CALS Curriculum Committee Meeting  
November 15, 2019  
2:00 p.m.  
1044 McCarty Hall D


Agenda and Index for Materials

Approve Minutes from October 11, 2019 meeting

Dr. Brendemuhl: Update from UCC

Graduate New Course Proposals

1. FYC 6XXX – Capstone Project (req. #14413)
2. MCB 6XXX – Antimicrobial Resistance (AMR) (req. #14385)
3. WIS 6XXX – Wildlife Forensics Internship (req. #14353)

Graduate Course Change Proposals

4. DIE 6241 – Advanced Medical Nutrition Therapy I (req. #14335)
5. DIE 6242 – Advanced Medical Nutrition Therapy II (req. #14336)
6. WIS 6559 – Contemporary Issues in Wildlife Protection & Conservation (req. #14352)

Undergraduate New Course Proposals

7. MCB 4XXX – Antimicrobial Resistance Laboratory (AMR-L) (req. #14356)
8. MCB 4XXX – Antimicrobial Resistance (AMR) (req. #14340)
9. PCB 4XXX – Human Genomics (req. #14348)
10. WIS 4XXX – The Ecology of Climate Change (req. #14338)

Undergraduate Course Change Proposals

11. ORH 3815C – Florida Native Landscaping (req. #14326)
12. ORH 4804 – Annual and Perennial Gardening (req. #14328)

Certificate

13. Proposed termination of the Wetland Sciences Graduate Certificate (req. #14393)

Curriculum

14. Proposed Modification to the Hydrologic Sciences Concentration (req. #14329)

15. Proposed New Graduate Degree Program – Plant Breeding (req. #14426)

Recycled item

16. MCB 4XXX – Applications and Technologies of Synthetic Biology (req. #11708)

Previously reviewed with graduate submission on 1/12/2018, 4/13/2018, 8/17/18 and 10/12/18. Graduate version no longer being proposed. The undergraduate version is now the only proposed course. Comments from 10/12/18 are as follows:

A motion was made by C. Prince to recycle these items back to the department for required changes and resubmission. The motion was approved. A reading list needs to be included on the UCC form for the graduate submission. The points breakdown on the UCC form (3 places) does not match the syllabus. The possible points for discussion, quizzes and homework should read 200 points. Also, a specific breakdown of the 200 points for discussion, quizzes, and homework is needed (i.e. how many of the 200 points are for the discussions?) On the document that states the differences between the graduate and undergraduate course there is mention of a manuscript presentation using literature published within the past three years. The UCC form for the graduate course lists MCB 3020 or 3023 as a prerequisite. This must match in the syllabus. Wording cannot be used as a prerequisite. You must use the most up to date version of the CALS syllabus statements available at: http://cals.ufl.edu/faculty-staff/docs/policies/CALS%20Syllabus%20Policy%202017-18.pdf

Discussion item

17. Proposed CALS CC Checklist

A hard copy of the proposed checklist will be provided at the meeting.
CALS Curriculum Committee Meeting  
October 11, 2019  
Submitted by James Fant


Guest: Adam Wong

Call to Order: The College of Agricultural and Life Sciences Curriculum Committee met on October 11, 2019 in Rm. 1044 McCarty Hall D. Scott Sager called the meeting to order at 2:00 p.m.

Previous agenda items and supporting material can be found on the CALS College Committees homepage under document archives: https://cals.ufl.edu/faculty-staff/committees/

Approval of Minutes: A motion was made by Dr. Porter to approve the minutes from the September 20, 2019 meeting of the CALS CC. The motion was approved.

Selection of Chair-elect: Jennifer Weeks volunteered to be the next chair-elect.

All items approved by the committee will be forwarded to either the Graduate Curriculum Committee (GCC), Graduate Council (GC) or the University Curriculum Committee (UCC) once any changes requested are made and the submission is complete.

Links: Grades – https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/  
Syllabus Statements – https://cals.ufl.edu/content/PDF/Faculty_Staff/CALS-Syllabus-Policy.pdf  
Writing Learning Objectives - https://cals.ufl.edu/content/PDF/Faculty_Staff/cals-course-objectives.pdf.

Update from UCC: N/A

Graduate New Course Proposal

1. ENY 6XXX – Molecular Biology of Insects and Nematodes (req. #14136)  
   This item was reviewed along with item #2. All comments apply to both submissions unless otherwise stated. A motion was made by Dr. Porter to approve these items with changes required. The motion was approved. An outside consultation is required from Biology to ensure there is no excess of topic overlap with an existing course. The grading scale on the approval form and in the syllabus must match. Change the recommended textbook to say required textbook. Elaborate more on the differences between the graduate and undergraduate courses on the approval form.
Undergraduate New Course Proposals

2. ENY 4XXX – Molecular Biology of Insects and Nematodes (req. #14124)
   See item #1.

3. FYC 4XXX – Youth Development, Service-Learning and Irish Culture (req. #13939)
   A motion was made by Dr. Sharp to approve this item as submitted. The motion was approved.

Curriculum

4. Proposed IS-EMANR On-Campus ALC/SLO Revisions (req. #14251)
   This item was reviewed along with item #5. All comments apply to both submissions unless otherwise stated. A motion was made by Dr. Porter to approve these items as submitted. The motion was approved.

5. Proposed IS-EMANR UF Online ALC/SLO Revisions (req. #14252)
   See item #4.

Recycled items

6. MCB 6XXX – Prokaryotic Cell Structure and Function (req. #13924)
   A motion was made by Dr. Porter to approve this item with changes required. The motion was approved. There is still concern regarding the learning objectives. Avoid using expert, to gain, and improve. The learning verbs need to reflect the rigor of a graduate level course. Please refer to the following link for guidance: [https://cals.ufl.edu/content/PDF/Faculty_Staff/cals-course-objectives.pdf](https://cals.ufl.edu/content/PDF/Faculty_Staff/cals-course-objectives.pdf). Add the required reading for the assignments to the approval form. There is a full point missing between each grade percentage. (Do you mean 94.5-100 = A, 89.5 – 94.49 = A-, etc. or 95-100 = A, 90-94.99 = A-, etc.?)

7. Proposed Biosecurity Undergraduate Certificate (req. #13875)
   A motion was made by Dr. Porter to approve this item with changes required. The motion was approved. The title for this certificate needs to be more specific. Therefore, outside consults are requested from Animal Sciences and the College of Veterinary Medicine. Dialogue with these programs should assist in coming up with a more appropriate title. Dr. Inglett asked that you consider adding SWS 4307 – Ecology of Waterborne Pathogens to list of certificate electives.

Discussion

8. Proposed CALS Curriculum Committee Required Checklist
   Document emailed to committee members for their suggestions and comments. Final version will be submitted for approval at the November meeting.

The meeting was adjourned at 2:53 p.m.
# Cover Sheet: Request 14413

**FYC Capstone**

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Course|New for request 14413

Info
Request: FYC Capstone
Description of request: New course request for an intermediate level graduate capstone course
Submitter: Larry Forthun lforthun@ufl.edu
Created: 5/24/2016 10:53:01 AM
Form version: 1

Responses
Recommended Prefix FYC
Course Level 6
Number XXX
Lab Code None
Course Title Capstone Project
Transcript Title FYCS Capstone
Effective Term Earliest Available
Effective Year Earliest Available
Rotating Topic? No
Amount of Credit 3

Repeatable Credit? Yes
If repeatable, # total repeatable credit allowed 6
S/U Only? No
Contact Type Regularly Scheduled
Degree Type Graduate

Weekly Contact Hours 3
Category of Instruction Intermediate
Delivery Method(s) On-Campus, Online
Course Description Students will complete a project that addresses an issue within Family, Youth, and Community Sciences. Students will develop an e-portfolio of academic and professional accomplishments and prepare and deliver a professional presentation. The course satisfies the graduate school requirement of the final comprehensive examination for a master’s degree without thesis.
Prerequisites Permission of department
Co-requisites none
Rationale and Placement in Curriculum This course will be taken during the last semester of enrollment and will satisfy the graduate school requirement for a comprehensive examination for a master’s degree without thesis
Course Objectives 1. Design a capstone project that enables the student to
a. Apply academic and professional skills developed in graduate program, and
b. Demonstrate advanced skills to achieve the student’s career goals
2. Prepare and present a professional presentation designed for a specialized/career audience
3. Develop an E-portfolio to document student learning and self-reflection, identify and clarify educational and career goals, and showcase achievement to potential employers.

Course Textbook(s) and/or Other Assigned Reading Palmer, E. (2017). Own Any Occasion: Mastering the Art of Speaking and Presenting. Alexandria, VA: ATD Press.
FYCS Capstone Project Workbook.

Weekly Schedule of Topics Planning your project
1 Introduction to capstone
2 Project planning: Goals, objectives, activities
3 Evaluate project resources and challenges
4 Developing your evaluation plan
Creating your portfolio
5 Creating an e-portfolio
6 Adding and editing content
7 Project check-in
8 Preparing your presentation
9 Planning your presentation: understanding your audience
10 Presentation content and organization
11 Presentation design
12 Presentation Skills - review
13 Taking care of yourself
14 Compassion Fatigue Self-Assessment
15 Workplace Factors
16 Steps to Wellness
17 Presentations
18 Presentations/Final Project

Grading Scheme

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Additional Links and Policies

COURSE AND UNIVERSITY POLICIES

Academic Honesty
As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity." You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: Student Conduct and Honor Code.

Class Attendance, Make-Up Work
Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: UF Attendance Policies

Communication
E-mail: Please use CANVAS to communicate with your instructors. It will be checked daily but plan for a 24-hour response time. You may have cell phones on for UF Alert purposes. Students may use laptops with Canvas open only in order to take notes during lectures or to work on group projects during team meeting days.

Late Assignments
All late assignments will be penalized 10 points for each business day late. This penalty starts the minute after the assignment was due. It is the student's responsibility to ensure that assignments are received by the instructor by the time described on each assignment (double-check that your assignment successfully uploaded into Canvas). Only University-approved excuses will be accepted.

Accommodations for Students with Disabilities
Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, dso.ufl.edu/drc) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluations
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at gatorevals.aa.ufl.edu/students/.
Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via ufl.bluerca.com/ufl/. Summaries of course evaluation results are available to students at gatorevals.aa.ufl.edu/public-results/

Netiquette and Communications
All members of the class are expected to follow rules of common courtesy in all online communication. For specific guidelines, read the following: Netiquette Guide

Software Use
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.

Technical Problems
For resolving technical issues please contact the UF Help Desk: helpdesk.ufl.edu, 352-392-4357

CAMPUS RESOURCES FOR HEALTH AND WELLNESS
U Matter, We Care: If you or someone you know is in distress, please contact via email umatter@ufl.edu, phone 352-392-1575, or visit umatter.ufl.edu/ to refer or report a concern and a team member will reach out to the student in distress.
Counseling and Wellness Center: Visit counseling.ufl.edu/ or call 352-392-1575 for information on crisis services as well as non-crisis services.
Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need or visit shcc.ufl.edu/.
University Police Department: Visit police.ufl.edu/ or call 352-392-1111 (or 9-1-1 for emergencies).
UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; uffhealth.org/emergency-room-trauma-center.

CAMPUS RESOURCES FOR ACADEMICS
E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at helpdesk@ufl.edu.
Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services career.ufl.edu/.
Library Support: cms.uflib.ufl.edu/ask for various ways to receive assistance with respect to using the libraries or finding resources.
Teaching Center: Broward Hall, 352-392-2010 or to make an appointment 352-392-6420. General study skills and tutoring; teachingcenter.ufl.edu/
Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers; writing.ufl.edu/writing-studio/

Instructor(s) to be determined
FYCXXX: Capstone Project  
Fall 2019 – Section XXXX  
3 credits

Instructor: XXXX, Ph.D., Assistant/Associate/Full Professor,  
Department of Family Youth and Community Sciences  
Email: XXXX@ufl.edu  
Phone: (352) 273- XXXX  
Office: XXXX McCarty Hall D  
Office Hours: 10am – 12pm every Tuesday, or by appointment on Zoom  
Course Website: http://elearning.ufl.edu/

CLASS MEETING  
TBD

UNIVERSITY COURSE DESCRIPTION  
Students will complete a project that addresses an issue within Family, Youth, and Community Sciences. Students will develop an e-portfolio of academic and professional accomplishments and prepare and deliver a professional presentation. The course satisfies the graduate school requirement of the final comprehensive examination for a master’s degree without thesis.

OVERALL COURSE GOAL  
The goal of this course is to develop and implement an original project that demonstrates your ability to apply the knowledge and skills gained in the program.

COURSE OBJECTIVES  
1. Design a capstone project that enables the student to  
   a. Apply academic and professional skills developed in graduate program, and  
   b. Demonstrate advanced skills to achieve the student’s career goals  
2. Prepare and present a professional presentation designed for a specialized/career audience  
3. Develop an E-portfolio to document student learning and self-reflection, identify and clarify educational and career goals, and showcase achievement to potential employers.
REQUIRED READINGS


FYCS Capstone Project Workbook.

COURSE ASSIGNMENTS

Students are expected to complete the following assignments:

**Capstone project**

The capstone project is the student’s opportunity to demonstrate and apply the theories and knowledge they’ve learned to address real-world issues. The project must have a practical application and may be designed in collaboration with the student’s current employer, a human services or nonprofit organization, or other community-based initiative. In the first few weeks of class students will work to define a project goal, create a project outline, describe a problem or issue, and conduct a brief literature review. Throughout the semester, the student will work toward completion of the capstone project and present the project as if they were giving a professional presentation to an engaged audience. Rubric provided at end of document.

**E-portfolio**

Students will create an e-portfolio demonstrating the breadth and depth of the knowledge they have gained in the FYCS MS program. The e-portfolio is a way for students to consider their professional development in an active and engaged manner culminating in a useable product applicable to their career goals. Students are expected to demonstrate what they have done in the FYCS program including products from previous courses (ex., a fundraising plan or evaluation plan). Students should use past course syllabi, projects, and other products completed in the program to help identify items for use in the portfolio. Additionally, students will discuss how they have changed as a result of their participation in the program and articulate their goals and the importance of continued professional development. Rubric provided at end of document.

**Professional presentation**

The capstone course provides students with an understanding of the importance of professional development and effective presentation techniques. Students will be asked to turn their capstone project into a professional presentation. In preparation, students will define their potential audience, analyze that audience, then craft a relevant and focused presentation. Students are expected to demonstrate their mastery of their project content and incorporate presentation skills that help the audience internalize the concepts discussed. Rubric provided at end of document.
GRADING

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GRADING SCALE

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Course grading policies are consistent with UF Grading policies and can be found at: UF Grades and Grading Policies

COURSE SCHEDULE

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Creating your portfolio

| 5    | Creating an e-portfolio                    |                                   |                 |
| 6    | Adding and editing content                 |                                   |                 |
| 7    | Project check-in                           | DRAFT e-portfolio                 |                 |

Preparing your presentation

<p>| 8    | Planning your presentation: understanding your audience | Palmer Ch. 1                |                 |
| 9    | Presentation content and organization      | Palmer Ch. 2, 3                |                 |</p>
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<td>11</td>
<td>Presentation Skills - review</td>
<td>Palmer Ch. 6 - 11</td>
</tr>
<tr>
<td></td>
<td><strong>Taking care of yourself</strong></td>
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<tr>
<td>12</td>
<td>Compassion Fatigue Self-Assessment</td>
<td>Mathieu, Ch. 3, 4, 6</td>
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<tr>
<td>13</td>
<td>Workplace Factors</td>
<td>Mathieu, Ch. 7 - 9</td>
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<td>14</td>
<td>Steps to Wellness</td>
<td>Mathieu, Ch. 10 - 15</td>
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<td>Presentations</td>
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<td>16</td>
<td>Presentations/Final Project</td>
<td>Project e-Portfolio</td>
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</tbody>
</table>

*This schedule is only a guide and is subject to change*

**CRITICAL DATES**
Critical dates to keep in mind throughout the semester include:
- Classes Begin XX
- Drop/Add ends XX
- Classes End XX

**COURSE AND UNIVERSITY POLICIES**

**Academic Honesty**
As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity." You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: [Student Conduct and Honor Code](#).

**Class Attendance, Make-Up Work**
Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: [UF Attendance Policies](#).

**Communication**
E-mail: Please use CANVAS to communicate with your instructors. It will be checked daily but plan for a 24-hour response time. You may have cell phones on for UF Alert purposes. Students
may use laptops with Canvas open only in order to take notes during lectures or to work on group projects during team meeting days.

**Late Assignments**
All late assignments will be penalized 10 points for each business day late. This penalty starts the minute after the assignment was due. It is the student’s responsibility to ensure that assignments are received by the instructor by the time described on each assignment (double-check that your assignment successfully uploaded into Canvas). **Only University-approved excuses** will be accepted.

**Accommodations for Students with Disabilities**
Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, dso.ufl.edu/drc) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

**Course Evaluations**
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via ufl.bluerca.com/ufl/. Summaries of course evaluation results are available to students at gatorevals.aa.ufl.edu/public-results/

**Netiquette and Communications**
All members of the class are expected to follow rules of common courtesy in all online communication. For specific guidelines, read the following: [Netiquette Guide](#)

**Software Use**
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.

**Technical Problems**
For resolving technical issues please contact the UF Help Desk: helpdesk.ufl.edu, 352-392-4357

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**CAMPUS RESOURCES FOR HEALTH AND WELLNESS**

U Matter, We Care: If you or someone you know is in distress, please contact via email umatter@ufl.edu, phone 352-392-1575, or visit umatter.ufl.edu/ to refer or report a concern and a team member will reach out to the student in distress.
Counseling and Wellness Center: Visit counseling.ufl.edu/ or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need or visit shcc.ufl.edu/.

University Police Department: Visit police.ufl.edu/or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; ufhealth.org/emergency-room-trauma-center.

CAMPAUS RESOURCES FOR ACADEMICS

E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at helpdesk@ufl.edu.

Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services career.ufl.edu/.

Library Support: cms.uflib.ufl.edu/ask for various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center: Broward Hall, 352-392-2010 or to make an appointment 352-392-6420. General study skills and tutoring; teachingcenter.ufl.edu/

Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers; writing.ufl.edu/writing-studio/

Student Complaints On-Campus: sccr.dso.ufl.edu/policies/student-honor-code/student-conduct-code/

On-Line Students Complaints: distance.ufl.edu/student-complaint-process/

Note that the instructor reserves the right to adjust the syllabus as needed.
**Capstone Project Rubric**
Possible total: 300 points

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Performance Indicators</th>
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</thead>
<tbody>
<tr>
<td></td>
<td><strong>Excellent</strong></td>
</tr>
<tr>
<td>Inclusion of basic project elements</td>
<td>Includes all components of capstone project (75 points)</td>
</tr>
<tr>
<td></td>
<td>Includes most components of capstone project (1 missing) (50 points)</td>
</tr>
<tr>
<td></td>
<td>Includes some components of capstone project (2-3 missing) (25 points)</td>
</tr>
<tr>
<td></td>
<td>Missing more than 3 components of capstone project (0 points)</td>
</tr>
<tr>
<td>Relevant and focused to project goals</td>
<td>Project is relevant, focused and makes sense for the chosen audience. (40 points)</td>
</tr>
<tr>
<td></td>
<td>Project is mostly relevant, focused and makes sense for the chosen audience. (30 points)</td>
</tr>
<tr>
<td>Integration of concepts/skills learned in program</td>
<td>Program concepts/skills integrated into project. (40 points)</td>
</tr>
<tr>
<td></td>
<td>Some use of program concepts/skills in project. (30 points)</td>
</tr>
<tr>
<td></td>
<td>Very little use of program concepts/skills in project. (15 points)</td>
</tr>
<tr>
<td></td>
<td>Concepts learned in program were not used in project. (0 points)</td>
</tr>
<tr>
<td>Quality of Information Sources</td>
<td>Sources clearly relate to the project. It includes several supporting details and/or examples. (45 points)</td>
</tr>
<tr>
<td></td>
<td>Sources clearly relate to the project. It provides 1-2 supporting details and/or examples. (30 points)</td>
</tr>
<tr>
<td></td>
<td>Sources clearly relate to the project. No details and/or examples are given. (15 points)</td>
</tr>
<tr>
<td></td>
<td>Sources have little or nothing to do with the project. (0 points)</td>
</tr>
<tr>
<td>Originality and creativity</td>
<td>The majority of the project shows originality and inventiveness. (50 points)</td>
</tr>
<tr>
<td></td>
<td>Most of the project shows originality and inventiveness. (40 points)</td>
</tr>
<tr>
<td></td>
<td>Some of the project shows originality and inventiveness. (15 points)</td>
</tr>
<tr>
<td></td>
<td>The project displays a lack of inventiveness. (0 points)</td>
</tr>
<tr>
<td>Grammar, spelling, and coherence in overall presentation</td>
<td>Very well written and organized, with no spelling or grammatical errors. (50 points)</td>
</tr>
<tr>
<td></td>
<td>Generally well written and organized with a few spelling and/or grammatical errors. (40 points)</td>
</tr>
<tr>
<td></td>
<td>Somewhat well written and organized with a few spelling and/or grammatical errors. (15 points)</td>
</tr>
<tr>
<td></td>
<td>Poorly written or organized with many spelling and grammatical errors. (0 points)</td>
</tr>
</tbody>
</table>
E-Portfolio Rubric  (This rubric was created using the Association of American Colleges and Universities (AAC&U) Critical Thinking VALUE Rubric. Retrieved from  https://www.aacu.org/value-rubrics)
Possible total: 150 points

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<tr>
<th>Criteria</th>
<th>Performance Indicators</th>
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<th>Meets Expectations</th>
<th>Needs Improvement</th>
<th>Poor</th>
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<tr>
<td>Connections to Experience</td>
<td>Connects relevant experience and academic knowledge (40 points)</td>
<td>Connects some relevant experience and academic knowledge (30 points)</td>
<td>Connects little experience and academic knowledge (15 points)</td>
<td>Connects no experience and academic knowledge (0 points)</td>
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</tr>
<tr>
<td>Connections to Discipline</td>
<td>Makes connections to disciplines, perspectives (20 points)</td>
<td>Makes some connections to disciplines, perspectives (15 points)</td>
<td>Makes few connections to disciplines, perspectives (10 points)</td>
<td>Makes no connections to disciplines, perspectives (0 points)</td>
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</tr>
<tr>
<td>Integrated Communication</td>
<td>Chose a format, language, graphic, or other visual representation that enhances meaning (20 points)</td>
<td>Chose a format, language, graphic, or other visual representation that enhances meaning (15 points)</td>
<td>Chose a format, language, graphic, or other visual representation that does not enhance meaning (10 points)</td>
<td>Chose a format, language, graphic, or other visual representation that confuses meaning (0 points)</td>
<td></td>
</tr>
<tr>
<td>Reflection and Self-Assessment</td>
<td>Builds on many prior experiences to respond to new and challenging contexts (Includes both self-assessment and reflection) (20 points)</td>
<td>Builds on some prior experiences to respond to new and challenging contexts (Includes both self-assessment and reflection) (15 points)</td>
<td>Builds on some prior experiences to respond to new and challenging contexts (Includes only one, self-assessment or reflection) (10 points)</td>
<td>Does not build on prior experiences to respond to new and challenging contexts or does not include self-assessment or reflection (0 points)</td>
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</tr>
<tr>
<td>Originality and Creativity</td>
<td>The majority of the topic shows originality and inventiveness. (30 points)</td>
<td>Most of the topic shows originality and inventiveness. (20 points)</td>
<td>Some of the topic shows originality and inventiveness. (10 points)</td>
<td>The topic displays a lack of inventiveness. (0 points)</td>
<td></td>
</tr>
<tr>
<td>Grammar, spelling, and coherence</td>
<td>Very well written and organized, with no spelling or grammatical errors. (20 points)</td>
<td>Generally well written and organized with a few spelling and/or grammatical errors. (15 points)</td>
<td>Somewhat well written and organized with a few spelling and/or grammatical errors. (10 points)</td>
<td>Poorly written or organized with many spelling and grammatical errors. (0 points)</td>
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## Presentation Rubric

Example possible total: 150 points

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<tbody>
<tr>
<td></td>
<td>Excellent</td>
<td>Meets Expectations</td>
<td>Needs Improvement</td>
<td>Poor</td>
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</tr>
<tr>
<td>Integration of capstone project elements</td>
<td>Presentation includes all components of capstone project (25 points)</td>
<td>Presentation includes most components of capstone project (1 missing) (20 points)</td>
<td>Presentation includes some components of capstone project (2-3 missing)</td>
<td>Presentation missing more than 3 components of capstone project (0 points)</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Relevance and focused to chosen audience</td>
<td>Presentation is relevant, focused and makes sense for the chosen audience (30 points)</td>
<td>Presentation is somewhat relevant, focused and makes sense for the chosen audience (20 points)</td>
<td>Presentation is not relevant, focused or does not make sense for the chosen audience (0 points)</td>
<td></td>
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<tr>
<td>Integration of concepts learned in course</td>
<td>Course concepts integrated into presentation and/or topic (25 points)</td>
<td>Some use of course concepts within topic (15 points)</td>
<td>Very little use of course concepts within topic (10 points)</td>
<td>Concepts learned in course were not used in presentation/topic (0 points)</td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
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Cover Sheet: Request 14385

Antimicrobial Resistance Course - Approval Request (Grad-level)

Info

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<td>Status</td>
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<tr>
<td>Submitter</td>
<td>Daniel Czyz <a href="mailto:dczyz@ufl.edu">dczyz@ufl.edu</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Created</td>
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<td>Updated</td>
<td>10/28/2019 8:22:59 PM</td>
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Description of request: I have developed a new course on Antimicrobial Resistance that I teach to upper-undergraduate and graduate-level students in an asynchronous online format. The course concentrates on the basis of antimicrobial resistance in bacteria but also touches on mechanisms responsible for resistance in viruses, parasites, fungi, and cancer. It describes the mechanisms of resistance, transmission, diagnostics, and development of novel alternative treatment options. This course teaches students one of the most urgent global problems that now affect not only healthcare and agriculture but also the environment. Please consider this course for formal approval.

