files/soilbiolandmgt.pdf>
- Pp.173-186 in Magdoff, F. and Van Es, H. (2009). *Building Soils for Better Crops: Sustainable Soil Management.* Waldorf, MD: SARE Agriculture Publications. Online: <http://www.sare.org/publications/bsbc/bsbc.pdf>.

In Class Activities:

1. The Building Blocks of Soils
2. The Role of Soil Organic Matter
3. The Role of Microorganisms
4. Soil Management for Soil Organic Matter
5. Composition and Functions of Soil Organic Matter

Homework 3:

Soil Web Survey

Lesson 13: Plant Nutrition and Nutrient Cycling

Readings:

- Magdoff, Fred and Van Es, Harold. (2009). *Building Soils for Better Crops: Sustainable Soil Management*. Waldorf, MD: SARE Agriculture

Publications

Online: <http://www.sare.org/publications/bsbc/bsbc.pdf>.
Chapters 18-19 (pp. 203-234).

- Mengel, D.B. (n.d.) *Fundamentals of Soil Cation Exchange Capacity (CEC)*, AY-238. *Agronomy Guide: Purdue University Cooperative Extension Service*.
Online: <http://www.ces.purdue.edu/extmedia/ay/ay-238.html>

In-Class Activities:

1. Soil pH and Cation Exchange
2. Understanding Nutrient Cycles
3. The N Cycle
4. The P Cycle
5. The Carbon Cycle

Field Day 3: Soil Fertility Demonstration

1. Sources of Nutrients
2. Organic amendments vs. Fertilizer
3. Calibrations
4. Soil Color
5. Organic Matter & Compost
6. Crop Residues
7. Soil Microorganisms

Lesson 14: Soil and Water

Readings:

- Sands, G. (2001). *Soil Water Concepts. Agricultural Drainage Publication Series*. University of Minnesota Extension Service. Online: <http://www.extension.umn.edu/distribution/cropsystems/components/07644.pdf>
- Scherer, T.F., Seelig, B., and Franzen, D. (1996). *Soil, Water and Plant Characteristics Important to Irrigation*. Publication EB-66. North Dakota State University Extension. Online: <http://www.ag.ndsu.edu/pubs/ageng/irrigate/eb66w.htm#plants>
- Haman, D.Z. and Izuno, F.T. (1993). *Soil Plant Water Relationships*. Online: <http://edis.ifas.ufl.edu/ae021>

In Class Activities:

1. Evapotranspiration and Crop Water Use
2. Soil Water
3. Soil Type and Water Storage Capacity
4. Visualizing Soil Water Using a Sponge

Lesson 15: Introduction to Plant Pathogens

Readings:

- Ellis, S.D and Boehm, M.J. (2008) Plants Get Sick Too! An Introduction to plant Diseases. Publication 401.01. Ohio State University. Online:
http://ohioline.osu.edu/hyg-fact/3000/pdf/PP401_01.pdf
 - Maloy, O.C. (2005). Plant Disease Management. The Plant Health Instructor. Online:
<http://www.apsnet.org/edcenter/intropp/topics/Pages/PlantDiseaseManagement.aspx>
- Video
- Tainter, F.H., Palmer K.S., and Ruhl, G.E. (2010) A Story of Plant Pathology: Past to Present. On line:
<http://www.btny.purdue.edu/Outreach/PlantPathStory/>

In Class Activities:

1. The Causal Agents of Disease
2. The Disease Triangle
3. Diseases and Their Symptoms and Impacts on Plant Functions
4. Exploring Disease Cycles and Pathogen Life Cycles

Exam 2