Actions

<table>
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<th>User</th>
<th>Comment</th>
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<td>CALS - Microbiology and Cell Science 514910000</td>
<td>Eric Triplett</td>
<td></td>
<td>10/28/2019</td>
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No document changes

Graduate Curriculum Committee

No document changes

University Curriculum Committee Notified

No document changes

Statewide Course Numbering System

No document changes

Graduate School Notified

No document changes

Office of the Registrar

No document changes

College Notified

No document changes
Course|New for request 14385

Info

Request: Antimicrobial Resistance Course - Approval Request (Grad-level)
Description of request: I have developed a new course on Antimicrobial Resistance that I teach to
upper-undergraduate and graduate-level students in an asynchronous online format. The course
concentrates on the basis of antimicrobial resistance in bacteria but also touches on mechanisms
responsible for resistance in viruses, parasites, fungi, and cancer. It describes the mechanisms of
resistance, transmission, diagnostics, and development of novel alternative treatment options. This
course teaches students one of the most urgent global problems that now affect not only healthcare
and agriculture but also the environment. Please consider this course for formal approval.
Submitter: Daniel Czyz dczyz@ufl.edu
Created: 10/28/2019 10:21:25 AM
Form version: 2

Responses

Recommended Prefix MCB
Course Level 6
Course Number XXX
Category of Instruction Joint (Ugrad/Grad)
Lab Code None
Course Title Antimicrobial Resistance (AMR)
Transcript Title AMR
Degree Type Graduate

Delivery Method(s) Online, UF Online - Please attach a letter of support from the Director of the UF
Online program
Co-Listing Yes
Co-Listing Explanation Undergraduate and Graduate students are required to complete 10 quizzes,
each worth 10 points (100 pts total) and four exams (Exam I: 100 pts., Exam II: 200 pts., Exam III: 100
pts., Exam IV: 300 pts.). In addition to these assignments, graduate students are required to complete
and turn in weekly written assignments (total of 13 assignments worth 130 pts.).
Effective Term Spring
Effective Year 2020
Rotating Topic? No
Repeatable Credit? No

Amount of Credit 3

S/U Only? No
Contact Type Regularly Scheduled
Weekly Contact Hours 3
Course Description This course covers content related to antimicrobial resistance: the origins of
antimicrobial resistance, dissemination, mechanisms, therapeutics, and impact on healthcare,
agriculture, and the environment. This course mainly concentrates on resistance in bacteria, but will
also discuss other organisms, including viruses, parasites, fungi, and cancer.
Prerequisites B.S.
Co-requisites N/A
Rationale and Placement in Curriculum Antibiotic resistance is a growing problem on a global scale.
It is estimated that by 2050 annual deaths from antibiotic resistance will increase by 10 fold, reaching
10 million. One of the major contributors to this problem is the lack of awareness and education. The
knowledge and problems
addressed in the course prepare students for their future health-related careers. This course is also
much needed not only at UF, but also at the national level. Finally, there is a high demand for this
course to be broadly implemented into UF curriculum; here are some examples of what
students say about this course:
-Great course that is needed!!! Hopefully it will be continued to be offered since all pre-health
professionals should be educated on this topic!
I think this course should be a required class for microbio students.

I really enjoyed this course! While I didn't do AMAZING, I feel I learned more in this class than I did in any other courses this semester.

This was by far one of my favorite courses in this program, highly informative and well put together.

It is a lot of material. But again, because it is so relevant to today, and because he taught with passion and even gave personal examples in relation to his life, it really didn't feel like it was too much. It felt more like "wow this is interesting, what steps can I take for myself, my friends, my family to prevent (blank) disease/ or prevent the enhancement of antibiotic resistance".

I loved this course! Reading articles or watching videos about topics discussed was interesting and not always something you can do with certain classes. I enjoyed not having a textbook, as this topic is changing too rapidly for a text to keep up.

I thoroughly enjoy this course, would recommend it to all future students, and can easily see this course becoming part of the core curriculum with being mandatory. The knowledge I've obtained is above and beyond my expectations with myself even using a large portion of this course as a focus for my graduation thesis paper.

I really enjoyed this course and I wish I could enroll in a part 2. The information in this course is so applicable to real world situations and the information uncovered real issues which the world is facing right now and will face in the future.

I thought this course was one of the best out of the program.

I absolutely loved this class! It has opened my eyes to the world of AMR and just how large scale these problems are today.

I hope that this course will be available from here on out. The subject matter is relevant to all fields of medicine, lab, and epidemiology, as well as agriculture and animal husbandry. The more people who are educated about antimicrobial resistance the better.

**Course Objectives**

After completion of this course, students should be able to:

- Outline problems associated with antimicrobial resistance across healthcare, agriculture, and the environment
- Explain resistance mechanisms in viruses, fungi, parasites, and cancer
- Identify major classes of antibiotics and their respective mechanisms of action
- Describe known mechanisms of antibiotic resistance and modes of transmission
- Identify means of detection/assessment of antibiotic resistance
- Describe therapeutic approaches used to fight antibiotic resistance
- Recognize scientific terms related to antimicrobial resistance
- Assess risks associated with antibiotic-resistant infections
- Employ online databases to utilize genomic, chemical, and epidemiological data on AMR

**Course Textbook(s) and/or Other Assigned Reading**

Lecture 1 - Antibiotic Resistance Threats in the United States, CDC 2013
Lecture 2 - Reducing antimicrobial use in food animals, Van Boeckel et al. 2017
Lecture 3 - Antibiotic-resistance genes in waste water, Karkman et al. 2018
Lecture 4 - On the antibacterial action of cultures of a penicillin with special reference to their use in the isolation of B. influenzae, Fleming 1929
Lecture 5 - Heavy use of prophylactic antibiotics in aquaculture a growing problem for human and animal health and for the environment, Cabello 2006
Lecture 6 - Balancing water sustainability and public health goals in the face of growing concerns about antibiotic resistance. Pruden 2014
Lecture 7 - Bacterial Wall as Target for Attack - Past Present and Future Research. Koch 2003
Lecture 8 - Antimicrobial resistance in the last 30 years. Bassetti et al. 2017
Lecture 9 - Aureomycin - a product of the continuing search for new antibiotics, Duggar 1948
Lecture 10 - Antibiotics for Emerging Pathogens. Fischbach and Walsh 2009
Lecture 14 - The origins and molecular basis of antibiotic resistance. Hawkey 1998
Lecture 15 - Bacterial resistance to antibiotics - enzymatic degradation and modification. Wright 2005
Lecture 16 - The importance of Efflux pumps in bacterial antibiotic resistance. Webber and Piddock 2003
Lecture 17 - Bacterial resistance to antibiotics - modified target sites. Lambert 2005
Lecture 18 - Antibiotic resistance of bacteria in biofilms. Stewart and Costerton 2001
Lecture 19 - Bad bugs no drugs no ESKAPE. Boucher et al. 2009
Lecture 20 - Reduced glycopeptide susceptibility in methicillin-resistant S. aureus. Appelbaum 2007
Lecture 21 - Food and human gut as reservoirs of transferable antibiotic resistance encoding genes. Rolain 2013
Lecture 22 - The role of type VI secretion system effectors in target cell lysis and subsequent HGT.
Ringel et al. 2017
Lecture 23 - Antibiotic resistance in prevalent bacterial and protozoan sexually transmitted infections.
Krupp and Madhiyanan 2015
Lecture 26 - Antimicrobial susceptibility testing - a review of general principles and contemporary practices. Jorgensen and Ferraro 2009
Lecture 27 - Diagnosing Antimicrobial Resistance. Burnham et al. 2017
Lecture 28 - Platforms for Antibiotic Discovery. Lewis 2013
Lecture 29 - Host-directed antimicrobial drugs with broad-spectrum efficacy against intracellular bacterial pathogens. Czyz et al. 2014
Lecture 30 - Targeting host metabolism. Czyz et al. 2017
Lecture 31 - Revising Natural Products. Weiman 2015
Lecture 35 - Antiviral Drug Resistance - Mechanism and Clinical Implications. Strasfeld and Chou 2010
Lecture 36 - Influenza Antiviral Drug Resistance _ CDC
Lecture 38 - Antifungal Agents. Ghannoum and Rice 1999
Lecture 39 - Antiparasitic chemotherapy - from genomes to mechanisms. Horn and Duraisingh 2014
Lecture 41 - Cancer Drug Resistance. Manscori et al. 2017

There is a list of additional reading material provided to students

Weekly Schedule of Topics Lectures:
1 Course Introduction; Antimicrobial Resistance in Healthcare
2 Antimicrobial Resistance in Agriculture
3 Antimicrobial Resistance in the Environment
4 Penicillin Discovery and Mechanism of Action
5 Antibiotics: Cell Wall Synthesis Inhibitors, Part I
6 Antibiotics: Cell Wall Synthesis Inhibitors, Part II
7 Antibiotics: Folate Synthesis Inhibitors
8 Antibiotics: Protein Synthesis Inhibitors, Part I
9 Antibiotics: Protein Synthesis Inhibitors, Part II
10 Antibiotics: Other Mechanisms of Action & the Future
11 Antibiotics: Toxicity and Side Effects
12 Lecture 1-11 Exam Review
13 No Lecture, Exam I covering lectures 1-11
14 Antibiotic Resistance: Overview
15 Antibiotic Resistance: Modification/Destruction of Antibiotics
16 Antibiotic Resistance: Efflux Pumps & Porins
17 Antibiotic Resistance: Target Modification
18 Antibiotic Resistance: Bacterial Biofilms
19 Multidrug Resistant Bacteria: No ESKAPE
20 Multidrug Resistant Bacteria: MRSA/VRSA
21 Antibiotic Resistance Reservoirs
22 Modes of Transmission
23 Antimicrobial Resistance in Sexually Transmitted Infections
24 Lecture 1-23 Exam Review
25 No Lecture, Exam II covering lectures 1-23
26 Antimicrobial Resistance Assessments, Part I
27 Antimicrobial Resistance Assessments, Part II
28 Therapeutics: Hunt for Novel Antibiotics
29 Therapeutics: Host-targeted Therapeutics, Part I
30 Therapeutics: Host-targeted Therapeutics, Part II
31 Therapeutics: Alternative Medicine
32 Prophylaxis and Control Measures
33 Lecture 24-32 Exam Review
34 No Lecture, Exam III covering lectures 24-32
35 Antimicrobial Resistance: Viral Infections, Part I
36 Antimicrobial Resistance: Viral Infections, Part II
37 Antimicrobial Resistance: Fungal Infections, Part I
38 Antimicrobial Resistance: Fungal Infections, Part II
39 Antimicrobial Resistance: Parasitic Infections, Part I
40 Pesticide Resistance: Genetically Modified Organisms
41 Drug Resistance in Cancer
42 Lectures 1-23 Final Exam Review
43 Lectures 24-43 Final Exam Review

Grading Scheme

<table>
<thead>
<tr>
<th>Percentage Score range</th>
<th>Graduate Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>&gt;93.4</td>
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<td>93.3-90.0</td>
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<tr>
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<td>D+</td>
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<tr>
<td>D-</td>
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Points

Percentage
Exam I

100 12
Midterm

200 24
Exam II

100 12
Final Exam 300

36
Quizzes

100

Assignments 130 16
Total 830

Instructor(s) Dr. Daniel M. Czyz
Attendance & Make-up Yes
Accomodations Yes
UF Grading Policies for assigning Grade Points Yes
Course Evaluation Policy Yes
<table>
<thead>
<tr>
<th>Assignments</th>
<th>Level</th>
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<tr>
<td></td>
<td>Undergraduate</td>
</tr>
<tr>
<td>Exam I (lectures 1-11)</td>
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<tr>
<td>Exam II (lectures 1-23)</td>
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<td>Exam III (lectures 23-32)</td>
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<td>Exam IV (lectures 1-43)</td>
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<tr>
<td>Quizzes, 10</td>
<td>100</td>
</tr>
<tr>
<td>Extra Credit Quiz, 1</td>
<td>10</td>
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<tr>
<td>Case Study Writing Assignment, 13</td>
<td><em>not required</em></td>
</tr>
<tr>
<td>Total</td>
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</table>

*students get to drop the lowest-score exam (either I or III).

NR: not required

There is a 15.7% grade difference between undergraduate and graduate students
MCB6XXX: Antimicrobial Resistance 3 credits

Course Description

UF Catalog: This course covers content related to antimicrobial resistance: the origins of antimicrobial resistance, dissemination, mechanisms, therapeutics, and impact on healthcare, agriculture, and the environment. This course mainly concentrates on resistance in bacteria, but will also discuss other organisms, including viruses, parasites, fungi, and cancer.

Course Importance: Cells are living factories that are capable of adapting their production line to any changes in the environment. Hence, cells encountering a toxic environment will evolve their machinery to maintain survival and replication. Such adaptation, called Antimicrobial Resistance, is commonly observed across bacteria, viruses, parasites, and fungi. However, only recently the overuse of antimicrobial agents created a high selection pressure to drive a widespread of resistance. While we are currently witnessing a constant increase of antimicrobial resistance, the development of novel treatments has almost completely ceased. This course will provide an extensive background on antimicrobial resistance, treatments, and respective mechanisms.

Time and Location

Online pre-recorded classes for the upcoming week (M-W-F lectures) will be made available every Sunday. New lectures are uploaded weekly onto Canvas (see access instructions below)

Instructor

Dr. Daniel Czyż (chysh)
Department of Microbiology and Cell Science
1355 Museum Drive
Office: Room 1004, Building 981
Phone: 352-392-0237
Email: dczyz@ufl.edu
Twitter: @360Science
Slack: AMR-UF, the app can be downloaded on a desktop, Android, or iOS
Preferred method of communication with the instructor regarding the course is by Slack

Office hours: Tuesdays 9-10 AM or by appointment
Virtual office hours: Fridays 9-10 AM (EST) or by appointment. Office hours will be available through Canvas Video Conference (Blue Button) or a phone call

To request an office hours appointment, send an e-mail directly to the instructor with three suggested dates/times.

Instructor's Teaching Philosophy

"Your work is going to fill a large part of your life, and the only way to be truly satisfied is to do what you believe is great work" - Steve Jobs

You embrace education; devote your time to pursue your goals, strive for success, and do your best, but sometimes you are just hitting obstacles that prevent you from moving forward. That's when you wish you would have a good mentor. I've helped people who hit obstacles get right back on track, but more
MCB6XXX syllabus

importantly, I help my mentees and students avoid hitting obstacles in the first place. I always make sure I am available for my students and my colleagues, whether it's in a classroom or in a laboratory setting. As a scientist, I put a lot of time and emphasis on my trainees providing them with the right personalized support plan to guide them towards their short and long-term goals, as their success is my success. As an educator, my primary objectives are to retain students' attention, promote creativity and teamwork, and encourage out-of-classroom learning.

I find science to be the most fascinating and exciting subject to teach, mostly because it is never fully explored and with the ongoing new discoveries, teaching becomes learning. Science can be found in our everyday life and I believe that relating new information to practical application in daily lives focuses students' attention and enhances learning. For that reason, I link my lecture material to everyday applications as much as possible.

I encourage and expect students to employ out-of-textbooks material, including public databases, online tools, and primary literature. While independent projects are important, in science, single-person projects are nearly nonexistent. I strongly believe that assigning students to group projects strengthens their team-building core, helps to develop essential communication skills, and exposes students to conflicts and teaches them how to deal with them. Most importantly, an assignment might seem difficult to an individual student, but becomes trivial when done as a team.

Finally, I put emphasis on mentorship and participation in extracurricular activities. My students are expected to mentor each other, because it will help them develop essential skills in their future careers. It's never too early to become a mentor. Finally, I truly believe that building a career is not solely attained during classroom education. Participation in community outreach events, conferences, seminars, and symposia is just as important as classroom-based learning. These extracurricular activities build leadership and improve communication skills and I strongly encourage my students to participate in such activities.

Course Level & Prerequisites
The course is designed for both undergraduate-level and graduate students.
The course requires graduate students to have a Bachelor's degree in biology or a related field. Important concepts will be briefly reviewed to provide students with a better understanding of the subject.

Course Objectives
After completion of this course, students should be able to:
- Outline problems associated with antimicrobial resistance across healthcare, agriculture, and the environment
- Explain resistance mechanisms in viruses, fungi, parasites, and cancer
- Identify major classes of antibiotics and their respective mechanisms of action
- Describe known mechanisms of antibiotic resistance and modes of transmission
- Identify means of detection/assessment of antibiotic resistance
- Describe therapeutic approaches used to fight antibiotic resistance
- Recognize scientific terms related to antimicrobial resistance
- Assess risks associated with antibiotic-resistant infections
- Employ online databases to utilize genomic, chemical, and epidemiological data on AMR
Learning Assessment
Grades are used to assess your learning progress. The vast extent of the information covered by this course should not discourage students. This course is designed to teach you and not fail you. If you encounter any learning difficulties that will affect your grades/learning progress, contact the professor as soon as possible.

**GRADING SCALE (total: 830 pts)**

<table>
<thead>
<tr>
<th>Graduate Students</th>
<th>Percentage</th>
<th>Score range</th>
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<tbody>
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</table>

**EXAMS (700 pts):**
- Exam I, September 18, 2019: Covers lectures 1-11. (100 pts)
- Exam II, October 18, 2019: Covers lectures 1-23. (200 pts)
- Exam III, November 13, 2019: Covers lectures 24-32. (100 pts)
- Exam IV, December 9, 2019: Covers lectures 1-43 (300 pts)

Exams will assess student knowledge of the material covered in lectures, assignments, and required reading/video material. The lowest exam score (either Exam I or III only) will be dropped. All exams are mandatory and only students who take all four exams will be able to drop one. Each exam will take approximately 50 minutes (final exam will take 2x time) to complete and will consist of multiple-choice questions, true/false, fill in the blanks, sentence completion, definition matching, and short-answer questions. Students must sign up on ProctorU at least 72 hours in advance. The academic honesty will be remotely monitored in real-time by assigned course proctors. For more information about academic honesty, please see the Student Honor Code.

**QUIZZES (100 pts):**
There will be 11 quizzes (10 points each, 100 points total plus 10 extra credit points). See the Course Content (below) for dates. Quizzes will cover lecture material and assigned reading/video material. There will be one Extra Credit Quiz during the first week. This will be an introductory quiz that will cover students' understanding of the syllabus and course requirements.

**WRITING ASSIGNMENTS (130 pts):**
At the end of every Monday lecture, the instructor will assign a reading/video. Written assignments will be due every Saturday (11:59 PM EST) following the introduction of the assignment. Only
students registered for the course have to turn in the written assignments. There will be 13 written assignments worth 10 points each for a total of 130 points. Graduate students are required to provide a brief answer to questions that relate to each assigned reading/video in a single abstract form (sample abstract is provided with Assignment No. 1). The response should not take more than 250 words in total – adhering to this limit is a must. The purpose of these assignments is to link the course material to real cases, encourage creative thinking, and assess your learning. See “Late Submission” for information related to late work. See the “Assignments” section for more details.

EXTRA CREDIT: The professor may offer an extra credit written assignment.

Late Submission
Graduate students who turn in late writing assignments will be penalized 10% of the total score for each late day up to 3 days. After three days, no late submissions will be accepted. Students with special medical or family problems should contact the instructor directly.

Attendance and Make-Up Work
The requirements for class attendance and make-up exams, assignments and other work are consistent with university policies and can be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Excused Absence
Documentation MUST be provided for missed exams caused by serious illness, accident, jury duty, or death in the immediate family. If the circumstances allow, you must contact the instructor IN ADVANCE of the missed exam to arrange for an alternative time.

Website
Course material can be accessed through Canvas.
https://ufl.instructure.com/

Technical issues related to the course can be addressed to UF helpdesk
http://helpdesk.ufl.edu, 352-393-4357, helpdesk@ufl.edu

Communication
For questions and issues on assignments and class organization please check first the syllabus, the announcements, calendar, and the Course Handout. To seek further help, please communicate with the instructor via Slack or email. For questions regarding class and class content use the Canvas Discussion Board.

Discussion Board: Available through Canvas. Postings and answers are monitored by the instructor
Slack: AMR-UF, the app can be downloaded on a desktop, Android, or iOS
Twitter: Follow and share science news related to the course using #AMR_UF

IMPORTANT: Prior to the first lecture, please familiarize yourself with netiquette (cyber behavior guidelines). See below “Netiquette guide for online courses”.
Course Material

Required material: There is no textbook for this course. This course is based on peer-reviewed publications that will be provided by the instructor. The required reading material will be posted under "Assignments" in Canvas. Questions related to information from the required reading/video material will appear on quizzes and exams.

Recommended reading and other material: Additional reading material, links to videos, and other online resources will be posted under "Files" in Canvas.

Services for Students with Disabilities
Students with disabilities requesting accommodations should first register with the Disability Resource Center (0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter that must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Campus Resources
Resources are available on campus for students having personal problems or lacking clear career and academic goals, which interfere with their academic performance. These resources include:

Health & Wellness
- **U Matter, We Care:** If you or a friend is in distress, please contact umatter@ufl.edu or tel. 352-392-1575 so that a team member can reach out to the student. http://www.umatter.ufl.edu/
- **Counseling and Wellness Center:** Provides counseling services to students, tel. 352-392-1575. https://counseling.ufl.edu/
- **Sexual Assault Recovery Services** (SARS): Provides services related to sexual violence. Tel. 352-392-5648. http://www.umatter.ufl.edu/sexual_violence
- **Student Health Care Center:** Student health-related services. Tel. 352-392-1161. https://shcc.ufl.edu/
- **Gator Career Closet:** Serves as a lending closet for students to borrow professional clothing and accessories free of charge. This service is available to all UF students with a valid UF ID. Tel. 352-392-1601. https://career.ufl.edu/careercloset/
- **Food Pantry:** Offers non-perishable food, toiletries, and fresh vegetables. This service is provided to current students, staff, and faculty at the University of Florida. Gator 1 ID is required, but no proof of need is required.

For emergencies call the **University Police Department** at 352-392-1111 (or 911).

Academic Resources

E-learning technical support: Tel. 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Library Support: Various ways to receive assistance with respect to using the libraries or finding resources. Text 813-463-2283 or Tel. 866-281-6309. http://cms.uflib.ufl.edu/ask

Teaching Center, Broward Hall: General study skills and tutoring. Tel. 352-392-2010 or 352-392-6420. http://teachingcenter.ufl.edu/


Course Evaluation
Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

Setting up VPN
To access UF resources and journal articles off-campus, please set up a Virtual Private Network (VPN). VPN allows you to remotely connect to UF services (i.e. library, UF servers). For detailed instructions on how to set up VPN visit: https://it.clas.ufl.edu/kb/category/vpn/

Netiquette guide for online courses
It is important to recognize that the online classroom is in fact a classroom, and certain behaviors are expected when you communicate with both your peers and your instructors. These guidelines for online behavior and interaction are known as netiquette. http://teach.ufl.edu/wp-content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdf

University Honesty Policy
UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (https://sccr.dso.ufl.edu/process/honor-code/) specifies behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor. Additional policies on academic integrity can be found in the Orange Book.

Additional comments regarding academic integrity:
Students are encouraged to discuss the course material with each other, help each other understand concepts, study together, and even discuss assessment questions with each other once the quiz window is closed. However, the following is considered academic dishonesty, and I expect that no student will ever do any of the following:

- Have another person complete a quiz in this course
- Copy another student's quiz in this course
- Collaborate with anyone during a quiz in this course
- Discuss the questions and answers of a quiz with other students while the quiz is still open
- Manipulate and/or distribute any materials provided in this course for any purpose (including course lecture slides).
- Use any materials provided by a previous student in the course

Software Use
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.

Microsoft Office 365 Software is free for UF students
http://www.it.ufl.edu/gatorcloud/free-office-365-downloads/

Other free software is available at:
http://www.software.ufl.edu/

To check for availability of the media and technical requirements, contact the UF Computing Help Desk at (352)392-HELP(4357).

University of Florida Complaints Policy and Student Complaint Process
The University of Florida and most instructors believe strongly in the ability of students to express concerns regarding their experiences at the University. Most problems, questions and concerns about the course will be resolved by professionally communicating with the instructor. Please try to meet your instructor in person, make an appointment to call, or try to set up a remote meeting through Skype or other media. The University encourages its students who still wish to file a written complaint to submit that complaint directly to the department that manages that policy. Please refer to Student Complain Process: http://distance.ufl.edu/student-complaint-process/

Professionalism is a two-way street. Unprofessional behavior of students includes, among other things: lack of communication, blaming other people or external factors, lying, affecting others negatively in a group or in the class, not accepting criticism and not being proactive in solving problems or seeking help. Furthermore, faculty often have family and other obligations to tend to. Over the weekend, replies to your inquiries or questions may be delayed. If a student is lacking professionalism repeatedly, the instructor has the right to file a formal complaint against the student through the Dean of Student office.

Academic Calendar
Students should familiarize themselves with important academic dates and deadlines available at https://catalog.ufl.edu/UGRD/dates-deadlines/
# Course Content

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture</th>
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<tbody>
<tr>
<td>1</td>
<td>08/19/19</td>
<td>01</td>
<td>Course Introduction; Antimicrobial Resistance in Healthcare</td>
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<tr>
<td>2</td>
<td>08/21/19</td>
<td>02</td>
<td>Antimicrobial Resistance in Agriculture</td>
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<tr>
<td>3</td>
<td>08/23/19</td>
<td>03</td>
<td>Antimicrobial Resistance in the Environment</td>
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<td>4</td>
<td>08/26/19</td>
<td>04</td>
<td>Penicillin Discovery and Mechanism of Action</td>
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<td>5</td>
<td>08/28/19</td>
<td>05</td>
<td>Antibiotics: Cell Wall Synthesis Inhibitors, Part I</td>
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<tr>
<td>6</td>
<td>08/30/19</td>
<td>06</td>
<td>Antibiotics: Cell Wall Synthesis Inhibitors, Part II</td>
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<td>7</td>
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<td>8</td>
<td>09/04/19</td>
<td>07</td>
<td>Antibiotics: Cell Wall Synthesis Inhibitors, Part III</td>
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<td>Antibiotics: Folate Synthesis Inhibitors</td>
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<td>12</td>
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<td>Antibiotics: Other Mechanisms of Action</td>
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<td>16</td>
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<td>Antibiotic Resistance: Efflux Pumps</td>
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<td>Antibiotic Resistance: Target Modification</td>
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<td>Multidrug Resistant Bacteria: No ESKAPE</td>
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<td>23</td>
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<td>Antibiotic Resistance Reservoirs</td>
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<td>Antimicrobial Resistance Assessment, Part I</td>
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<td>10/25/19</td>
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<td>Therapeutics: Hunt for Novel Antibiotics</td>
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<td>10/28/19</td>
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<td>Therapeutics: Host-targeted Therapeutics, Part I</td>
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<td>Therapeutics: Host-targeted Therapeutics, Part II</td>
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<td>Therapeutics: Alternative Medicine</td>
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<td>Antimicrobial Resistance: Fungal Infections, Part I</td>
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<td>11/20/19</td>
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<td>41</td>
<td>11/22/19</td>
<td>39</td>
<td>Antimicrobial Resistance: Parasitic Infections, Part I</td>
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<td>11/25/19</td>
<td>No Class</td>
<td>Happy Thanksgiving</td>
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<td>43</td>
<td>11/27/19</td>
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<td>Pesticide Resistance: Genetically Modified Organisms</td>
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<td>44</td>
<td>11/29/19</td>
<td>41</td>
<td>Drug Resistance in Cancer</td>
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<td>Lectures 1-23 Final Exam Review</td>
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<td>46</td>
<td>12/04/19</td>
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<td>Lectures 24-43 Final Exam Review</td>
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<td>47</td>
<td>12/06/19</td>
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<td>Reading Day</td>
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<td>12/09/19</td>
<td>No Class</td>
<td>Final Exam</td>
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<td>49</td>
<td>12/11/19</td>
<td>No Class</td>
<td>Have a safe winter break!</td>
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<tr>
<td>50</td>
<td>12/13/19</td>
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*Required informal course and instructor evaluation

**Final and official course evaluation
### Assignments

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<tr>
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<tr>
<td>1</td>
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<td>08/19/19</td>
<td>Antibiotic Resistance Threats in the US</td>
<td>Hunting the Nightmare Bacteria, part I</td>
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<td>08/21/19</td>
<td>Reducing Antimicrobial Use in Food Animals</td>
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<td>Antibiotic Resistance Genes in Wastewater</td>
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<td>Discovery of penicillin</td>
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<td>08/28/19</td>
<td>Antibiotic Use in Fish Industry</td>
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<td>08/30/19</td>
<td>Water Sustainability and Public Health Goals</td>
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<td>Bacterial Wall as Target to Attack</td>
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<td>8</td>
<td>09/06/19</td>
<td>Future of AMR</td>
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<td>Discovery of tetracycline</td>
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<td>Antibiotic for Emerging Pathogens</td>
<td>KPC Outbreak</td>
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<td>11</td>
<td>09/13/19</td>
<td>Other approaches</td>
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<td>09/16/19</td>
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<td>TED Talk: Antibiotic Resistance</td>
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<td>The Origin and Molecular Basis of ABR</td>
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<td>Enzymatic Degradation and Modification</td>
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<td>Efflux Pumps in ABR</td>
<td>Antibiotics in Healthy Animals</td>
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<td>Modified Target Sites</td>
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<td>09/30/19</td>
<td>ABR of Bacterial Biofilms</td>
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<td>Reservoirs of AMR</td>
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<td>HGT Warfare</td>
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<td>AMR in STIs</td>
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<td>Antimicrobial Susceptibility Testing</td>
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<td>10/28/19</td>
<td>Diagnosing AMR</td>
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<td>Platforms for Antibiotic Discovery</td>
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<td>Host-directed Antimicrobial Drug Discovery</td>
<td>Phage Treatment of P. aeruginosa</td>
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<td>Targeting host metabolism</td>
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<td>11/06/19</td>
<td>Revising Natural Products</td>
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<td>11/08/19</td>
<td>National Action Plan for Combating ABR</td>
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<td>11/15/19</td>
<td>Antiviral Drug Resistance</td>
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<td>Antifungal Agents: Mechanisms of Action</td>
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<td>Antiparasitic Chemotherapy</td>
<td>Protecting Yourself &amp; Family</td>
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<td>43</td>
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*All assigned reading will be posted on Course Canvas in pdf format*
# Cover Sheet: Request 14353

**New graduate course**

## Info

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<tr>
<td>Submitter</td>
<td>Jason Byrd <a href="mailto:jhbyrd@ufl.edu">jhbyrd@ufl.edu</a></td>
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<td>Updated</td>
<td>10/17/2019 12:03:17 PM</td>
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Description of request: Create a course for graduate internships for students in the Wildlife Forensic Science and Conservation MS concentration program.

## Actions

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<td>CALS - Wildlife Ecology and Conservation</td>
<td>Eric Heiglren</td>
<td>Jason - I think the minimum and maximum credits on the Version 1 form should be 1 and 6, respectively.</td>
<td>10/17/2019</td>
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No document changes

| College            | Pending     | CALS - College of Agricultural and Life Sciences |              |                                                                         | 10/17/2019    |

No document changes

Graduate Curriculum Committee

No document changes

University Curriculum Committee Notified

No document changes

Statewide Course Numbering System

No document changes

Graduate School Notified

No document changes

Office of the Registrar

No document changes

College Notified

No document changes
Course|New for request 14353

Info
Request: New graduate course
Description of request: Create a course for graduate internships for students in the Wildlife Forensic Science and Conservation MS concentration program.
Submitter: Jason Byrd jhubryd@ufl.edu
Created: 10/17/2019 9:59:57 AM
Form version: 2

Responses
Recommended Prefix WIS
Course Level 6
Course Number XXX
Category of Instruction Intermediate
Lab Code None
Course Title Wildlife Forensics Internship
Transcript Title Wildlife For Sci Intr
Degree Type Graduate

Delivery Method(s) Online
Co-Listing No

Effective Term Earliest Available
Effective Year Earliest Available
Rotating Topic? No
Repeatable Credit? Yes
If repeatable, # total repeatable credit allowed 6
Amount of Credit Variable
If variable, # min 1
If variable, # max 6
S/U Only? Yes
Contact Type Supervision of Student Interns
Weekly Contact Hours 1
Course Description This internship will provide an opportunity for students to gain first-hand experience at a public or private conservation, ecological or forensic institution of their choice, with approval for credit from the University of Florida (UF). Placement is designed to integrate theory and practice beyond the scope of the online program.
Prerequisites N/A - graduate course. Any successfully enrolled in the program is eligible for the internship.
Co-requisites N/A

Rationale and Placement in Curriculum This course is needed in order to facilitate hands-on, experiential learning in a working environment for students under the direction of a qualified conservationist and/or forensic scientist. Projects are student-driven with a heavy emphasis on student independence and responsibility in the planning and implementation of the work, along with Faculty support and the supervision of a host site-appointed and qualified practicing conservationist or forensic scientist.

Course Objectives • Develop leadership skills in facilitating and implementing a work program that builds upon the competencies developed in the core curriculum
  • Develop a personal learning/work contract with tailored goals, objectives, and activities;
  • Demonstrate an acceptable level of performance in the specific work goals, objective, and activities outlined in their contract
  • Integrate skills and techniques based on the specialization, resources and equipment available
  • Create a professional network at the host institution, thereby developing contacts in the profession while becoming familiar with a variety of training environments and subject matter expertise
  • Establish sufficient competence in their work activities under the direction of their supervisor
  • Provide a biweekly progress report to the host institution and UF summarizing their experiences and activities, and a final report or project at the completion of the internship explaining
their overall findings, accomplishments, and recommendations

**Course Textbook(s) and/or Other Assigned Reading** No text required. Supplemental reading material may be assigned.

**Weekly Schedule of Topics** Course Format:

Students are placed with an approved institution of their choice for academic credit. Each credit hour is the equivalent of 75 hours of work, verified by the host supervisor. There is a maximum of six credit hours awarded for the internship. Students may choose to pursue a domestic or international internship, and are fully encouraged to take the lead in all aspects of the identification of the host institution to the planning and implementation of the internship. The student works under the direction of the host institution on activities, projects, and work responsibilities to the mutual benefit both parties. The success of the internship is dependent on the cooperation and collaboration of the three partners: the intern, the college and the host site.

**Intern Responsibilities:**

- Identification and approval of a host site or host institution to fulfill the requirements for credit.
- Identification and approval of a host supervisor
- Confirmation of start and finish dates with the intern coordinators and the site supervisor, and immediate notification of any changes
- Adherence to the site work week, hours of operation, and expectations or flexibility for special needs as required
- At the request of the host institution, and only when necessary, the student will work to initiate and implement the development of a Memorandum of Understanding (MoU) between the host institution and the University of Florida to specify the terms and expectations of the collaboration
- Development of a work plan in cooperation with and approved by the host institution and the University of Florida
- Regular consultations with the intern coordinators and host supervisor on work status and progress
- Adherence to the standardized code of ethics for the host institution
- Demonstration of a lively and professional interest in the site and the operations of the host institution
- Seeking of guidance and/or help as required
- Acceptance of feedback in a graceful manner
- Discussion of any perceived work-related problems with the site supervisor and intern coordinators as they may arise
- Maintenance of a journal that briefly documents the major points of placement activity (e.g. activities, responsibilities, challenges and resolutions)
- Writing a letter of thanks to the site and site supervisor(s), with the intern coordinators copied, at the conclusion of the internship
- Provision of a final written report to the host institution and UF, to be graded based on a rubric provided in the student internship manual
- Publication of scientific data or findings if deemed appropriate and/or presentation of scientific findings in a poster or oral presentation format at a professional conference is encouraged.

**Site Responsibilities:**

The site will be responsible for:

- Provision of clear guidance and direction, as required
- Provision of appropriate, honest and frequent feedback
- Responsiveness to the needs and abilities of the intern
- Assistance in intern comprehension of the institutional operation, day to day activities, resources and constraints
- Completion of written assessments for UF
- Provision of a site orientation, policies and procedures, safety equipment or uniform if required; and site-specific training as needed

**Intern Coordinator Responsibilities:**

- Assisting of interns in all aspects of the planning process
- Consultation of interns in the development of learning or work contracts and/or MoUs
Availability for communication with interns throughout the placement
Problem solving or negotiation, as required
Assignment of final grades to students based on interpretation of the assessment tools

**Grading Scheme**

Grading:

This course is pass/fail; there will be no letter grade.
Credits earned will be variable (1-6) depending on the time requirement for the internship (~75 hours of work = 1 credit).
Evaluation of pass/fail status will be determined by the following:

1. Site Supervisor’s Assessment: the supervisor is requested to complete a written assessment of the student at the midpoint and upon completion of the placement. Detailed criteria for assessment and forms will be provided in the internship manual. The assessment will be based on the extent to which the student has fulfilled the responsibilities described in the course outline as well as the level of satisfaction with the specific outcomes of the learning contract.

2. Intern Coordinator’s Assessment: based on activities throughout the placement.

Faculty are responsible for interpreting and assessing student performance at the site. Criteria for assessment include the extent to which the student has met the responsibilities described in the outline as well as the outcomes of the learning contract. Faculty will work with site supervisors in assessing the student level of performance. To ensure that faculty have enough information to work with, students should maintain regular contact with the intern coordinators.

3. Learning/Work Contract

4. Weekly Journal: entries must be submitted every two weeks or more frequently if preferred. The journals are the primary means of the intern liaison understanding the content, pacing and progress of the internship. They must be submitted to receive a passing grade from the course. Journal entries may be e-mailed to the intern coordinators with deadlines set at the beginning of the semester.

5. Intern Final Report: details for report guidelines can be found in the internship manual, along with additional detail on grading policies and requirements.

Registrar’s Grade Policy regulations at
http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html

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

**Instructor(s)** Hayley Adams, DVM, Ph.D., DACVP, DACYM; and Susan Underkoffler, MFS

**Attendance & Make-up** Yes

**Accommodations** Yes

**UF Grading Policies for assigning Grade Points** Yes

**Course Evaluation Policy** Yes
Internship in Wildlife Forensic Sciences & Conservation
WIS-6XXX

Instructors: Hayley Adams, DVM, Ph.D., DACVPM, DACVM; and Susan Underkoffler, MFS

Office hours: Please contact us via email and, if necessary, you can make an appointment if we need to chat via phone. We will do our best to respond to emails within 24 hours on weekdays and within 48 hours on weekends.

Email: hayleyradams@ufl.edu; sunderkoffler@ufl.edu

Website: https://masters.wildlife.forensics.med.ufl.edu/

Supplemental Readings may be assigned to you once your internship location has been secured.

Course Description:

This internship will provide an opportunity for students to gain first-hand experience at a public or private conservation, ecological or forensic institution of their choice, with approval for credit from the University of Florida (UF). Placement is designed to integrate theory and practice beyond the scope of the online program.

Primary Aims & Learning Outcomes:

Aim:
To facilitate hands-on, experiential learning in a working environment for students under the direction of a qualified conservationist and/or forensic scientist. The internship can be developed as a specialized and focused opportunity or a more general placement in conservation and/or forensics. It can be designed to introduce new techniques, methods, and approaches beyond the what is taught in the online certificate or Master’s degree program. Projects are student-driven with a heavy emphasis on student independence and responsibility in the planning and implementation of the work, along with Faculty support and the supervision of a host site-appointed and qualified practicing conservationist or forensic scientist.

Learning Outcomes and Objectives:
Students will have demonstrated the ability to:
- Develop leadership skills in facilitating and implementing a work program that builds upon the competencies developed in the core curriculum
- Develop a personal learning/work contract with tailored goals, objectives, and activities;
- Demonstrate an acceptable level of performance in the specific work goals, objective, and activities outlined in their contract
• Integrate skills and techniques based on the specialization, resources and equipment available
• Create a professional network at the host institution, thereby developing contacts in the profession while becoming familiar with a variety of training environments and subject matter expertise
• Establish sufficient competence in their work activities under the direction of their supervisor
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Communication:
Please email instructors directly during your internship. Course Email, not the discussion board, should always be used to contact the faculty or staff if you have a problem of a personal nature. If you are unable to access your course interface, please contact the UF Help Desk. We don’t want any of you to be offline for any length of time. Contact us as soon as you can so we can check it out and help you. If you are experiencing difficulty with your access to course email, then please email your course instructor directly via regular email. In that email, make sure you give your name and the name of your course. Please respond to all emails from your instructor or TA.
When we email you, we are usually contacting you because we want to help you. If you have a question about your grade, an exam, or assignment question, please email us and we’ll be happy to help you.

Grade Changes:
Grades will be changed only when a grading error has been made. If you think an error has been made, you should email the instructor as soon as possible. Your entire assignment will then be re-graded.

Instructional Policy:
This course is part of the distance education program at the University of Florida. Instead of traditional lecture format, the medium for communication between course instructors, teaching assistants and students will be via Canvas, a user-friendly Web-based classroom management tool and via email with instructors.

**Attendance Policy:** Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at:

https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

**Performance Expectations:** Students are expected to produce quality work of a standard comparable to any graduate level didactic course. Discussion postings must be legible, constructive and appropriate. Students are required to think for themselves and will be expected to complete assignments that require the application of logic and reasoning skills when the answer may not be found in a book or the course notes.

**Academic Honesty:** All students are expected to abide by the student honor code. To review the student honor code read the information on standards of ethical Conduct at:
http://www.dso.ufl.edu/judicial/honorcodes/honorcode.php

**Plagiarism:** Plagiarism includes any attempt to take credit for another person’s work. This includes quoting directly from a book or web site, without crediting the source. Sources should always be referenced, a link to the website added, or quotation marks placed around the material. However, we expect more than simply cutting and pasting in this graduate level course. Students are expected to review, evaluate and comment on material they research, rather than simply copying relevant material. Your work will be graded accordingly.

**Incomplete grades:** Under special circumstances, if a student is unable to finish a course before the end of the semester we may be able to assign an incomplete grade. An incomplete grade is a non-punitive grade assigned at the discretion of the course instructor. In this course an incomplete grade may be assigned if 1/3rd or more of the course assignments have been completed and if the student has remained in communication with TA’s and instructors throughout the course or has made an effort to request an incomplete grade. If an incomplete grade is assigned, outstanding assignments must be completed by the end of the next semester or by a due date agreed upon by the student and instructor in writing. If the assignments are not completed in this time you will be assigned a grade based on the completed assignments.

**Drop Dates:** consult the UF Calendar of Critical Dates at
http://www.forensicscience.ufl.edu/Students/Dates.asp
Students must inform us that they are withdrawing from a course to ensure appropriate tuition reimbursement. Deleting yourself from the course roster does not officially withdraw you from a course.

**Important Dates:**
For Assignment deadlines - see the course Calendar in WebCT.
For other important dates, consult the UF Calendar of Critical Dates and http://www.registrar.ufl.edu/

Additional information on the University of Florida Grades and Grading Policies may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

“Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting the accommodation.”

University’s Honesty Policy (cheating and use of copyrighted materials)

Academic Integrity – Students are expected to act in accordance with the University of Florida policy on academic integrity (see Student Conduct Code, the Graduate Student Handbook or this web site for more details:

Cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior.

We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

Accommodations for Students with Disabilities
The College and the course instructor are committed to providing reasonable accommodations to assist students’ coursework. To obtain academic accommodations, first register with the Dean of Students’ Office. The Dean of Students’ Office will provide documentation to be given to the course instructor at the time you request the accommodation.

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter, which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Online Course Evaluations
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluerca.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

Counseling and Student Health
Health and Wellness

U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit umatter.ufl.edu/ to refer or report a concern and a team member will reach out to the student in distress. Counseling and Wellness Center: Visit counseling.ufl.edu/ or call 352-392-1575 for information on crisis services as well as non-crisis services. Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit shcc.ufl.edu/.

University Police Department: Visit police.ufl.edu/ or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; ufhealth.org/emergency-room-trauma-center.
Cover Sheet: Request 14335

MS-DI Adv Med Nutr 1 Course change

<table>
<thead>
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<tr>
<td><strong>Status</strong></td>
<td>Pending at CALS - College of Agricultural and Life Sciences</td>
</tr>
<tr>
<td><strong>Submitter</strong></td>
<td>Wendy Dahl <a href="mailto:wdahl@ufl.edu">wdahl@ufl.edu</a></td>
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<td><strong>Description of request</strong></td>
<td>In response to a request from the Master of Science - Dietetic Internship director (MS-DI), I am requesting to increase Adv Med Nutri Thera 1 from 3 to 4 credits and decrease the Adv Med Nutri Thera 2 from 4 to 3 credits to fit into the new MS-DI schedule of courses for the program. I have moved course content to reflect this credit change - pediatrics (approx. 1 credit) will now be covered in the spring course to correspond to the MS-DI practicum course (requiring pediatrics) in the summer following Adv Med Nutri Thera 1.</td>
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<td><strong>Department</strong></td>
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<td><strong>Group</strong></td>
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<td><strong>User</strong></td>
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No document changes

Graduate Curriculum Committee

No document changes

University Curriculum Committee Notified

No document changes

Statewide Course Numbering System

No document changes

Graduate School Notified

No document changes

Office of the Registrar

No document changes

College Notified

No document changes
Course|Modify for request 14335

Info
Request: MS-DI Adv Med Nutr 1 Course change
Description of request: In response to a request from the Master of Science - Dietetic Internship director (MS-DI), I am requesting to increase Adv Med Nutri Thera 1 from 3 to 4 credits and decrease the Adv Med Nutri Thera 2 from 4 to 3 credits to fit into the new MS-DI schedule of courses for the program. I have moved course content to reflect this credit change - pediatrics (approx. 1 credit) will now be covered in the spring course to correspond to the MS-DI practicum course (requiring pediatrics) in the summer following Adv Med Nutri Thera 1.
Submitter: Wendy Dahl wdahl@ufl.edu
Created: 10/11/2019 1:26:04 PM
Form version: 1

Responses
Current Prefix D1E
Course Level 6
Number 241
Lab Code None
Course Title Adv Med Nutri Thera 1
Effective Term Earliest Available
Effective Year Earliest Available
Requested Action Other (selecting this option opens additional form fields below)
Change Course Prefix? No

Change Course Level? No

Change Course Number? No

Change Lab Code? No

Change Course Title? No

Change Transcript Title? No

Change Credit Hours? Yes
Current Credit Hours 3
Proposed Credit Hours 4
Change Variable Credit? No

Change S/U Only? No

Change Contact Type? No

Change Rotating Topic Designation? No

Change Repeatable Credit? No

Maximum Repeatable Credits 3
Change Course Description? No
Change Prerequisites? No

Change Co-requisites? No

Rationale The director of the Master of Science - Dietetic Internship program, Jeanette Andrade, has requested that I increase the Adv Med Nutri Thera 1 from 3 to 4 credits and decrease the Adv Med Nutri Thera 2 from 4 to 3 credits to fit into the new MS-DI schedule of courses for the program. I have moved course content to reflect this credit change - pediatrics will now be covered in the spring course to correspond to the MS-DI practicum course (requiring pediatrics) in the summer following Adv Med Nutri Thera 1.
COURSE SYLLABUS: Section 04BC
ADVANCED MEDICAL NUTRITION THERAPY 1
SPRING 2020 (4 Credits)

Instructor: Wendy Dahl PhD RD
Office: 207 FSHN Building
Phone: 352-294-3707 (office)
e-mail: wdahl@ufl.edu
Office hours: Tuesday 3:00-5:00 p.m. or by appointment.

Guest Faculty: Anne Mathews PhD RDN
Office: 303 FSHN Building
e-mail: anne.mathews@ufl.edu

Class Time: Monday 9:35-11:30 a.m.; Wednesday 12:50-2:45 p.m.
Class Location: Dietetics Lab – Building 162

Course Description
Opportunity to integrate theories and principles of medical nutrition therapy into clinical practice. Prereq: admission to Master of Science-Dietetic Internship.

Additional Course Information
Part 1 of a two-semester course designed to provide students enrolled in the combined Master of Science - Dietetic Internship Program with the opportunity to integrate the theories and principles of medical nutrition therapy into clinical practice. Case studies will be used to help students integrate and apply their knowledge of nutrition, dietetics, metabolism and physiology, with the ultimate goal of producing students who can effectively plan and manage the nutritional care of a variety of patients using a critical thinking approach to evidence-based medical nutrition therapy. Topics include pediatrics, nutrition assessment, and evidence-based medical nutrition therapy of obesity, diabetes, cardiovascular disease, and kidney disease.

Fundamental Concepts
Recommended appropriate medical nutrition therapy requires:
1. Understanding physiology, metabolism and pathology
2. Critical thinking skills
3. Applying evidence-based nutrition principles
4. Knowing where to find information and how to apply information.

Course Objectives
Upon completion of this course, students will:
• use critical thinking skills to evaluate social, anthropometric, nutritional, medical, laboratory, pharmacologic and other relevant patient data/information for all assigned case studies and care plans and recommend appropriate intervention strategies
• relate the theoretical bases for nutrition/medical intervention strategies with the anatomical, physiological and/or biochemical changes of selected diseases/conditions
• integrate the theories and principles of medical nutrition therapy into clinical practice
• develop and justify appropriate recommendations for the management of selected diseases/conditions
• understand and use medical terminology and appropriate documentation styles to communicate patients’ status with other health care professionals
• develop skills in using medical reference materials and begin to build a professional library
• develop problem solving skills
• give and receive constructive criticism
Required Resource Materials
- Medical nutrition reference handbook, “black book”. This is a pocket-sized reference for information to be used in clinical practice. It could be a self-made, purchased reference or electronic.
- Extensive outside readings assigned from journals including: JPEN, JAND, AJCN, BJB, etc.

Recommended Materials/Online Access
- Medical dictionary, medical abbreviations, laboratory values, food composition, pharmacology reference

Expectations for Classroom Discussions
This is a graduate course and, therefore, class discussions build on information learned in undergraduate nutrition and disease, physiology, biochemistry, and metabolism. You will be expected to review your undergraduate material and read assigned material before coming to class.

Class Attendance and Demeanor
Students are expected to attend all class sessions, arrive on time and be present for the entire class. An excused absence is at the discretion of the instructor. An excused absence is any unavoidable, unplanned situation such as an illness, death in the family, or car accident. Proof of illness is required (e.g. note from physician or clinic; vague notes such as “was seen” are not acceptable), death (e.g. obituary), accident (e.g. police report), etc. Please notify the instructor about your situation as soon as possible, leaving a message if necessary (by text message, email or voice mail). Students are expected to show courtesy to their classmates, instructors and guest speakers by silencing cell phones before the class begins and refraining from engaging in personal laptop use and conversations during class.

Student Evaluation
Due to the practical nature of the lecture material and the problem-solving skills developed during the classes, material presented during class cannot be replaced with assigned readings, therefore, class attendance is required. Excused absences are at the discretion of the instructor and must be arranged prior to the start of the class period. An “excused” absence is any unavoidable, unplanned situation such as an illness, death in the family, or car accident. However, to be fair to all students, proof of the illness (note from doctor or clinic), death (obituary), accident (police report), etc. will be required. Please contact me the day of class or as soon as possible to inform me of your situation. Upon returning to class, please present proof of the problem. Each year assignments are returned to students. You may want to keep your work to prepare for clinical rotations or the registration exam. Please do not give these items to future students in this class. Do not review students’ work from previous years. Grades will not be curved.

<table>
<thead>
<tr>
<th>Grading Scale</th>
<th>Percentages</th>
<th>Grade</th>
<th>Points</th>
<th>Percentages</th>
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<tbody>
<tr>
<td>465-500</td>
<td>93-100%</td>
<td>A</td>
<td>365-384</td>
<td>73-76%</td>
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<td>450-464</td>
<td>90-92%</td>
<td>A-</td>
<td>350-364</td>
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<td>435-449</td>
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<td>335-349</td>
<td>67-69%</td>
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<td>415-434</td>
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<td>B</td>
<td>315-334</td>
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<td>D</td>
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<tr>
<td>400-414</td>
<td>80-82%</td>
<td>B-</td>
<td>300-314</td>
<td>60-62%</td>
<td>D-</td>
</tr>
<tr>
<td>385-399</td>
<td>77-79%</td>
<td>C+</td>
<td>&lt;300</td>
<td>&lt;60%</td>
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Distribution of points (Assignments will be posted on Canvas):

- Pediatric Case Study Presentations: 25
- Pediatric Enteral Case Study: 25
- Pediatric Formula Worksheet: 25
- Hot topic contributions (3 @ 5 pts): 15
- Assessment Workshop (participation): 10
- Evidence-based Analysis of Practice Question: 50
- CVD Case Study Presentation: 25
- Dietary Assessment (Reflection): 25
- Hot Topic in Diabetes – Debate: 25
- Counseling Assignments – Dr. Mathews (2 @ 25 pts): 50
- Evidence-Based Nutrition Presentations (3 @ 25 pts): 75
- Diabetes Assignments (2 @ 25 pts): 50
- Kidney Disease Assignments (2 @ 25 pts): 50
- Take Home Case Study Final Exam: 50

Total: 500

Grades and Grade Points
For information on current UF policies for assigning grade points, see:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Attendance and Make-Up Work
Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Online Course Evaluation Process
Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online at https://evaluations.ufl.edu. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results.

Academic Honesty
As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.” You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: http://www.dso.ufl.edu/secr/process/student-conduct-honor-code.
Software Use
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.

Services for Students with Disabilities
The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation
0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/

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
  Counseling Services
  Groups and Workshops
  Outreach and Consultation
  Self-Help Library
  Wellness Coaching

- U Matter We Care, www.umatter.ufl.edu/
- Career Connections Center, First Floor JWRU, 392-1601, https://career.ufl.edu/

Student Complaints
Residential Course: https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/
Online Course: http://www.distance.ufl.edu/student-complaint-process
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<td>Course Introduction</td>
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<td>January 8</td>
<td>Critical Thinking</td>
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<td>January 13</td>
<td>Take-home survey discussion of infant feeding</td>
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<td>Mosca et al 2017</td>
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<td>Pediatric Assessment and Human Milk</td>
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<td>Infant formula calculations</td>
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<td>Pediatric Malnutrition</td>
<td>Formula Worksheet</td>
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<td>Motivational Interviewing and Counseling - Dr. Mathews Guest Lecturer</td>
<td>Pediatric Enteral Case</td>
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<td>Motivational Interviewing and Counseling - Dr. Mathews Guest Lecturer</td>
<td>Evidence Analysis</td>
<td>Hettema et al 2005</td>
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Cover Sheet: Request 14336

MS-DI Adv Med Nutri Thera 2 Course Change

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<td>Description of request</td>
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Course|Modify for request 14336

Info

Request: MS-DI Adv Med Nutri Thera 2 Course Change
Description of request: At the request of the director of the Master of Science - Dietetic Internship (MS-DI) program, Jeanette Andrade, has requested that I increase the Adv Med Nutri Thera 1 from 3 to 4 credits and decrease the Adv Med Nutri Thera 2 from 4 to 3 credits to fit into the new MS-DI schedule of courses for the program. I have moved course content to reflect this credit change - pediatrics will now be covered in the spring course to correspond to the MS-DI practicum course (requiring pediatrics) in the summer following Adv Med Nutri Thera 1.
Submitter: Wendy Dahl wdahl@ufl.edu
Created: 10/11/2019 6:32:05 PM
Form version: 1

Responses
Current Prefix DIE
Course Level 6
Number 262
Lab Code None
Course Title Adv Med Nutri Thera 2
Effective Term Fall
Effective Year 2020
Requested Action Other (selecting this option opens additional form fields below)
Change Course Prefix? No

Change Course Level? No
Change Course Number? No
Change Lab Code? No
Change Course Title? No
Change Transcript Title? No
Change Credit Hours? Yes
Current Credit Hours 4
Proposed Credit Hours 3
Change Variable Credit? No
Change S/U Only? No
Change Contact Type? No
Change Rotating Topic Designation? No
Change Repeatable Credit? No
Maximum Repeatable Credits 3
Change Course Description? No
Change Prerequisites? No

Change Co-requisites? No

Rationale The director of the Master of Science - Dietetic Internship program, Jeanette Andrade, has requested that I decrease the Adv Med Nutri Thera 2 from 4 to 3 credits and increase the Adv Med Nutri Thera 1 from 3 to 4 credits to fit into the new MS-DI schedule of courses for the program. I have moved course content to reflect this credit change - pediatrics will now be covered in the spring course to correspond to the MS-DI practicum course (requiring pediatrics) in the summer following Adv Med Nutri Thera 1.
COURSE SYLLABUS: DIE6242 (section 2490)
ADVANCED MEDICAL NUTRITION THERAPY 2
Fall 2020 (3 credits)

Instructor: Wendy J. Dahl PhD
Office: Room 207, FSHN Building
Office hours: Tuesdays 3:00 – 5:00 p.m. or by appointment
Phone: 352-294-3707
e-mail: w Dahl@ufl.edu

Class Time: Tuesday 12:50 p.m. – 2:45 p.m.; Thursday 12:50 p.m. – 1:30 p.m.
Class Location: Dietetics Lab – Building 162

Course Description
Opportunity to integrate principles of medical nutrition therapy into clinical practice. Prereq: admission to Master of Science-Dietetic Internship and DIE 6241.

Additional Course Information
Part 2 of a two-semester course designed to provide students enrolled in the Masters/Dietetic Internship Program with the opportunity to use critical thinking skills and integrate the theories and principles of medical nutrition therapy (MNT) into clinical practice. Case studies and an evidence-based medicine approach to practice will facilitate students to integrate and apply their knowledge of nutrition, dietetics, metabolism and physiology, with the ultimate goal of producing students who can effectively plan and manage the nutritional care of a variety of patients. Topics include enteral and parenteral nutrition, cardiovascular, pulmonary, gastrointestinal and liver disease, critical care, HIV/AIDS, and oncology.

Fundamental Concepts
Recommending appropriate medical nutrition therapy requires:
1. Understanding physiology, metabolism and pathology
2. Critical thinking skills
3. Applying evidence-based nutrition principles
4. Knowing where to find information and how to apply information.

Course Objectives
Upon completion of this course, students will:
- apply critical thinking skills
- discuss the theoretical basis for nutrition/medical intervention strategies with the anatomical, physiological and/or biochemical changes that occur in diseases/conditions covered in this course
- prepare to integrate the theories and principles of medical nutrition therapy into clinical practice
- evaluate social, nutritional, medical, laboratory, pharmacologic and other relevant patient data for all assigned case studies and recommend appropriate intervention strategies
- develop and justify appropriate recommendations for the management of patients with diseases/conditions covered in this course
- use medical terminology and appropriate documentation styles to communicate patients’ nutritional status
- use and critique medical/nutrition reference materials and begin to build a professional library
- practice the process of providing nutritional care based on an evidence-based approach
- develop problem-solving skills
- give and receive constructive criticism

Page 56 of 239
Required Resource Materials

- Medical nutrition reference handbook, “black book”. This is a pocket-sized reference for information to be used in clinical practice. It could be a self-made, purchased reference or electronic.
- Extensive outside readings assigned from journals including: JPEN, JAND, AJCN, BJN, etc.

Recommended Resource Materials/Online Access

- Medical dictionary, medical abbreviations, laboratory values, food composition, pharmacology reference

Expectations for Classroom Discussions

This is a graduate course and, therefore, class discussions build on information learned in undergraduate nutrition and disease, physiology, biochemistry, and metabolism. You will be expected to review your undergraduate material and read assigned material before coming to class.

Class Attendance and Demeanor

Students are expected to attend all class sessions, arrive on time and be present for the entire class. An excused absence is at the discretion of the instructor. An excused absence is any unavoidable, unplanned situation such as an illness, death in the family, or car accident. Proof of illness is required (e.g. note from physician or clinic; vague notes such as “was seen” are not acceptable), death (e.g. obituary), accident (e.g. police report), etc. Please notify the instructor about your situation as soon as possible, leaving a message if necessary (by text message, email or voice mail). Students are expected to show courtesy to their classmates, instructors and guest speakers by silencing cell phones before the class begins and refraining from engaging in personal laptop use and conversations during class.

Student Evaluation

Due to the practical nature of the lecture material and the problem-solving skills developed during the classes, material presented during class cannot be replaced with assigned readings. Therefore, class attendance is required. Excused absences are at the discretion of the instructor and must be arranged prior to the start of the class period. An “excused” absence is any unavoidable, unplanned situation such as an illness, death in the family, or car accident. However, to be fair to all students, proof of the illness (note from doctor or clinic), death (obituary), accident (police report), etc. will be required. Please contact me the day of class or as soon as possible to inform me of your situation. Upon returning to class, please present proof of the problem. Each year assignments are returned to students. You may want to keep your work to prepare for clinical rotations or the registration exam. Please do not give these items to future students in this class. Do not review students’ work from previous years. Grades will not be curved.

Students receiving a grade less than a B will not be allowed to advance to the Dietetic Internship.

Distribution of points (Assignments will be posted on Canvas):

Evidenced-based MNT Presentations (3 at 25 points each) 75
Hot Topics in MNT (3 at 5 points)/25-word summaries (2 at 5 points each) 25
Enteral Patient Assessment 25
Diet Counseling Reflection (2 at 25 points each) 5
Worksheets (3 at 25 points each) 7 5
Professional Writing 50
Formulary Debate 50
Formulary Summaries and Conclusion 50
Total 400
Grading Scale

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Grades and Grade Points
For information on current UF policies for assigning grade points, see https://catalog.ufl.edu/grad/current/regulations/info/grades.aspx

Attendance and Make-Up Work
Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at https://catalog.ufl.edu/grad/current/regulations/info/attendance.aspx.

Online Course Evaluation Process
Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online at https://evaluations.ufl.edu. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results.

Academic Honesty
As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity. You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: http://www.dso.ufl.edu/sec/process/student-conduct-honor-code.

Software Use
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.
Services for Students with Disabilities
The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation 0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/

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
  Counseling Services
  Groups and Workshops
  Outreach and Consultation
  Self-Help Library
  Wellness Coaching

- U Matter We Care, www.umatter.ufl.edu/
- Career Connections Center, First Floor JWRU, 392-1601, https://career.ufl.edu/

Student Complaints
Residential Course: https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/
Online Course: http://www.distance.ufl.edu/student-complaint-process
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*Subject to change EBN: Evidence-based nutrition
### Cover Sheet: Request 14352

#### Change course title

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Page 61 of 239
Course|Modify for request 14352

Info
Request: Change course title
Description of request: Change title of WIS 6559 from Contemporary Issues in Animal Protection and Conservation to Forensic Science in Conservation Biology
Submitter: Jason Byrd jhbyrd@ufl.edu
Created: 8/20/2018 7:55:27 PM
Form version: 1

Responses
Current Prefix WIS
Course Level 6
Number 559
Lab Code None
Course Title Contemporary Issues in Wildlife Protection and Conservation
Effective Term Earliest Available
Effective Year Earliest Available
Requested Action Other (selecting this option opens additional form fields below)
Change Course Prefix? No

Change Course Level? No

Change Course Number? No

Change Lab Code? No

Change Course Title? Yes
Current Course Title Contemporary Issues in Wildlife Protection and Conservation
Proposed Course Title Forensic Science for Conservation Biology
Change Transcript Title? Yes
Current Transcript Title Issues Wildlife Prot
Proposed Transcript Title (21 char. max) For Sci Conserv Bio
Change Credit Hours? No

Change Variable Credit? No

Change S/U Only? No

Change Contact Type? No

Change Rotating Topic Designation? No

Change Repeatable Credit? No

Maximum Repeatable Credits 0
Change Course Description? Yes
Current Course Description At the successful completion of this course, students will have an understanding of wildlife ecology, biodiversity, current environmental and wildlife concerns, and wildlife and environmental forensics, as well as an overview of some wildlife forensic techniques. The student will have learned some of the various considerations in wildlife management and population assessments, in addition to how to evaluate animal populations for decreases, altered structure, or
changing adaptations. The student will be familiar with the current trends in wildlife and ecology threats, including poaching, trade, and harvesting, as well as some investigative tools such as soil and isotopic analysis, chemical fingerprinting, and microscopy, that can be used to combat these issues.

Proposed Course Description (50 words max) This course will demonstrate the relationship between the forensic sciences and conservation biology and how the many different forensic disciplines can be applied to ecological and conservation-based issues. Students will gain an understanding of wildlife ecology, biodiversity, current environmental and wildlife concerns, and environmental forensics.

Change Prerequisites? No

Change Co-requisites? No

Rationale The title change adds "Forensic Science" to the course title to provide a better content description to the students.
Forensic Science in Conservation Biology (name change from Contemporary Issues in Animal Protection and Conservation)
WIS 6559

Office hours: (remote via Canvas Chat): Please contact the instructor via email with any concerns, general issues or to schedule a phone or online chat appointment if necessary. Responses will be provided within 24-48 hours.

Email: sunderkoffler@ufl.edu

Phone: 352-294-4091

Website: https://masters.wildlife.forensics.med.ufl.edu/

Text: There are NO required texts for this course. Readings from relevant literature will be provided on the course website.

Suggested Texts:
Texts frequently used throughout the course instruction are listed below, but the list may change as updates become available; students will be notified of any major changes at the beginning of the semester:
Cooper, John E. and Margaret E. Cooper, 2013. Wildlife Forensic Investigation: Principles & Practice; CRC Press, Boca Raton, Florida, USA.
Morrison, Robert D. and Brian L. Murphy, 2006 Environmental Forensics: Contaminant Specific Guide. Elsevier Ltd., Oxford, UK.

Course Description:
This course will demonstrate the relationship between the forensic sciences and conservation biology and how the many different forensic disciplines can be applied to ecological and conservation-based issues. Students will gain an understanding of wildlife ecology, biodiversity, current environmental and wildlife concerns, and environmental forensics.

Primary Course Objectives:
Upon successful completion of the course, students will be able to:

1. Inspect and compare the interrelationship of conservation and forensic science, how forensics can be used in conjunction with conservation theories and principles, and how forensic disciplines can assist with ecological and environmental problems.

2. Analyze and discuss conservation biology fundamental principles and topics.

3. Appraise and debate the ethical considerations inherent in both conservation work and the forensic sciences and the problems that can arise when ethical principles are not applied.

4. Examine and critique major threats to biodiversity, both natural/environmental and human-induced, some of their origins and causes, and their effects on wildlife populations and ecosystems as a whole.

5. Evaluate and interpret key forensic techniques and disciplines for their ability to effectively combat biodiversity threats, as well as evolving environmental and conservation issues.

Topics:

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<td>1 - Course Introduction / Conservation Biology &amp; Biodiversity</td>
<td>Course Introduction Introduction to wildlife and environmental forensics and their intersections with conservation biology Definitions and Explanations: - Conservation Biology - Ecosystems - Biomes - Biodiversity</td>
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Discussion Question 1
| **3 – Biodiversity Threats: Part I** | **Ethical Essay** | Wildlife and environmental concerns/threats:  
- Extinction  
- Habitat destruction  

Forensic science considerations and applications:  
- Environmental forensics introduction  
- Information and intelligence gathering  
  - Historical Research  
  - Photogrammetry/Photointerpretation |

**Discussion Question 2**  
**Quiz 1** |

| **4 – Biodiversity Threats: Part II** | Wildlife and environmental concerns/threats:  
- Habitat and wildlife destruction continued  
- Habitat and wildlife overexploitation  

Forensic science considerations and applications:  
- Fingerprinting for environmental contaminants  
- Microscopy |

**Discussion Question 3** |

| **5 – Biodiversity Threats: Part III** | Environmental concerns/threats:  
- Climate change  
- Fossil fuel extraction/creation/use and resulting environmental impacts  

Forensic science considerations and applications:  
- Hydraulic Fracturing  
- Underground Storage Tanks  
- Subsurface Contaminants |

**Discussion Question 4**  
**Quiz 2** |

| **MIDTERM EXAM (Summer Break Week)** | Midterm Exam |

| **6 – Biodiversity Threats: Part IV** | Wildlife and environmental concerns/threats:  
- Exotic Pet Trade  
- Poaching  
- Invasive/non-native/exotic species |
<table>
<thead>
<tr>
<th>Section</th>
<th>Forensic Science Considerations and Applications</th>
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</thead>
</table>
| 7 - Populations | Population Ecology and Biology  
- Small Populations  
- Counting Animals  
Forensic science considerations:  
- Using drones in conservation and forensics  
- Environmental DNA |

**Discussion Question 6**

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| 8 - Community Ecology Part I | Community Relationships and Considerations  
- Animals as Individuals  
- Ecological Succession  
- Communities  
- Competitions  
- Symbiosis  
Forensic science considerations and applications:  
- Soil Forensics  
- Artificial Intelligence |

**Discussion Question 7**

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| 9 - Community Ecology Part II | Community Functionality and Concerns  
- Species Interactions  
- Trophic Structure  
- Food & Nutrition  
Forensic science considerations and applications:  
- Stable Isotopes  
- Radioisotopes |

**Discussion Question 8**

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| 10 - Restoration Considerations | Restoration Ecology  
- Establishing New Populations  
- Establishment & Management of Protected Areas  
- Designing Protected Areas  
- Outside Protected Areas |
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<tr>
<th>Course Wrap-up &amp; FINAL EXAM</th>
<th>Final Exam</th>
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</table>

Grading:

**Exams**: two (midterm and final)
The exams MAY each consist of 20 multiple choice questions worth 2 points each and two short essay questions worth 5 points each OR 25 multiple choice questions worth 2 points each for a total of 50 points per exam. Exam structure and point value is subject to change. The exams will open on a Monday morning (EST) and be due by 11:59 PM EST the following Sunday. The exams will be open book and the students may use the readings and their notes from the lectures.

**Quizzes**: There will be four quizzes throughout the semester. These are open-note/book, consisting of 10 multiple choice questions worth 2 points each for a total of 20 points per quiz. The quizzes will open on a Monday morning (EST) and be due by 11:59 PM EST the following Sunday.

**Weekly Discussion Questions/Essays**: There will either be a discussion question or a short essay assigned for each module. Point values will vary. Discussion questions/essay assignments will open on a Monday morning (EST) and be due by 11:59 PM EST the following Sunday. The discussions will remain open for the duration of the semester, but **you must post at least one response to the question and one response to another student’s answer by the following Sunday to receive credit**. Extra credit may be given for thought-provoking, on-going discussions. Each essay will have an accompanying rubric explaining the breakdown of how points are to be distributed.

**Grading Breakdown**:

- Midterm Exam: 50 points (18%)
- Final Exam: 50 points (18%)
- Quizzes (4): 20 points each = 80 points (29%)
- Discussion Questions (9): All worth 5 points each EXCEPT Discussion Question 9, which is worth 10 points. Total Discussion Board points = 50 (18%)
- Essays (2): Essay 1: 20 points; Essay 2: 30 points = 50 points (18%)

<table>
<thead>
<tr>
<th>Conservation Issue</th>
<th>Discussion of a current issue impacting conservation, ecosystem or wildlife management. Possible guest lecture.</th>
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<td>11 - Current Issue</td>
<td>Conservation Issue Comprehensive Essay Quiz 4</td>
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- Wildlife Harvesting
  - Trophy Hunting/Canned Hunting
  - Bush Meat
Total Course Points: (280)/100%

**Evaluation of Grades**

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<th>Points Each</th>
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<tr>
<td>Quizzes (4)</td>
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<td>Discussion Questions (8)</td>
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**Grading Policy**

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<td>86.6-83.4</td>
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<td>3.00</td>
<td>242.4-233.5</td>
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<td>83.3-80.0</td>
<td>B-</td>
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<td>233.2-224</td>
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<tr>
<td>79.9-76.7</td>
<td>C+</td>
<td>2.33</td>
<td>223.7-214.7</td>
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<tr>
<td>76.6-73.4</td>
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<td>2.00</td>
<td>214.4-205.5</td>
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<tr>
<td>73.3-70.0</td>
<td>C-</td>
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<td>205.2-196</td>
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<td>D+</td>
<td>1.33</td>
<td>195.7-186.7</td>
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<td>66.6-63.4</td>
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<td>0 - 59.9</td>
<td>E</td>
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There will be no curve.

**Attendance, Make-Up Work, and Late Policy:**

**Attendance:**
This is an online course. As such “attendance” is not required. However, students are expected to keep pace with the course as modules open and close weekly. Participation in the course discussion forum is required.

**Make-up and Late Policy:**
In general, credit will not be granted for late discussion board posts unless the student has communicated with the instructor in advance. Extensions are not guaranteed—it is important to communicate any anticipated late work submissions with the instructor.

Make up assignments are not given without prior permission by the instructor.

**MAKE-UP EXAMINATIONS WILL NOT BE GIVEN UNLESS ARRANGEMENTS ARE MADE PRIOR TO THE EXAM DATE. IN THE EVENT OF AN EMERGENCY AND YOU ARE UNABLE TO TAKE THE EXAM WITHIN THE DATES IT IS AVAILABLE TO THE CLASS, A DOCTOR’S NOTE MUST BE PROVIDED IN ORDER TO BE ABLE TO RETAKE THE EXAM AND THE EXAM QUESTIONS AND FORMAT MAY BE DIFFERENT.**

**ASSIGNMENTS SUBMITTED LATE (WITHOUT A DOCTOR’S NOTE OR SIMILAR EXCUSE) WILL BE SUBJECT TO POINT REDUCTIONS OR COMPLETE LOSS OF CREDIT.**

**Late Assignments:** The essay assignments will receive a 10%-point deduction for each day past the due date. Discussion Board assignments completed after the due date will receive zero points. Quizzes/Exams/module assessments will receive a zero if submitted after the closing deadline (the final exam must be submitted before final semester grades are due, otherwise it will be graded as a zero). If a student needs additional time to complete an assignment, he/she must email the professor at least 24 hours prior to the deadline to request a reasonable extension. Extensions may be granted on a case by case basis, however, they are not guaranteed.

**Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at:**
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

**Grade Changes:**
Grades will be changed only when a grading error has been made. If you think an error has been made, you should email the instructor or TA as soon as possible. Your entire assignment will then be re-graded.

**Required Equipment:**
Computer with reliable, high speed internet access; your preferred web browser; video player with ability to play MP4 videos; speakers and/or headphones and working sound; PDF reader.
For more information on hardware and software necessary to run Canvas, visit https://community.canvaslms.com/docs/DOC-2059. Canvas offers mobile applications for both Apple and Android products. These apps may be downloaded in the respective app stores. Depending on the device and your equipment, not all Canvas features may be available on the app at this time. For more information on Canvas apps, visit https://community.canvaslms.com/docs/DOC-1542
Getting Started:
To get started, briefy introduce yourself via the discussion board located in the left-hand menu on the homepage of the course. Once you have responded to the Introduction you will then go to the first module. Read through the course content and any required reading listed in the module introduction. Do not hesitate to contact your instructor at any time if you need guidance; if you are unsure about the focus of the assignment; if you have assignment questions or questions relating to the course content. If you don’t tell us you need help, we can’t help you!

Revision and Notes:
As you go through the semester, keep copies of important emails, bulletins and assignments you may use for revision as these will be purged from the course at the end of the semester. We recommend you make a copy of the course modules since this will be the only access you will get to these materials. We will not be able to provide you with copies of course content once the course is removed from your account.

Course Assignments:
All written assignments must be completed in your own words. Cutting and pasting from the internet or class notes is not acceptable and may be considered to be plagiarism. Failure to complete an assignment in your own words may result in you receiving a score of zero for the written assignment. When sending course assignments, include your name and please make sure your assignments are labeled clearly. Always keep a copy of your course assignments in case you need to resend it. Also, you may want it for revision purposes later.

Assignment Deadlines:
Please review the information regarding our policy for missed deadlines in the section on Instructional Policies. In some courses content modules may be released before the scheduled calendar date to help those who need to work ahead because of scheduling discrepancies. If a module is released ahead of time, the deadline for the assignment and exam will remain the same as it is on the course calendar. Most modules will be released one per week on a Monday morning EST.

Communication:

Student Expectations
You are expected to contribute regularly to discussion board topics. In some cases, a topic question may be part of an assignment, or contain a specific issue to discuss. You are encouraged to start your own threads, as well as read and respond to others. If you have input, then post it! Do not feel you must wait for me to “answer” a question if you can contribute something. I may contribute to the discussions as needed but have designed the discussion boards with a collaborative feel in mind.
If you wish to discuss a matter privately with me, you may do so via email or arrange a time to speak on the phone. If you have course or content questions, please review the discussion board and announcements prior to emailing questions to me. In many cases, the question may have already been covered.
Email/Online Etiquette:
Please use discretion and professional correspondence when emailing your professor by including an appropriate greeting (using Dr./ Mr./Mrs. before instructor’s last name), a clear explanation for your reason for writing (using complete sentences, correct grammar/spelling, etc.) and a closing that includes your name. When contributing to online discussions and forums, be respectful of your instructor/classmates by using professional, cordial, and thoughtful language and wording. Correspondence that is deemed as unprofessional, inappropriate, hostile, or inflammatory will be brought before the department Professional Conduct Board.
Course Email, not the discussion board, should always be used contact the faculty or staff if you have a problem of a personal nature. If you are having technical problems with the course content (downloads, etc.) or you are unable to access your course interface, please contact us directly, and please don’t spend hours trying to get something to work as this will only lead to frustration. We don’t want any of you to be offline for any length of time. Contact us as soon as you can so we can check it out and help you. If you are experiencing difficulty with your access to course email, then please email your course instructor directly via regular email. In that email, make sure you give your name and the name of your course. Please respond to all emails from your instructor or TA. When we email you, we are usually contacting you because we want to help you. If you have a question about your grade, an exam, or assignment question, please email us and we will be happy to help you.

Instructor Expectations
Please email me with questions (after first checking the discussion board and announcements) or with matters you wish to keep confidential. I will make every attempt to respond to emails within 24 hours, so please keep this in mind as due dates approach. Feedback and grading is assignment-dependent and will be stated as assignments are due. Quiz/exam content questions must be submitted before the start of the quiz/exam; I cannot respond to content questions once the exam period has begun.

Instructional Policy:
This course is part of the distance education program at the University of Florida. Instead of traditional lecture format, the medium for communication between course instructors, teaching assistants and students will be via Canvas, a user-friendly Web-based classroom management tool, and the World Wide Web.

Attendance: Students must participate in the discussion board and are required to visit the course website daily for important updates and bulletins.

Class Participation: Students are expected to constructively join in discussion boards, with appropriate preparation, to post interesting and relevant information and articles on the class bulletin board, and to interact professionally with their classmates.

Performance Expectations: Students are expected to produce quality work of a standard comparable to any graduate level didactic course. Discussion postings must be legible, constructive and appropriate. Students are required to think for themselves and will be expected to complete assignments that require the application of logic and reasoning skills when the answer may not be found in a book or the course notes.
**Academic Honesty:** All students are expected to abide by the student honor code. To review the student honor code read the information on standards of ethical Conduct at: http://www.dso.ufl.edu/judicial/honorcodes/honorcode.php

**Plagiarism:** Plagiarism includes any attempt to take credit for another person’s work. This includes quoting directly from a book or web site, without crediting the source. Sources should always be referenced, a link to the website added, or quotation marks placed around the material. However, we expect more than simply cutting and pasting in this graduate level course. Students are expected to review, evaluate and comment on material they research, rather than simply copying relevant material. Your work will be graded accordingly.

**Incomplete grades:** Under special circumstances, if a student is unable to finish a course before the end of the semester we may be able to assign an incomplete grade. An incomplete grade is a non-punitive grade assigned at the discretion of the course instructor. In this course an incomplete grade may be assigned if 1/3rd or more of the course assignments have been completed and if the student has remained in communication with TA’s and instructors throughout the course or has made an effort to request an incomplete grade. If an incomplete grade is assigned, outstanding assignments must be completed by the end of the next semester or by a due date agreed upon by the student and instructor in writing. If the assignments are not completed in this time you will be assigned a grade based on the completed assignments.

**Drop Dates:** consult the UF Calendar of Critical Dates at http://www.forensicscience.ufl.edu/Students/Dates.asp
Students must inform us that they are withdrawing from a course to ensure appropriate tuition reimbursement. Deleting yourself from the course roster does not officially withdraw you from a course.

**Important Dates:**
For Assignment deadlines - see the course Calendar in WebCT. 
For other important dates, consult the UF Calendar of Critical Dates and http://www.registrar.ufl.edu/

Additional information on the University of Florida Grades and Grading Policies may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

“Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting the accommodation”
University's Honesty Policy (cheating and use of copyrighted materials)
Academic Integrity - Students are expected to act in accordance with the University of Florida policy on academic integrity (see Student Conduct Code, the Graduate Student Handbook or this web site for more details: www.dso.ufl.edu/judicial/procedures/academicguide.php).

Cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior.

_We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity._

Accommodations for Students with Disabilities
The College and the course instructor are committed to providing reasonable accommodations to assist students’ coursework. To obtain academic accommodations, first register with the Dean of Students’ Office. The Dean of Students’ Office will provide documentation to be given to the course instructor at the time you request the accommodation.

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter, which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Online Course Evaluations
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

Counseling and Student Health
Health and Wellness

U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit umatter.ufl.edu/ to refer or report a concern and a team member will reach out to the student in distress. Counseling and

Wellness Center: Visit counseling.ufl.edu/ or call 352-392-1575 for information on crisis services as well as non-crisis services. Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit shcc.ufl.edu/.
University Police Department: Visit police.ufl.edu or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; ufhealth.org/emergency-room-trauma-center.
Cover Sheet: Request 14356

Antimicrobial Resistance Laboratory Course - Approval Request

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<thead>
<tr>
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<tbody>
<tr>
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<tr>
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<td>Submitter</td>
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<td>I am in the process of developing a new laboratory course on Antimicrobial Resistance that will be taught to upper-level undergraduate students. The course will concentrate on experimental techniques utilized in the study of antibiotic efficacy, mechanisms of resistance, transmission, surveillance, and development of novel antibiotics. In this course, students will be able to learn theoretical and practical applications and will develop essential data collection, analysis, and presentation skills which will help them gain essential experience and background knowledge necessary to excel in their future studies and careers. This course teaches students one fo the most urgent global problem that now affects not only healthcare and agriculture but also the environment. Please consider this course for formal approval.</td>
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Course|New for request 14356

Info

Request: Antimicrobial Resistance Laboratory Course - Approval Request
Description of request: I am in the process of developing a new laboratory course on Antimicrobial Resistance that will be taught to upper-level undergraduate students. The course will concentrate on experimental techniques utilized in the study of antibiotic efficacy, mechanisms of resistance, transmission, surveillance, and development of novel antibiotics. In this course, students will be able to learn theoretical and practical applications and will develop essential data collection, analysis, and presentation skills which will help them gain essential experience and background knowledge necessary to excel in their future studies and careers. This course teaches students one of the most urgent global problem that now affects not only healthcare and agriculture but also the environment. Please consider this course for formal approval.
Submitter: Daniel Czyz dczyz@ufl.edu
Created: 10/17/2019 12:52:40 PM
Form version: 1

Responses
Recommended Prefix MCB
Course Level 4
Course Number XXX
Category of Instruction Advanced
Lab Code L
Course Title Antimicrobial Resistance (AMR)
Transcript Title AMR_L
Degree Type Baccalaureate

Delivery Method(s) On-Campus
Co-Listing No

Effective Term Fall
Effective Year 2020
Rotating Topic? No
Repeatable Credit? No

Amount of Credit 1

S/U Only? No
Contact Type Regularly Scheduled
Weekly Contact Hours 6

Course Description This laboratory course covers content related to antimicrobial resistance: the origins of antimicrobial resistance, surveillance, dissemination, mechanisms, therapeutics, and impact on healthcare, agriculture, and the environment.
Prerequisites MCB3020 and MCB3020L or MCB3023 and MCB3023L and MCBXXX (AMR Lecture)
Co-requisites N/A

Rationale and Placement in Curriculum Antibiotic resistance is a growing problem on a global scale. It is estimated that by 2050 annual deaths from antibiotic resistance will increase by 10 fold, reaching 10 million. One of the major contributors to this problem is the lack of awareness and education. This year (Spring 2019) I started teaching a new course on AMR to upper-level undergraduate and graduate students. The enthusiasm received from students was really high. Students' interest is also seen in the enrolment (Spring 2019: 83 students; Fall 2020: 106 students). This laboratory course supplements and extends the material covered in the lecture section. Additionally, many students in the lecture section inquired about a laboratory component. Finally, the topics and the related experiments addressed in this course prepare students for their future health-related careers and stimulate their interest in this important subject.

Course Objectives - Outline problems associated with antimicrobial resistance across healthcare, agriculture, and the environment
- Describe known mechanisms of antibiotic resistance and modes of transmission
- Identify major classes of antibiotics and their respective mechanisms of action
- Recognize scientific terms related to antimicrobial resistance
- Identify means of detection/assessment of antibiotic resistance
- Describe therapeutic approaches used to fight antibiotic resistance
- Employ various microbiology methods to assess the efficacy of antibiotics
- Generate professional laboratory reports
- Manage and analyze a large amount of genomic data
- Translate laboratory results into clinical applications
- Employ online databases to utilize genomic, chemical, and epidemiological data on AMR

Course Textbook(s) and/or Other Assigned Reading

Assigned Reading

1. Laboratory Safety & Introduction to AMR: The challenge of antimicrobial resistance. Roope et al. 2019
2. One Health Approach: Report to the Secretary-General of the United Nations. IACG. 2019
7. Transmission of resistance: Mobile Genetic Elements Associated with AMR. Partridge et al. 2018
8. Transmission of resistance: Mobile Genetic Elements Associated with AMR. Partridge et al. 2018
10. Surveillance: Global trends in AMR in animals in L and M-income countries. Van Boeckel et al. 2019
12. Surveillance: Reducing antimicrobial use in food animals. Van Boeckel et al. 2017
13. Surveillance: Emergence of plasmid-mediated colistin resistance mechanism. Liu et al. 2015
15. Novel antimicrobial compounds: A new antibiotic kills pathogens without detectable resistance. Ling et al. 2015
16. Novel antimicrobial compounds: No assigned reading

Weekly Schedule of Topics

1. Why PPEs? What's One Health? Laboratory Safety & Introduction to AMR in Healthcare, Agriculture, and the Environment
2. What's the point of doing all of this? Mandatory Field Trip: UF Dairy Farm, UF Shands Hospital, UF Water Treatment Plant
3. Will this antibiotic work? Antibiotic susceptibility testing by Kirby-Bauer disk diffusion and dilution methods, part 1
4. Will this antibiotic work? Antibiotic susceptibility testing by Kirby-Bauer disk diffusion and dilution methods, part 2
5. Why is this antibiotic not working? Beta-lactamase-dependent mechanism of resistance testing by Modified Hodge Test, part 1
6. Why is this antibiotic not working? Beta-lactamase-dependent mechanism of resistance testing by Modified Hodge Test, part 2
7. Where does antibiotic resistance come from? Transmission of antibiotic resistance by horizontal gene transfer, part 1
8. Where does antibiotic resistance come from? Transmission of antibiotic resistance by horizontal gene transfer, part 2
11. Where is the resistance? Antibiotic resistance gene surveillance: identification of AMR genes on paper money, part 3: DNA extraction, barcoding
13. Where is the resistance? Antibiotic resistance gene surveillance: identification of AMR genes on paper money, part 5: Data analysis
15. Are there novel antibiotics? Screening soil bacteria for novel antimicrobial compounds, part 2: screening isolates for antimicrobial activity
16. Are there novel antibiotics? Screening soil bacteria for novel antimicrobial compounds, part 3: data analysis

**Grading Scheme**  
Lab Reports (4) 600 60  
Midterm Exam 100 10  
Final Exam 200 20  
Quiz (4) 100 10  
Total 1000

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Instructor(s) Dr. Daniel M. Czyz  
Attendance & Make-up Yes  
Accomodations Yes  
UF Grading Policies for assigning Grade Points Yes  
Course Evaluation Policy Yes
MCBXXXXX Antimicrobial Resistance Laboratory  1 credit

Course Description

**UF Catalog:** This course-based undergraduate research experience (CURE)-like laboratory covers content related to antimicrobial resistance: the origins of antimicrobial resistance, surveillance, dissemination, mechanisms, therapeutics, and impact on healthcare, agriculture, and the environment.

**Course Importance:** Cells are living factories that are capable of adapting their production line to any changes in the environment. Hence, cells encountering a toxic environment will evolve their machinery to maintain survival and replication. Such adaptation, called Antimicrobial Resistance, is commonly observed across bacteria, viruses, parasites, and fungi. However, only recently the overuse of antimicrobial agents created a high selection pressure to drive a wide-spread of resistance. While we are currently witnessing a constant increase of antimicrobial resistance, the development of novel treatments has almost completely ceased. This course will provide an extensive background on antimicrobial resistance, surveillance, treatment, and mechanisms of resistance. Finally, this course is designed to engage students in experiments that can potentially lead to publishable results.

**Time and Location**
Time (tentative): Tuesdays and Thursdays 5:00 – 8:00 PM; Location: TBD

**Field Trip:**
There will be a field trip to the UF Dairy Farm and/or Shands Hospital and/or the UF water treatment plant. The students' participation is mandatory: no points are given for attendance, but 25 points will be deducted for absence. The purpose of the field trip is to better understand the importance of AMR in daily activities that relate to health, food, and natural resources. Transportation will be arranged by the professor.

**Instructor**

Dr. Daniel Czyz (chys)
Department of Microbiology and Cell Science
1355 Museum Drive
Office: Room 1004, Building 981
Phone: 352-392-0237
Email: dczyz@ufl.edu
Twitter: @360Science
Slack: AMR-UF, the app can be downloaded on a desktop, Android, or iOS

**Office hours:** TBD
To request an office hours appointment, send an e-mail directly to the instructor with three suggested dates/times.
You embrace education; devote your time to pursue your goals, strive for success, and do your best, but sometimes you are just hitting obstacles that prevent you from moving forward. That’s when you wish you would have a good mentor. I’ve helped people who hit obstacles get right back on track, but more importantly, I help my mentees and students avoid hitting obstacles in the first place. I always make sure I am available for my students and my colleagues, whether it’s in a classroom or in a laboratory setting. As a scientist, I put a lot of time and emphasis on my trainees providing them with the right personalized support plan to guide them towards their short and long-term goals, as their success is my success. As an educator, my primary objectives are to retain students’ attention, promote creativity and teamwork, and encourage out-of-classroom learning.

I find science to be the most fascinating and exciting subject to teach, mostly because it is never fully explored and with the ongoing new discoveries, teaching becomes learning. Science can be found in our everyday life and I believe that relating new information to practical application in daily lives focuses students’ attention and enhances learning. For that reason, I link my lecture material to everyday applications as much as possible.

I encourage and expect students to employ out-of-textbooks material, including public databases, online tools, and primary literature. While independent projects are important, in science, single-person projects are nearly nonexistent. I strongly believe that assigning students to group projects strengthens their team-building core, helps to develop essential communication skills, and exposes students to conflicts and teaches them how to deal with them. Most importantly, an assignment might seem difficult to an individual student, but becomes trivial when done as a team.

Finally, I put emphasis on mentorship and participation in extracurricular activities. My students are expected to mentor each other, because it will help them develop essential skills in their future careers. It’s never too early to become a mentor. Finally, I truly believe that building a career is not solely attained during classroom education. Participation in community outreach events, conferences, seminars, and symposia is just as important as classroom-based learning. These extracurricular activities build leadership and improve communication skills and I strongly encourage my students to participate in such activities.

Course Level & Prerequisites
The course requires students to have the following prerequisites: MCBXXX (AMR Lecture) and MCB3020/MCB3020L, or MCB3023/MCB3023L. Important concepts will be briefly reviewed to provide students with a better understanding of the subject.

Course Objectives
After completion of this course, students should be able to:

- Outline problems associated with antimicrobial resistance across healthcare, agriculture, and the environment
- Describe known mechanisms of antibiotic resistance and modes of transmission
- Identify major classes of antibiotics and their respective mechanisms of action
- Recognize scientific terms related to antimicrobial resistance
- Identify means of detection/assessment of antibiotic resistance
- Describe therapeutic approaches used to fight antibiotic resistance
- Employ various microbiology methods to assess the efficacy of antibiotics
- Generate professional laboratory reports
- Manage and analyze a large amount of genomic data
- Translate laboratory results into clinical applications
- Employ online databases to utilize genomic, chemical, and epidemiological data on AMR

**Learning Assessment**

Grades are used to assess your learning progress. The vast extent of the information covered by this course should not discourage students. This course is designed to teach you and not fail you. If you encounter any learning difficulties that will affect your grades/learning progress, contact the professor as soon as possible.

**GRADING SCALE (total: 1000 pts)**

**Lab Reports (600 pts):**

There will be 4 written laboratory reporters, each worth 150 points. The reports constitute the majority of the grade. The purpose of these reports is to assess your understanding of the course concept and the respective experiments, but also to teach you how to generate professional laboratory reports, how to handle, organize, and present data. All laboratory reports have to be submitted in **EXACTLY** the format that the professor will provide prior to the first assignment. All reports must be turned in on time; see Course Calendar for more details. Unless there is a valid written excuse, **NO LATE REPORTS** will be accepted. The professor will provide laboratory notebooks to each student. Students are required to take all experimental notes in these notebooks and generate their reports based on their notes.

**EXAMS (300 pts):**

There will be two exams that will assess students’ understanding of the course material. Both exams will be given in-class as a paper copy. Students caught cheating will receive an automatic zero. Please see the "**Additional Comments Regarding Academic Integrity**" section for more information.

Midterm Exam, covers labs 1-8. (100 pts)
Final Exam, covers labs 1-16 (200 pts)

**QUIZZES (100 pts):**

There will be 4 quizzes (25 points each, 100 points total). Quizzes will cover laboratory safety, background knowledge on the material covered in class, understanding of the experimental procedures, and any material assigned by the professor. There will be one Extra Credit Quiz during the first week. This will be an introductory quiz that will cover students’ understanding of the syllabus and course requirements.

**ATTENDANCE:**

Attendance in all laboratory sessions is **MANDATORY**. No points are given for attendance, but 25 points will be deducted for a missed class. Additionally, there will be no make-up for missed experiments. Missed experiments will significantly affect laboratory report grade(s).
EXTRA CREDIT:
The professor may offer an extra credit written assignment.

For additional information on Grading Policies please visit https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

Laboratory Safety
Students with diagnosed medical conditions that are known to affect the immune system must contact the professor prior to registering for this course.

Microbiology & Cell Science teaching labs are approved by the Institutional Biosafety Committee for Biological Safety Level-2 work. Each student MUST complete proper Biological Safety Training prior to the first meeting and must obey the following rules when working in the laboratory:

Training:
UF_EHS850G_OLT: Bloodborne Pathogen and Biomedical Waste Training (General Audience)
UF_EHS862_OLT: Lab Safety Actions & Reactions
UF_EHS851_OLT: Biomedical Waste Training
UF_EHS809_OLT: Hazardous Waste Management

Rules:
1. No cell phone usage, eating, drinking, or applying cosmetics in the laboratory DESK area. Anyone breaking this rule will be dropped from the course and receive an automatic "incomplete".
2. All cell phones, backpacks, and purses must be placed in a clean designated area away from students’ bench.
3. Hands need to be washed when entering and leaving the lab.
4. Students must read and understand the Agent Profile Form for each pathogen(s) – provided by the professor.
5. Students must be familiar with the location of biological and chemical spill kits, emergency showers, eye-wash stations, and fire extinguishers.
6. When working with biological agents:
   a. Proper Personal Protective Equipment must be worn when biological agents are being handled in the lab.
   b. All BSL2 agents should be handled in a Class II Biological Safety Cabinet. The area should be disinfected with a proper disinfecting agent.
   c. Prior to and after work, decontaminate the work area with 70% ethanol.
   d. If the agent is resistant to ethanol, use bleach (10% of commercially available bleach) and follow with 70% ethanol wipe down.
   e. If a laboratory procedure requires gloves, use the One Glove Rule to mitigate contamination of common equipment.
7. Report any spills, drips, splatters, or any potential contamination of the laboratory area to the professor immediately. Follow proper clean-up procedures.
8. Solid infectious waste generated in BSCs must be kept inside in a leak-proof container lined with a red autoclave bag and stored covered until it is inactivated.
9. Liquid infectious waste must be treated in a BSC for 30 minutes with bleach added to a final concentration of 10% (5000 ppm hypochlorite) before disposal via the lab sink drain.
10. All reusable materials and labware used inside BSCs should be surface disinfected with a suitable disinfectant allowing for appropriate contact time before removal.

11. Don't rush! Safety first!

12. If in doubt, ask the professor.

Attendance and Make-Up Work
Attendance in all laboratory sessions is MANDATORY and there will be no make-up of missed experiments. The requirements for class attendance and make-up exams, assignments and other work are consistent with university policies and can be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Excused absence
Documentation MUST be provided for missed assignments (quizzes, exams, labs & reports) caused by serious illness, accident, jury duty, or death in the immediate family. If the circumstances allow, you must contact the instructor IN ADVANCE of the missed assignment to arrange for an alternative time to make up any missed work.

Website
Course material can be accessed through Canvas.
https://ufl.instructure.com/

Technical issues related to the course can be addressed to UF helpdesk
http://helpdesk.ufl.edu, 352-393-4357, helpdesk@ufl.edu

Communication
For questions and issues on assignments and class organization please check the syllabus first, the announcements, calendar, and the Course Handout. To seek further help, please communicate with the instructor via Slack or email. For questions regarding class and class content use the Canvas Discussion Board.

Discussion Board: Available through Canvas. Postings and answers are monitored by the instructor
Slack: AMR-UF, the app can be downloaded on a desktop, Android, or iOS
Twitter: Follow and share science news related to the course using #AMR_UF

IMPORTANT: Various material covered in this course (including PowerPoint slides) will be available through Canvas. Prior to the first lecture, please familiarize yourself with netiquette (cyber behavior guidelines). See below “Netiquette guide for online courses”.

Course Material
Required material: There is no textbook for this course. This course is based on peer-reviewed publications that will be provided by the instructor. The required reading material will be posted under "Assignments" in Canvas. Questions related to information from the required reading/video material will appear on quizzes and exams. Please refer to the “Assignment” section at the end of the syllabus for a list of Assigned Reading.
MCBXXXX syllabus

**Recommended reading and other material:** Additional reading material, links to videos, and other online resources will be posted under "Files" in Canvas.

**Services for Students with Disabilities**
Students with disabilities requesting accommodations should first register with the Disability Resource Center (0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter that must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

**Campus Resources**
Resources are available on campus for students having personal problems or lacking clear career and academic goals, which interfere with their academic performance. These resources include:

**Health & Wellness**
- **U Matter, We Care:** If you or a friend is in distress, please contact umatter@ufl.edu or tel. 352-392-1575 so that a team member can reach out to the student. http://www.umatter.ufl.edu/
- **Counseling and Wellness Center:** Provides counseling services to students, tel. 352-392-1575. https://counseling.ufl.edu/
- **Sexual Assault Recovery Services (SARS):** Provides services related to sexual violence. Tel. 352-392-5648. http://www.umatter.ufl.edu/sexual_violence
- **Student Health Care Center:** Student health-related services. Tel. 352-392-1161. https://shcc.ufl.edu/
- **Gator Career Closet:** Serves as a lending closet for students to borrow professional clothing and accessories free of charge. This service is available to all UF students with a valid UF ID. Tel. 352-392-1601. https://career.ufl.edu/careercloset/
- **Food Pantry:** Offers non-perishable food, toiletries, and fresh vegetables. This service is provided to current students, staff, and faculty at the University of Florida. Gator 1 ID is required, but no proof of need is required.

*For emergencies call the University Police Department at 352-392-1111 (or 911).*

**Academic Resources**
- **E-learning technical support:** Tel. 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://iss.at.ufl.edu/help.shtml.

  - **Career Resource Center,** Reitz Union: Career assistance and counseling. Tel. 352-392-1601. http://www.crc.ufl.edu/

  - **Library Support:** Various ways to receive assistance with respect to using the libraries or finding resources. Text 813-463-2283 or Tel. 866-281-6309. http://cms.uflib.ufl.edu/ask

  - **Teaching Center,** Broward Hall: General study skills and tutoring. Tel. 352-392-2010 or 352-392-6420. http://teachingcenter.ufl.edu/

Course Evaluation
Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

Setting up VPN
To access UF resources and journal articles off-campus, please set up a Virtual Private Network (VPN). VPN allows you to remotely connect to UF services (i.e. library, UF servers). For detailed instructions on how to set up VPN visit: https://it.clas.ufl.edu/kb/category/vpn/

Netiquette guide for online courses
It is important to recognize that the online classroom is in fact a classroom, and certain behaviors are expected when you communicate with both your peers and your instructors. These guidelines for online behavior and interaction are known as netiquette. http://teach.ufl.edu/wp-content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdf

University Honesty Policy
UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (https://scrr.dso.ufl.edu/process/honor-code/) specifies behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor. Additional policies on academic integrity can be found in the Orange Book.

Additional comments regarding academic integrity:
Students are encouraged to discuss the course material with each other, help each other understand concepts, study together, and even discuss assessment questions with each other once the quiz window is closed. However, the following is considered academic dishonesty, and I expect that no student will ever do any of the following:

- Have another person complete a quiz/exam in this course
- Copy another student’s quiz/exam in this course
- Collaborate with anyone during a quiz/exam in this course
- Manipulate and/or distribute any materials provided in this course for any purpose (including course lecture slides)
- Use any materials provided by a previous student in the course

For more information about academic honesty, please see the Student Honor Code.
Software Use
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.

Microsoft Office 365 Software is free for UF students
All students are required to install MS Office 365 on their personal computers or use university computers with pre-installed software. Microsoft Excel will be frequently used to tabulate, analyze, and graph collected data. To download a free copy of MS Office, please visit:
http://www.it.ufl.edu/gatorcloud/free-office-365-downloads/

Other free software is available at:
http://www.software.ufl.edu/

To check for availability of the media and technical requirements, contact the UF Computing Help Desk at (352)392-HELP(4357).

University of Florida Complaints Policy and Student Complaint Process
The University of Florida and most instructors believe strongly in the ability of students to express concerns regarding their experiences at the University. Most problems, questions and concerns about the course will be resolved by professionally communicating with the instructor. Please try to meet your instructor in person, make an appointment to call, or try to set up a remote meeting through Skype or other media. The University encourages its students who still wish to file a written complaint to submit that complaint directly to the department that manages that policy. Please refer to Student Complain Process: http://distance.ufl.edu/student-complaint-process/

Professionalism is a two-way street. Unprofessional behavior of students includes, among other things: lack of communication, blaming other people or external factors, lying, affecting others negatively in a group or in the class, not accepting criticism and not being proactive in solving problems or seeking help. Furthermore, faculty often have family and other obligations to tend to. Over the weekend, replies to your inquiries or questions may be delayed. If a student is lacking professionalism repeatedly, the instructor has the right to file a formal complaint against the student through the Dean of Student office.

Academic Calendar
Students should familiarize themselves with important academic dates and deadlines available at https://catalog.ufl.edu/UGRD/dates-deadlines/
### Course Content

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<td>Why PPEs? What's One Health? Laboratory Safety &amp; Introduction to AMR in Healthcare, Agriculture, and the Environment</td>
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<td>Will this antibiotic work? Antibiotic susceptibility testing by Kirby-Bauer disk diffusion and dilution methods, part 1</td>
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<td>Week 4</td>
<td>Why is this antibiotic not working? Betalactamase-dependent mechanism of resistance testing by Modified Hodge Test, part 1</td>
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<td>Why is this antibiotic not working? Betalactamase-dependent mechanism of resistance testing by Modified Hodge Test, part 2</td>
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<td>Where does antibiotic resistance come from? Transmission of antibiotic resistance by horizontal gene transfer, part 1</td>
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<td>Where does antibiotic resistance come from? Transmission of antibiotic resistance by horizontal gene transfer, part 2</td>
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<td>Week 8</td>
<td>Where is the resistance? Antibiotic resistance gene surveillance: identification of AMR genes on paper money, part 1</td>
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<td>Where is the resistance? Antibiotic resistance gene surveillance: identification of AMR genes on paper money, part 2</td>
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<td>Where is the resistance? Antibiotic resistance gene surveillance: identification of AMR genes on paper money, part 3</td>
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<td>Are there novel antibiotics? Screening soil bacteria for novel antimicrobial compounds, part 1: isolation of soil bacteria</td>
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<td>Week 12</td>
<td>Are there novel antibiotics? Screening soil bacteria for novel antimicrobial compounds, part 2: screening isolates for antimicrobial activity</td>
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<td>Quiz 3, Lab Report 1, Final Exam</td>
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**Laboratory topics for each class:**

1. **Why PPEs? What's One Health? Laboratory Safety & Introduction to AMR in Healthcare, Agriculture, and the Environment**
2. **What's the point of doing all of this? Mandatory Field Trip: UF Dairy Farm, UF Shands Hospital, UF Water Treatment Plant**
3. **Will this antibiotic work?** Antibiotic susceptibility testing by Kirby-Bauer disk diffusion and dilution methods, part 1
4. **Will this antibiotic work?** Antibiotic susceptibility testing by Kirby-Bauer disk diffusion and dilution methods, part 2
5. **Why is this antibiotic not working?** Betalactamase-dependent mechanism of resistance testing by Modified Hodge Test, part 1
6. **Why is this antibiotic not working?** Betalactamase-dependent mechanism of resistance testing by Modified Hodge Test, part 2
7. **Where does antibiotic resistance come from?** Transmission of antibiotic resistance by horizontal gene transfer, part 1
8. **Where does antibiotic resistance come from?** Transmission of antibiotic resistance by horizontal gene transfer, part 2
9. **Where is the resistance?** Antibiotic resistance gene surveillance: identification of AMR genes on paper money, part 1: isolation
10. **Where is the resistance?** Antibiotic resistance gene surveillance: identification of AMR genes on paper money, part 2: Quantification of MSSA/MRSA
11. **Where is the resistance?** Antibiotic resistance gene surveillance: identification of AMR genes on paper money, part 3: DNA extraction, barcoding
12. **Where is the resistance?** Antibiotic resistance gene surveillance: identification of AMR genes on paper money, part 4: Whole-genome sequencing
13. **Where is the resistance?** Antibiotic resistance gene surveillance: identification of AMR genes on paper money, part 5: Data analysis
14. **Are there novel antibiotics?** Screening soil bacteria for novel antimicrobial compounds, part 1: isolation of soil bacteria
15. **Are there novel antibiotics?** Screening soil bacteria for novel antimicrobial compounds, part 2: screening isolates for antimicrobial activity
16. **Are there novel antibiotics?** Screening soil bacteria for novel antimicrobial compounds, part 3: data analysis
Assignments

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Assigned Reading
1. Laboratory Safety & Introduction to AMR: The challenge of antimicrobial resistance. Roope et al. 2019
2. One Health Approach: Report to the Secretary-General of the United Nations. IACG. 2019
7. Transmission of resistance: Mobile Genetic Elements Associated with AMR. Partridge et al. 2018
8. Transmission of resistance: Mobile Genetic Elements Associated with AMR. Partridge et al. 2018
10. Surveillance: Global trends in AMR in animals in L and M-income countries. Van Boeckel et al. 2019
12. Surveillance: Reducing antimicrobial use in food animals. Van Boeckel et al. 2017
13. Surveillance: Emergence of plasmid-mediated colistin resistance mechanisms. Liu et al. 2015
15. Novel antimicrobial compounds: A new antibiotic kills pathogens without detectable resistance. Ling et al. 2015
16. Novel antimicrobial compounds: No assigned reading
Cover Sheet: Request 14340

Antimicrobial Resistance Course - Approval Request

Info

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<td>Daniel Czyz <a href="mailto:dczyz@ufl.edu">dczyz@ufl.edu</a></td>
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<td>I have developed a new course on Antimicrobial Resistance that I teach to upper-undergraduate and graduate-level students in an asynchronous online format. The course concentrates on the basis of antimicrobial resistance in bacteria but also touches on mechanisms responsible for resistance in viruses, parasites, fungi, and cancer. It describes the mechanisms of resistance, transmission, diagnostics, and development of novel alternative treatment options. This course teaches students one of the most urgent global problems that now affect not only healthcare and agriculture but also the environment. Please consider this course for formal approval.</td>
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Actions

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No document changes

University Curriculum Committee

No document changes

Statewide Course Numbering System

No document changes

Office of the Registrar

No document changes

Student Academic Support System

No document changes

Catalog

No document changes

College Notified

No document changes
Course|New for request 14340

Info

Request: Antimicrobial Resistance Course - Approval Request
Description of request: I have developed a new course on Antimicrobial Resistance that I teach to upper-undergraduate and graduate-level students in an asynchronous online format. The course concentrates on the basis of antimicrobial resistance in bacteria but also touches on mechanisms responsible for resistance in viruses, parasites, fungi, and cancer. It describes the mechanisms of resistance, transmission, diagnostics, and development of novel alternative treatment options. This course teaches students one of the most urgent global problems that now affect not only healthcare and agriculture but also the environment. Please consider this course for formal approval.

Submitter: Daniel Czyz dczyz@ufl.edu
Created: 10/16/2019 4:33:10 PM
Form version: 3

Responses

Recommended Prefix MCB
Course Level 4
Course Number XXX
Category of Instruction Joint (Ugrad/Grad)
Lab Code None
Course Title Antimicrobial Resistance (AMR)
Transcript Title AMR
Degree Type Other
If other degree type, specify BS/MS
Delivery Method(s) Online, UF Online - Please attach a letter of support from the Director of the UF Online program
Co-Listing Yes
Co-Listing Explanation Undergraduate and Graduate students are required to complete 10 quizzes, each worth 10 points (100 pts total) and four exams (Exam I: 100 pts., Exam II: 200 pts., Exam III: 100 pts., Exam IV: 300 pts.). In addition to these assignments, graduate students are required to complete and turn in weekly written assignments (total of 13 assignments worth 130 pts.).
Effective Term Spring
Effective Year 2020
Rotating Topic? No
Repeatable Credit? No

Amount of Credit 3

S/U Only? No
Contact Type Regularly Scheduled
Weekly Contact Hours 3
Course Description This course covers content related to antimicrobial resistance: the origins of antimicrobial resistance, dissemination, mechanisms, therapeutics, and impact on healthcare, agriculture, and the environment. This course mainly concentrates on resistance in bacteria, but will also discuss other organisms, including viruses, parasites, fungi, and cancer.
Prerequisites MCB2000 or MCB3020 or MCB3023
Co-requisites N/A
Rationale and Placement in Curriculum Antibiotic resistance is a growing problem on a global scale. It is estimated that by 2050 annual deaths from antibiotic resistance will increase by 10 fold, reaching 10 million. One of the major contributors to this problem is the lack of awareness and education. The knowledge and problems addressed in the course prepare students for their future health-related careers. This course is also much needed not only at UF, but also at the national level. Finally, there is a high demand for this course to be broadly implemented into UF curriculum; here are some examples of what students say about this course:

-Great course that is needed!!! Hopefully it will be continued to be offered since all pre-health
professionals should be educated on this topic!
- I think this course should be a required class for microbiology students.
- I really enjoyed this course! While I didn't do AMAZING, I feel I learned more in this class than I did in any other courses this semester.
- This was by far one of my favorite courses in this program, highly informative and well put together.
- It is a lot of material! But again, because its so relevant to today, and because he taught with passion and even gave personal examples in relation to his life, it really didn't feel like it was too much. It felt more like "Wow this is interesting, what steps can I take for myself, my friends, my family to prevent (blank) disease/ or prevent the enhancement of antibiotic resistance".
- I loved this course! Reading articles or watching videos about topics discussed was interesting and not always something you can do with certain classes. I enjoyed not having a textbook, as this topic is changing too rapidly for a text to keep up.
- I thoroughly enjoyed this course, would recommend it to all future students, and can easily see this course becoming part of the core curriculum with being mandatory. The knowledge I've obtained is above and beyond my expectations with myself even using a large portion of this course as a focus for my graduation thesis paper.
- I really enjoyed this course and I wish I could enroll in part 2. The information in this course is so applicable to real world situations and the information uncovered real issues which the world is facing right now and will face in the future.
- I thought this course was one of the best out of the program.
- I absolutely loved this class! It has opened my eyes to the world of AMR and just how large scale these problems are today.
- I hope that this course will be available from here on out. The subject matter is relevant to all fields of medicine, lab, and epidemiology, as well as agriculture and animal husbandry. The more people who are educated about antimicrobial resistance the better.

**Course Objectives** After completion of this course, students should be able to:
- Outline problems associated with antimicrobial resistance across healthcare, agriculture, and the environment
- Explain resistance mechanisms in viruses, fungi, parasites, and cancer
- Identify major classes of antibiotics and their respective mechanisms of action
- Describe known mechanisms of antibiotic resistance and modes of transmission
- Identify means of detection/assessment of antibiotic resistance
- Describe therapeutic approaches used to fight antibiotic resistance
- Recognize scientific terms related to antimicrobial resistance
- Assess risks associated with antibiotic-resistant infections
- Employ online databases to utilize genomic, chemical, and epidemiological data on AMR

**Course Textbook(s) and/or Other Assigned Reading**
Lecture 1 - Antibiotic Resistance Threats in the United States, CDC 2013
Lecture 2 - Reducing antimicrobial use in food animals, Van Boeckel et al. 2017
Lecture 3 - Antimicrobial-resistance genes in waste water. Karkman et al. 2018
Lecture 4 - On the antibacterial action of cultures of a penicillium with special reference to their use in the isolation of B. influenzae, Fleming 1929
Lecture 5 - Heavy use of prophylactic antibiotics in aquaculture a growing problem for human and animal health and for the environment, Cabello 2006
Lecture 6 - Balancing water sustainability and public health goals in the face of growing concerns about antibiotic resistance. Pruden 2014
Lecture 7 - Bacterial Wall as Target for Attack - Past Present and Future Research. Koch 2003
Lecture 8 - Antimicrobial resistance in the next 30 years. Bassetti et al. 2017
Lecture 9 - Aureomycin - a product of the continuing search for new antibiotics, Duggar 1948
Lecture 10 - Antibiotics for Emerging Pathogens. Fischbach and Walsh 2009
Lecture 14 - The origins and molecular basis of antibiotic resistance. Hawkey 1998
Lecture 15 - Bacterial resistance to antibiotics - enzymatic degradation and modification. Wright 2005
Lecture 16 - The importance of Efflux pumps in bacterial antibiotic resistance. Webber and Piddock 2003
Lecture 17 - Bacterial resistance to antibiotics - modified target sites. Lambert 2005
Lecture 18 - Antibiotic resistance of bacteria in biofilms. Stewart and Costerton 2001
Lecture 19 - Bad bugs no drugs no ESKAPE. Boucher et al. 2009
Lecture 20 - Reduced glycopeptide susceptibility in methicillin-resistant S. aureus. Appelbaum 2007
Lecture 21 - Food and human gut as reservoirs of transferable antibiotic resistance encoding genes. Rolain 2013
Lecture 22 - The role of type VI secretion system effectors in target cell lysis and subsequent HGT. Ringel et al. 2017
Lecture 26 - Antimicrobial susceptibility testing - a review of general principles and contemporary practices. Jorgensen and Ferraro 2009
Lecture 27 - Diagnosing Antimicrobial Resistance. Burnham et al. 2017
Lecture 28 - Platforms for Antibiotic Discovery. Lewis 2013
Lecture 29 - Host-directed antimicrobial drugs with broad-spectrum efficacy against intracellular bacterial pathogens. Czyz et al. 2014
Lecture 30 - Targeting host metabolism. Czyz et al. 2017
Lecture 31 - Revising Natural Products. Weinman 2015
Lecture 35 - Antiviral Drug Resistance - Mechanism and Clinical Implications. Strasfeld and Chou 2010
Lecture 36 - Influenza Antiviral Drug Resistance _ CDC
Lecture 38 - Antifungal Agents. Ghannoum and Rice 1999
Lecture 39 - Antiparasitic chemotherapy - from genomes to mechanisms. Horn and Duraisingh 2014
Lecture 41 - Cancer Drug Resistance. Mansoori et al. 2017

There is a list of additional reading material provided to students

**Weekly Schedule of Topics Lectures:**

1. Course Introduction; Antimicrobial Resistance in Healthcare
2. Antimicrobial Resistance in Agriculture
3. Antimicrobial Resistance in the Environment
4. Penicillin Discovery and Mechanism of Action
5. Antibiotics: Cell Wall Synthesis Inhibitors, Part I
6. Antibiotics: Cell Wall Synthesis Inhibitors, Part II
7. Antibiotics: Folate Synthesis Inhibitors
8. Antibiotics: Protein Synthesis Inhibitors, Part I
9. Antibiotics: Protein Synthesis Inhibitors, Part II
10. Antibiotics: Other Mechanisms of Action & the Future
11. Antibiotics: Toxicity and Side Effects
12. Lecture 1-11 Exam Review
13. No Lecture, Exam I covering lectures 1-11
14. Antibiotic Resistance: Overview
15. Antibiotic Resistance: Modification/Destruction of Antibiotics
17. Antibiotic Resistance: Target Modification
18. Antibiotic Resistance: Bacterial Biofilms
19. Multidrug Resistant Bacteria: No ESKAPE
20. Multidrug Resistant Bacteria: MRSA/VRSA
21. Antibiotic Resistance Reservoirs
22. Modes of Transmission
23. Antimicrobial Resistance in Sexually Transmitted Infections
24. Lecture 1-23 Exam Review
25. No Lecture, Exam II covering lectures 1-23
26. Antimicrobial Resistance Assessments, Part I
27. Antimicrobial Resistance Assessments, Part II
28. Therapeutics: Hunt for Novel Antibiotics
29. Therapeutics: Host-targeted Therapeutics, Part I
Therapeutics: Host-targeted Therapeutics, Part II
Therapeutics: Alternative Medicine
Prophylaxis and Control Measures
Lecture 24-32 Exam Review
No Lecture, Exam III covering lectures 24-32
Antimicrobial Resistance: Viral Infections, Part I
Antimicrobial Resistance: Viral Infections, Part II
Antimicrobial Resistance: Fungal Infections, Part I
Antimicrobial Resistance: Fungal Infections, Part II
Antimicrobial Resistance: Parasitic Infections, Part I
Pesticide Resistance: Genetically Modified Organisms
Drug Resistance in Cancer
Lectures 1-23 Final Exam Review
Lectures 24-43 Final Exam Review

**Grading Scheme**

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Assignments 130 16
Total
700
Total 830

Instructor(s) Dr. Daniel M. Czyz
Attendance & Make-up Yes
Accomodations Yes
UF Grading Policies for assigning Grade Points Yes
Course Evaluation Policy Yes
Antimicrobial Resistance: Co-listed Graduate and Undergraduate Course

Graduate students are required to complete 13 written weekly assignments. These assignments assess students’ critical thinking, understanding of the literature, and assess their knowledge of the subject. These assignments are designed to develop graduate-level competencies, including deeper analysis, data mining, literature review, and research-based utilization of bioinformatics tools.

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*students get to drop the lowest-score exam (either I or III).

NR: not required

There is a 15.7% grade difference between undergraduate and graduate students
MCB4XXX: Antimicrobial Resistance  

Course Description
UF Catalog: This course covers content related to antimicrobial resistance: the origins of antimicrobial resistance, dissemination, mechanisms, therapeutics, and impact on healthcare, agriculture, and the environment. This course mainly concentrates on resistance in bacteria, but will also discuss other organisms, including viruses, parasites, fungi, and cancer.

Course Importance: Cells are living factories that are capable of adapting their production line to any changes in the environment. Hence, cells encountering a toxic environment will evolve their machinery to maintain survival and replication. Such adaptation, called Antimicrobial Resistance, is commonly observed across bacteria, viruses, parasites, and fungi. However, only recently the overuse of antimicrobial agents created a high selection pressure to drive a wide-spread of resistance. While we are currently witnessing a constant increase of antimicrobial resistance, the development of novel treatments has almost completely ceased. This course will provide an extensive background on antimicrobial resistance, treatments, and respective mechanisms.

Time and Location
Online pre-recorded classes for the upcoming week (M-W-F lectures) will be made available every Sunday. New lectures are uploaded weekly onto Canvas (see access instructions below)

Instructor
Dr. Daniel Czyz (chysh)
Department of Microbiology and Cell Science
1355 Museum Drive
Office: Room 1004, Building 981
Phone: 352-392-0237
Email: dczyz@ufl.edu
Twitter: @360Science
Slack: AMR-UF, the app can be downloaded on a desktop, Android, or iOS

Office hours: Tuesdays 9-10 AM or by appointment
Virtual office hours: Fridays 9-10 AM (EST) or by appointment. Office hours will be available through Canvas Video Conference (Blue Button) or a phone call

To request an office hours appointment, send an e-mail directly to the instructor with three suggested dates/times.

Instructor's Teaching Philosophy
"Your work is going to fill a large part of your life, and the only way to be truly satisfied is to do what you believe is great work" - Steve Jobs

You embrace education; devote your time to pursue your goals, strive for success, and do your best, but sometimes you are just hitting obstacles that prevent you from moving forward. That's when you wish you would have a good mentor. I've helped people who hit obstacles get right back on track, but more importantly, I help my mentees and students avoid hitting obstacles in the first place. I always make sure
I am available for my students and my colleagues, whether it’s in a classroom or in a laboratory setting. As a scientist, I put a lot of time and emphasis on my trainees providing them with the right personalized support plan to guide them towards their short and long-term goals, as their success is my success. As an educator, my primary objectives are to retain students’ attention, promote creativity and teamwork, and encourage out-of-classroom learning.

I find science to be the most fascinating and exciting subject to teach, mostly because it is never fully explored and with the ongoing new discoveries, teaching becomes learning. Science can be found in our everyday life and I believe that relating new information to practical application in daily lives focuses students’ attention and enhances learning. For that reason, I link my lecture material to everyday applications as much as possible.

I encourage and expect students to employ out-of-textbooks material, including public databases, online tools, and primary literature. While independent projects are important, in science, single-person projects are nearly nonexistent. I strongly believe that assigning students to group projects strengthens their team-building core, helps to develop essential communication skills, and exposes students to conflicts and teaches them how to deal with them. Most importantly, an assignment might seem difficult to an individual student, but becomes trivial when done as a team.

Finally, I put emphasis on mentorship and participation in extracurricular activities. My students are expected to mentor each other, because it will help them develop essential skills in their future careers. It’s never too early to become a mentor. Finally, I truly believe that building a career is not solely attained during classroom education. Participation in community outreach events, conferences, seminars, and symposia is just as important as classroom-based learning. These extracurricular activities build leadership and improve communication skills and I strongly encourage my students to participate in such activities.

Course Level & Prerequisites
The course is designed for both undergraduate-level and graduate students.
The course requires undergraduate students to have the following prerequisites: Either MCB2000, MCB3020, or MCB3023. Important concepts will be briefly reviewed to provide students with a better understanding of the subject.

Course Objectives
After completion of this course, students should be able to:
- Outline problems associated with antimicrobial resistance across healthcare, agriculture, and the environment
- Explain resistance mechanisms in viruses, fungi, parasites, and cancer
- Identify major classes of antibiotics and their respective mechanisms of action
- Describe known mechanisms of antibiotic resistance and modes of transmission
- Identify means of detection/assessment of antibiotic resistance
- Describe therapeutic approaches used to fight antibiotic resistance
- Recognize scientific terms related to antimicrobial resistance
- Assess risks associated with antibiotic-resistant infections
- Employ online databases to utilize genomic, chemical, and epidemiological data on AMR
encounter any learning difficulties that will affect your grades/learning progress, contact the professor as soon as possible.

**GRADING SCALE (total: 700 pts)**

<table>
<thead>
<tr>
<th>Undergraduate Students</th>
<th>Percentage</th>
<th>Score range</th>
</tr>
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<tbody>
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<td>&gt;654</td>
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<td>D+</td>
<td>69.9-66.6</td>
<td>489-466</td>
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<tr>
<td>D</td>
<td>66.5-63.3</td>
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<td>D-</td>
<td>63.1-60.0</td>
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<tr>
<td>F</td>
<td>&lt;60.0</td>
<td>&lt;420</td>
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**EXAMS (700 pts):**
Exam I, September 18, 2019: Covers lectures 1-11. (100 pts)
Exam II, October 18, 2019: Covers lectures 1-23. (200 pts)
Exam III, November 13, 2019: Covers lectures 24-32. (100 pts)
Exam IV, December 9, 2019: Covers lectures 1-43 (300 pts)

Exams will assess student knowledge of the material covered in lectures, assignments, and required reading/video material. The lowest exam score (either Exam I or III only) will be dropped. All exams are mandatory and only students who take all four exams will be able to drop one. Each exam will take approximately 50 minutes (final exam will take 2x time) to complete and will consist of multiple-choice questions, true/false, fill in the blanks, sentence completion, definition matching, and short-answer questions. Students must sign up on ProctorU at least 72 hours in advance. The academic honesty will be remotely monitored in real-time by assigned course proctors. For more information about academic honesty, please see the Student Honor Code. For additional information on Grading Policies please visit https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

**QUIZZES (100 pts):**
There will be 11 quizzes (10 points each, 100 points total plus 10 extra credit points). See the Course Content (below) for dates. Quizzes will cover lecture material and assigned reading/video material. There will be one Extra Credit Quiz during the first week. This will be an introductory quiz that will cover students' understanding of the syllabus and course requirements.

**EXTRA CREDIT:** The professor may offer an extra credit written assignment.
Attendance and Make-Up Work
The requirements for class attendance and make-up exams, assignments and other work are consistent with university policies and can be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Excused absence
Documentation MUST be provided for missed exams caused by serious illness, accident, jury duty, or death in the immediate family. If the circumstances allow, you must contact the instructor IN ADVANCE of the missed exam to arrange for an alternative time.

Website
Course material can be accessed through Canvas.
https://ufl.instructure.com/

Technical issues related to the course can be addressed to UF helpdesk
http://helpdesk.ufl.edu, 352-393-4357, helpdesk@ufl.edu

Communication
For questions and issues on assignments and class organization please check first the syllabus, the announcements, calendar, and the Course Handout. To seek further help, please communicate with the instructor via Slack or email. For questions regarding class and class content use the Canvas Discussion Board.

Discussion Board: Available through Canvas. Postings and answers are monitored by the instructor
Slack: AMR-UF, the app can be downloaded on a desktop, Android, or iOS
Twitter: Follow and share science news related to the course using #AMR_UF

IMPORTANT: Prior to the first lecture, please familiarize yourself with netiquette (cyber behavior guidelines). See below “Netiquette guide for online courses”.

Course Material
Required material: There is no textbook for this course. This course is based on peer-reviewed publications that will be provided by the instructor. The required reading material will be posted under "Assignments" in Canvas. Questions related to information from the required reading/video material will appear on quizzes and exams. Please refer to the “Assignment” section at the end of the syllabus for a list of Assigned Reading.

Recommended reading and other material: Additional reading material, links to videos, and other online resources will be posted under "Files" in Canvas.

Services for Students with Disabilities
Students with disabilities requesting accommodations should first register with the Disability Resource Center (0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter that must be presented to the instructor
when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

**Campus Resources**

Resources are available on campus for students having personal problems or lacking clear career and academic goals, which interfere with their academic performance. These resources include:

**Health & Wellness**

- **U Matter, We Care**: If you or a friend is in distress, please contact umatter@ufl.edu or tel. 352-392-1575 so that a team member can reach out to the student. [http://www.umatter.ufl.edu/](http://www.umatter.ufl.edu/)
- **Counseling and Wellness Center**: Provides counseling services to students, tel. 352-392-1575. [https://counseling.ufl.edu/](https://counseling.ufl.edu/)
- **Sexual Assault Recovery Services (SARS)**: Provides services related to sexual violence. Tel. 352-392-5648. [http://www.umatter.ufl.edu/sexual_violence](http://www.umatter.ufl.edu/sexual_violence)
- **Student Health Care Center**: Student health-related services. Tel. 352-392-1161. [https://shcc.ufl.edu/](https://shcc.ufl.edu/)
- **Gator Career Closet**: Serves as a lending closet for students to borrow professional clothing and accessories free of charge. This service is available to all UF students with a valid UF ID. Tel. 352-392-1601. [https://career.ufl.edu/careercloset/](https://career.ufl.edu/careercloset/)
- **Food Pantry**: Offers non-perishable food, toiletries, and fresh vegetables. This service is provided to current students, staff, and faculty at the University of Florida. Gator 1 ID is required, but no proof of need is required.

*For emergencies call the University Police Department at 352-392-1111 (or 911).*

**Academic Resources**

**E-learning technical support**: Tel. 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. [https://lss.at.ufl.edu/help.shtm](https://lss.at.ufl.edu/help.shtm).


**Library Support**: Various ways to receive assistance with respect to using the libraries or finding resources. Text 813-463-2283 or Tel. 866-281-6309. [http://cms.uflib.ufl.edu/ask](http://cms.uflib.ufl.edu/ask)

**Teaching Center**, Broward Hall: General study skills and tutoring. Tel. 352-392-2010 or 352-392-6420. [http://teachingcenter.ufl.edu/](http://teachingcenter.ufl.edu/)


**Course Evaluation**

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at [https://evaluations.ufl.edu](https://evaluations.ufl.edu). Evaluations are typically open during the last two or three
weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

Setting up VPN
To access UF resources and journal articles off-campus, please set up a Virtual Private Network (VPN). VPN allows you to remotely connect to UF services (i.e. library, UF servers). For detailed instructions on how to set up VPN visit: https://it.clas.ufl.edu/kb/category/vpn/

Netiquette guide for online courses
It is important to recognize that the online classroom is in fact a classroom, and certain behaviors are expected when you communicate with both your peers and your instructors. These guidelines for online behavior and interaction are known as netiquette. http://teach.ufl.edu/wp-content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdf

University Honesty Policy
UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (https://scrr.dso.ufl.edu/process/honor-code/) specifies behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor. Additional policies on academic integrity can be found in the Orange Book.

Additional comments regarding academic integrity:
Students are encouraged to discuss the course material with each other, help each other understand concepts, study together, and even discuss assessment questions with each other once the quiz window is closed. However, the following is considered academic dishonesty, and I expect that no student will ever do any of the following:

- Have another person complete a quiz in this course
- Copy another student’s quiz in this course
- Collaborate with anyone during a quiz in this course
- Discuss the questions and answers of a quiz with other students while the quiz is still open
- Manipulate and/or distribute any materials provided in this course for any purpose (including course lecture slides).
- Use any materials provided by a previous student in the course

Software Use
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.
Microsoft Office 365 Software is free for UF students
http://www.it.ufl.edu/gatorcloud/free-office-365-downloads/

Other free software is available at:
http://www.software.ufl.edu/

To check for availability of the media and technical requirements, contact the UF Computing Help Desk at (352)392-HELP(4357).

University of Florida Complaints Policy and Student Complaint Process
The University of Florida and most instructors believe strongly in the ability of students to express concerns regarding their experiences at the University. Most problems, questions and concerns about the course will be resolved by professionally communicating with the instructor. Please try to meet your instructor in person, make an appointment to call, or try to set up a remote meeting through Skype or other media. The University encourages its students who still wish to file a written complaint to submit that complaint directly to the department that manages that policy. Please refer to Student Complain Process: http://distance.ufl.edu/student-complaint-process/

Professionalism is a two-way street. Unprofessional behavior of students includes, among other things: lack of communication, blaming other people or external factors, lying, affecting others negatively in a group or in the class, not accepting criticism and not being proactive in solving problems or seeking help. Furthermore, faculty often have family and other obligations to tend to. Over the weekend, replies to your inquiries or questions may be delayed. If a student is lacking professionalism repeatedly, the instructor has the right to file a formal complaint against the student through the Dean of Student office.

Academic Calendar
Students should familiarize themselves with important academic dates and deadlines available at https://catalog.ufl.edu/UGRD/dates-deadlines/
## Course Content

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture</th>
<th>Date</th>
<th>Lecture topic</th>
<th>Due</th>
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<td>Extra Credit Quiz</td>
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<td>08/21/19</td>
<td>Antimicrobial Resistance in Agriculture</td>
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<td>08/23/19</td>
<td>Antimicrobial Resistance in the Environment</td>
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<td>Penicillin Discovery and Mechanism of Action</td>
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<td>Antibiotics: Cell Wall Synthesis Inhibitors, Part I</td>
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<td>09/04/19</td>
<td>Antibiotics: Cell Wall Synthesis Inhibitors, Part III</td>
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<td>Antibiotics: Protein Synthesis Inhibitors, Part II</td>
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<td>Antibiotics: Other Mechanisms of Action</td>
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<td>Antibiotic Resistance: Overview</td>
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<td>Antibiotic Resistance: Modification/Destruction of Antibiotics</td>
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<td>Antibiotic Resistance: Target Modification</td>
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<td>Antibiotic Resistance: Bacterial Biofilms</td>
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<td>Multidrug Resistant Bacteria: No ESCAPE</td>
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<td>Multidrug Resistant Bacteria: MRSA/VRSA</td>
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<td>Modes of Transmission</td>
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<td>Antimicrobial Resistance in Sexually Transmitted Infections</td>
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<td>Antimicrobial Resistance Assessments, Part II</td>
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<td>28</td>
<td>10/25/19</td>
<td>Therapeutics: Hunt for Novel Antibiotics</td>
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<td>Therapeutics: Host-Targeted Therapeutics, Part I</td>
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<td>Therapeutics: Alternative Medicine</td>
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<td>Prophylaxis and Control Measures</td>
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<td>Drug Resistance in Cancer</td>
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<td>17</td>
<td>46</td>
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<td>Have a safe winter break!</td>
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*Required informal course and instructor evaluation

**Final and official course evaluation
## Assignments

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<tr>
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<th>Lecture</th>
<th>Date</th>
<th>Assigned Reading</th>
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<tr>
<td>1</td>
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<td>Antibiotic Resistance Threats in the US</td>
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<td>Reducing Antimicrobial Use in Food Animals</td>
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<td>3</td>
<td>08/23/19</td>
<td>Antibiotic-Resistance Genes in Wastewater</td>
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<td>4</td>
<td>08/26/19</td>
<td>Discovery of penicillin</td>
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<td>5</td>
<td>08/28/19</td>
<td>Antibiotic Use in Fish Industry</td>
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<td>6</td>
<td>08/30/19</td>
<td>Water Sustainability and Public Health Goals</td>
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<td>Gram-negative vs Gram-positive</td>
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<td>7</td>
<td>09/04/19</td>
<td>Bacterial Wall as Target to Attack</td>
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<td>8</td>
<td>09/06/19</td>
<td>Future of AMR</td>
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<td>09/09/19</td>
<td>Discovery of tetracycline</td>
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<td>09/11/19</td>
<td>Antibiotic for Emerging Pathogens</td>
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<td>09/13/19</td>
<td>Other approaches</td>
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<td>09/18/19</td>
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<td>09/20/19</td>
<td>The Origin and Molecular Basis of ABR</td>
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<td>09/23/19</td>
<td>Enzymatic Degradation and Modification</td>
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<td>09/25/19</td>
<td>Efflux Pumps in ABR</td>
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<td>09/27/19</td>
<td>Modified Target Sites</td>
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<td>09/30/19</td>
<td>ABR of Bacterial Biofilms</td>
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<td>24</td>
<td>10/15/19</td>
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<td>28</td>
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<td>Antimicrobial Susceptibility Testing</td>
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<td>29</td>
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<td>Diagnosing ABR</td>
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<td>Platforms for Antibiotic Discovery</td>
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<td>Host-directed Antimicrobial Drug Discovery</td>
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<td>32</td>
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<td>Targeting host metabolism</td>
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<td>11/06/19</td>
<td>Revising Natural Products</td>
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<td>National Action Plan for Combating ABR</td>
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<td>36</td>
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<td>Influenza Antiviral Drug Resistance</td>
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<td>38</td>
<td>11/20/19</td>
<td>Antifungal Agents: Mechanisms of Action</td>
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<tr>
<td></td>
<td>No Class</td>
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*All assigned reading will be posted on Course Canvas in pdf format*
Cover Sheet: Request 14348

Human Genomics Undergraduate Course

<table>
<thead>
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<td>Submitter</td>
<td>Jennifer Drew <a href="mailto:jdrew@ufl.edu">jdrew@ufl.edu</a></td>
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Description of request: This request is for course approval for an undergraduate course entitled "Human Genomics" to be offered through the Microbiology and Cell Science department and 3 credits. This course is for life sciences majors. The course is taught at a 4000 level because it requires prerequisite knowledge of eukaryotic molecular biology and classical genetics. Its appropriate and valuable preparation for students considering medical, research, biotech, education, public health, communication, and social science fields of study and careers. The course will serve as an elective for the Microbiology and Cell Science major and includes a CURE component. We are in the era of precision medicine, which began with the sequencing of the human genome and is based on the personalized analysis of individual genomes. It is important for life science majors to understand the structure and function of the human genome and how that information is studied, interpreted and applied. Human genomics, and its advances, is a field that encompasses medicine, biomedical research, agriculture, environment, and increasingly, ethical/social/societal/legal issues.

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<td>Eric Triplett</td>
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No document changes

University Curriculum Committee

No document changes

Statewide Course Numbering System

No document changes

Office of the Registrar

No document changes

Student Academic Support System

No document changes

Catalog

No document changes
Course|New for request 14348

Info

Request: Human Genomics Undergraduate Course
Description of request: This request is for course approval for an undergraduate course entitled "Human Genomics" to be offered through the Microbiology and Cell Science department and 3 credits. This course is for life sciences majors. The course is taught at a 4000 level because it requires prerequisite knowledge of eukaryotic molecular biology and classical genetics. Its appropriate and valuable preparation for students considering medical, research, biotech, education, public health, communication, and social science fields of study and careers. The course will serve as an elective for the Microbiology and Cell Science major and includes a CURE component. We are in the era of precision medicine, which began with the sequencing of the human genome and is based on the personalized analysis of individual genomes. It is important for life science majors to understand the structure and function of the human genome and how that information is studied, interpreted and applied. Human genomics, and its advances, is a field that encompasses medicine, biomedical research, agriculture, environment, and increasingly, ethical/social/societal/legal issues.

Submitter: Jennifer Drew jdrew@ufl.edu
Created: 10/28/2019 4:35:21 PM
Form version: 2

Responses

Recommended Prefix PCB
Course Level 4
Course Number XXX
Category of Instruction Advanced
Lab Code None
Course Title Human Genomics
Transcript Title Human Genomics
Degree Type Baccalaureate

Delivery Method(s) Online, UF Online - Please attach a letter of support from the Director of the UF Online program
Co-Listing No

Effective Term Earliest Available
Effective Year Earliest Available
Rotating Topic? No
Repeatably Credit? No

Amount of Credit 3

S/U Only? No
Contact Type Regularly Scheduled
Weekly Contact Hours 3
Course Description This course will discuss how human genome sequence data is obtained, analyzed, and interpreted with an emphasis on what can be learned from an individual's genome. Genome-based strategies are used for the detection, treatment, and prevention of many diseases. Prerequisites BSC 2010 & BSC 2011 & (PCB 3134 OR PCB 4522 OR BCH 4024 OR BCH 3025)
Co-requisites N/A
Rationale and Placement in Curriculum We are in the era of precision medicine, which began with the sequencing of the human genome and is based on the personalized analysis of individual genomes. It is important for life science majors to understand the structure and function of the human genome and how that information is studied, interpreted and applied. Human genomics, and its advances, is a field that encompasses medicine, biomedical research, agriculture, environment, and increasingly, ethical/social/societal/legal issues. This course is for life sciences majors. The course is taught at a 4000 level because it requires prerequisite knowledge of eukaryotic molecular biology and classical genetics. Its appropriate and valuable preparation for students considering medical,
research, biotech, education, public health, communication, and social science fields of study and careers. The course will serve as an elective for the Microbiology and Cell Science major. Course will be offered once a year in the fall semester and is currently being taught as a special topic course in the fall semester and is in its 3rd iteration. The course averages 80 - 150 students per year.

**Course Objectives** At the conclusion of this course, the student will be able to:
1. Describe how the genome determines traits, including susceptibility to disease.
2. Assess the role of the genome in the development, detection, prevention and treatment of disease.
3. Conduct and evaluate human genomics research approaches and outcomes.
4. Illustrate and discuss how advances in biotechnology and genomics are personalizing all aspects of medicine including prevention, diagnostics, and treatment.
5. Lead broader discussions of the ethics and complexities of this era of biotechnology and precision medicine.

**Course Textbook(s) and/or Other Assigned Reading** Genetics From Genes to Genomes by Hartwell, Goldberg, Fischer. Hood. 6th Edition. Published by McGraw Hill, 2018.

**Weekly Schedule of Topics** Structure and Function of Genome
- Diversity and evolution – sources of diversity
- Tracking inheritance in the genomic era
- Advanced Genetic Technology
- Genomic Sequencing - then and now
- Bioinformatics
- Genomics approaches for Mendelian and rare disorders – Exome sequencing and whole genome analysis
- Genomics approaches for common disorders – GWAS
- Epigenomics – Epigenome mapping
- Cancer Genomics
- Molecular Diagnostics and Detection – liquid biopsy, cfDNA analysis, pathogen detection
- Genetic Testing including DTC
- Gene and genome-based treatments
- Pharmacogenomics and Precision Medicine

**Grading Scheme** Students will be evaluated and their grades will be determined through proctored exams, low stakes quizzes, two assignments, discussion and participation, and a final project. Three proctored, non-cumulative exams will be administered throughout the semester. Each exam is worth 18% of grade.

Brief quizzes will be given each week that cover each module. Quizzes can be taken up to two times each and only your highest score of each week’s quiz will be recorded for a grade. The quiz average will count for 15% of final grade. The 3 lowest quiz grades will be dropped.

There will be two assignments (each worth 8% of final grade). The assignments are activities in which students analyze real genomic data from an ongoing study to identify associations between genetic variants and dietary traits. The students will then use online tools and resources, including those from NCBI and the primary literature to synthesize a biological hypothesis to support their associations and to contribute to the field of genomics.

Students will receive points for participation in Discussion Boards on Canvas. Participation is worth 2% of their final grade.

A final paper/presentation will be worth 18% of final grade. Students will have the option to write a paper or prepare a brief video presentation on a recent genomic discovery or development. This assignment will allow students to explore a specific disease, treatment, or technology of interest more deeply. Students will use tools and resources such as PubMed, GenBank, GENE and other resources that they used in the course.

**Instructor(s)** Jennifer Drew
**Attendance & Make-up** Yes
**Accomodations** Yes
**UF Grading Policies for assigning Grade Points** Yes
**Course Evaluation Policy** Yes
October 28, 2019

To all members of the University Curriculum Committee:

We have carefully examined the distinguishing characteristics between the Molecular Genetics of Disease course (ANT 4531) offered by Professor Connie Mulligan and the proposed Human Genomics course (PCB 4XXX) to be taught by Dr. Jennifer Drew. The two courses are complimentary, not competing.

Our proposed course, Human Genomics, will be an elective for our major. In its third year as an experimental course, enrollment has grown from 60 to 106 students. In addition, 87% of the students are Microbiology and Cell Science majors. It is clearly a course that serves primarily our own majors.

As background, it requires a year of introductory biology and additional course such in genetics, molecular biology or biochemistry. In contrast, ANT 4531 has no prerequisites listed and is open to all students. These differences are also reflected in course content. ANT 4531 is taught by a series of excellent guest lecturers who provide very nice overviews of important topics that relate genetics and human disease. PCB 4XXX teaches students the content and the tools of the trade with a variety of bioinformatics exercises that have access to IRB approved human genetic data with associated metadata acquired from UF student saliva. Students in PCB 4XXX get hands-on big data analysis exercises that are NOT offered in ANT 4531. Thus, the content overlap is very small. The two courses are also offered from different perspectives and to different audiences.

In addition, ANT 4531 is offered irregularly (every 2-3 years) and hasn't been offered since 2017. PCB 4XXX will be offered every fall semester. ANT 4531 is also only offered in-person while PCB 4XXX is accessible to all life science majors whether they are on-campus or online.

I ask that our Human Genomics course be given official status. Both of these courses would serve as excellent cornerstones for a new minor in human genetics that would be very popular and offered by multiple departments.

Sincerely,

Eric W. Triplett
Professor and Chair
### UCC: External Consultations

**External Consultation Results** (departments with potential overlap or interest in proposed course, if any)

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<tr>
<th>Department</th>
<th>Name and Title</th>
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<tr>
<td>Anthropology</td>
<td>Pete Collings, Chair</td>
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<tr>
<td>352-281-4200 (cell)</td>
<td><a href="mailto:pcollings@ufl.edu">pcollings@ufl.edu</a></td>
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**Comments**

Re: MCB 4xxx course proposal, the proposed course is sufficiently different from ANT 4531 that we have no objections to UCC granting it a permanent course number.
External Consultation Results (departments with potential overlap or interest in proposed course, if any)

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<thead>
<tr>
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<td>Biology</td>
<td>Marta Wayne, Chair of Biology</td>
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Phone Number  
E-mail  
mlwayne@ufl.edu

Comments
Contacted Dr. Wayne in February, 2018 with a copy of the syllabus. She did not report any conflicts with Biology, but suggested we contact Anthropology for a potential conflict with ANT4531. We followed up with Anthropology (see next page).
Course Conflict

In 2018, we shared a syllabus of Human Genomics with Biology for an external consultation. The Biology Chair did not report any conflicts with their courses, but suggested we contact Anthropology regarding a potential conflict with a course called Molecular Genetics of Disease (ANT 4531). We did, and they responded in opposition to the creation of the course citing too much overlap and that they had intentions to expand enrollment and offer their course online.

Human Genomics has been taught under a special topics designation MCB4934 since 2017 and is in its 3rd iteration. The enrollment trends from the past 3 years provide some indication of the interest level of the students.

We feel that the two courses are distinct in many ways including their size, intended audience, frequency, scope and mode of delivery. Here, we summarize key distinctions between the two courses in the table below.

<table>
<thead>
<tr>
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<th>Human Genomics</th>
<th>Molecular Genetics of Disease – (from the attached syllabus)</th>
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<tr>
<td>Prerequisite</td>
<td>Biology 1 and 2 as well as a molecular biology, genetics OR a biochemistry course BSC 2010 &amp; BSC 2011 &amp; (PCB 3134 OR PCB 4522 OR BCH 4024 OR BCH 3025)</td>
<td>No one specific course listed in the syllabus but some knowledge of Mendelian genetics and molecular biology (such as Intro Bio, BCS 2011) is expected</td>
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<tr>
<td>Mode of delivery</td>
<td>Asynchronous, online (currently enrolls UF Online students)</td>
<td>Face to face, 1x per wk for 3 hr</td>
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<tr>
<td>Format</td>
<td>Lectures, activities, quizzes, presentation</td>
<td>Lecture/guest lectures, discussion and substantial participation</td>
</tr>
<tr>
<td>Intended Audience</td>
<td>Life science majors – particularly those who are interested in biomedical research or health professional careers Currently, 93% of students are life science majors; 87% are Microbiology and Cell Science Majors</td>
<td>Students from all colleges and majors</td>
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<td>Place in Microbiology and Cell Science Curriculum</td>
<td>Approved as dept elective</td>
<td>Not approved as elective</td>
</tr>
<tr>
<td>Frequency course is offered</td>
<td>Every Fall semester</td>
<td>Every 2-3 years</td>
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<th>Enrollment</th>
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<th>5 - 40</th>
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<tr>
<td>Highlights of course</td>
<td>sequence analysis, bioinformatics activities, genotype-phenotype association testing, variant analysis</td>
<td>Rich discussions with diverse perspectives, guest speakers</td>
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PCB4XXX: Human Genomics
3 Credits
Online

Instructor
Dr. Jennifer Drew
Department: Microbiology & Cell Science
Email: jdrew@ufl.edu
Office hours: Tuesdays 9am – 11 am or by appointment. Office hours will be with Zoom

Office Hours and Communication
Since this is a web-based course and Dr. Drew is located off-campus, office hours will be online by appointment. Dr. Drew is also available to answer questions by email.

Pre-requisites
Two semesters of college biology or equivalent (BSC 2010 and BSC 2011) OR PCB 3134 OR PCB 4522 OR BCH 4024 OR BCH 3025 or equivalents

Course Description
Increasingly, researchers and health care providers are mining the genome to uncover the basis of disease susceptibility and treatment. Genome-based strategies are used for the detection, treatment, and prevention of many diseases. This course will discuss the field of genomics, how genome sequence data is obtained and analyzed, and most importantly, what can be learned from an individual's genome. Students will work with anonymous human genome data and conduct a small analysis of associations between genetic variants and the diet. The course will address cutting-edge research in epigenetics, pharmacogenomics, molecular diagnostics, and the microbiome. The course will also include timely topics such as GMO’s, stem cells, genetic testing and genome editing. This course will reinforce fundamental concepts in molecular biology and genetics.

We are in the era of precision medicine, which began with the sequencing of the human genome and is based on the analysis of individual genomes. It is important for life science majors to understand the basic structure and function of the human genome and how that information is studied, interpreted, and applied.

The reading assignments, course lecture materials and online activities will be posted each week. There will be a quiz each week over the module’s material. All exams will be proctored and taken with HonorLock. Specific information about exam proctoring procedures will be posted closer to exam time.

This is a Classroom Undergraduate Research Experience (CURE) course, which means that students will become part of the research team to analyze associations of human genome variants. The findings generated by the students will contribute to the body of knowledge about the human genome. The research tools and methods are online, web-based or open source and are used by human genome researchers and those used by direct to consumer genetic providers like ancestry.com and 23andme. Thus, in addition to contributing to the body of knowledge of
human genomics, students will take away skills that they can use to analyze their own genetic data should they ever acquire it.

The data that will be analyzed in this course is derived from an ongoing study called "Associations between the oral microbiome, diet, depression, and human genotype among University of Florida undergraduate and graduate students." It is approved under IRB 201801744. Students in this course will be given the opportunity to volunteer as a research subject this study, which is completely optional. More information will be provided in class.

**Course Goals**
At the conclusion of this course, the student will be able to:
1. Describe how the genome determines traits, including susceptibility to disease.
2. Assess the role of the genome in the development, detection, prevention and treatment of disease.
3. Conduct and evaluate human genomics research approaches and outcomes.
4. Illustrate and discuss how advances in biotechnology and genomics are personalizing all aspects of medicine including prevention, diagnostics, and treatment.
5. Lead broader discussions of the ethics and complexities of this era of biotechnology and precision medicine.

**List of Weekly Modules and Topics**

<table>
<thead>
<tr>
<th>Mod</th>
<th>Topic</th>
<th>Readings Resources</th>
<th>Key Specific Learning Objectives (does not include all SLOs per module)</th>
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</table>
| 1   | Structure and Function of Genome  
  *What is a genome? What is the broad purpose of a genome?*  
  *Molecular Biology Bootcamp (for an optional review)* | Ch 1, 6.1-6.4, 8.1-8.4 | Molecular Biology Bootcamp SLOs:  
  Outline and compare the processes of replication, transcription and translation including the identification of the major players and their roles in the process. |
| 2   | Diversity and evolution –  
  *What is the source of genetic diversity?*  
  *How similar and how different are we?* | Ch 7 | Identify different sources of diversity  
  Classify and predict the effect of mutations on protein structure, function and phenotype. |
| 3   | Tracking Inheritance in the genomic era  
  *How are traits inherited from generation to generation? How can inheritance be tracked and predicted?* | Ch 2 – 4 Online Mendelian Inheritance in Man (OMIM) | Draw a 3 generation pedigree  
  Predict conditional probabilities of inheritance  
  Use OMIM.org to research molecular mechanism of disease. |
| 4   | Advanced Genetic Technology  
  *What are the tools, applications, and limitations of genetic technology? (PCR, microarrays, recombinant DNA technology, DNA profiling, genome editing, stem cells)* | Ch 9.1, 9.2, 11.2, 11.3, 14.3, 18 | Determine appropriate applications of tools and techniques to varied case scenarios  
  Identify the key characteristic of a GMO and summarize the GMO |
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<tr>
<th>Topic</th>
<th>Description</th>
<th>Exam I (Modules 1 - 4)</th>
<th>Exam II (Modules 5 - 8)</th>
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<tr>
<td>5</td>
<td>Genome Sequencing – Then and Now</td>
<td><em>How do we sequence and analyze a genome? How has genome sequencing advanced to high throughput, multi-parallel analysis?</em></td>
<td>Ch 9.3, 10</td>
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<tr>
<td>6</td>
<td>Bioinformatics</td>
<td><em>How do we interpret and analyze genome data? What are the common tools?</em></td>
<td>Multiple tools at the National Center for Biotechnology Information (ncbi.nlm.nih.gov)</td>
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<tr>
<td>7</td>
<td>Genomic approaches for Mendelian and rare disorders</td>
<td><em>How are they inherited? What is their cause? How are they studied and tracked? Exome sequencing, WGS</em></td>
<td>Ch. 2 and 3; Sections 4.2, 4.7, 15.1, 15.5</td>
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<tr>
<td>8</td>
<td>Genomic approaches for Complex disorders</td>
<td><em>How are they inherited? What is their cause? How are they studied and tracked? GWAS and statistical genomics</em></td>
<td>Ch 22</td>
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<tr>
<td>9</td>
<td>Genotype and Phenotype Analysis</td>
<td><em>Participate in ongoing course-based research project to determine associations between genetic variants (SNPs) and dietary habits (phenotype)</em></td>
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<tr>
<td>10</td>
<td>Epigenomics</td>
<td><em>How is gene expression controlled and what is the effect on human health and disease? Epigenome mapping</em></td>
<td>Ch. 17</td>
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<tr>
<td>11</td>
<td>Cancer Genomics</td>
<td><em>What is the role of the genome in cancer development, progression, detection and treatment?</em></td>
<td>Ch. 20 Revisiting the hallmarks of cancer (Fouad and Aanei, 2017)</td>
</tr>
<tr>
<td>Module</td>
<td>Topic</td>
<td>Notes</td>
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</table>
| 12 | Molecular Diagnostics and Detection  
*How can genomic information and biotechnology be used to detect and diagnose disease?* | Ch 4 and Ch 11 ncbi.nlm.nih.gov/gtr/  
Evaluate and compare genetic testing strategies  
Determine the appropriate genetic test or screen based on clinical information and distinguish the differences between them  
Use Genetic Testing Registry to identify genetic tests |
| 13 | Gene and Genome-based treatments  
*How can the genome be modified for treatment of disease?* | Ch. 18 Rossidis, et al.,  
2018 FDA statement on first gene therapy approved for genetic disease  
FDA statement on first RNAi therapy |
| 14 | Pharmacogenomics and Precision Medicine  
*How can personal genomic data affect drug choice, dosage and outcomes? What are ELSI issues stemming from DTC?* | Ashley, 2016 Towards Precision Medicine, Nature Reviews Genetics Amare et al., 2017 Pharmacogenomics in the treatment of mood disorder: Strategies and opportunities for personalized psychiatry. EPMA Journal. Pharmacogenetics Knowledge base  
Use pharmacogenomic resources (online), results and case information to evaluate scenarios (see pharmacogenomic review for major depressive disorder (MDD) and SSRI treatments as an example)  
Identify and evaluate ELSI issues stemming from personal genomics and DTC providers including forensic use of ancestry DNA data and its privacy implications  
Distinguish clinical vs. research lab testing  
Use pharmgkb.org to drug selection and dosing based on genotypic info |
| 15 | Reflections and Synthesis | Projects Due (papers or presentations) to share with class Facilitate Discussion on project |

**Textbook**  
The book is available in digital form or in hardback, to rent or buy. Other online resources will be posted.

**Basic course structure and flow – how it works**
Welcome to the course. Login to Canvas, select this course, and then go to the “Start Here” Module. This module will highlight all the important policies, features, and flow of the course. I’ve included an intro video of myself too so you can get to know me.

New modules are posted each week of the semester. For each module, there will be several items to complete. Click on the link for each item. The first item will always list the **learning objectives** for the week. Keep the learning objectives in mind as you learn the material. After reading the learning objectives, please go through the material in the order presented. The next item in the list will usually be the reading assignment, followed by the lectures, and links to any online tutorials or modules. After you go through the material in the order presented, you are always free to return and visit any of the content. The welcome video will give an example of the types of course content and how it will be presented. The pdf of the lecture slides of each module will also be posted for your convenience. This convenience is for students who wish to print out the slides and follow along with the lecture, study the notes later, etc. The lectures slides will only be available in pdf format.

Each module includes a quiz. The quizzes are due on the last day of the module week by 11:59 PM. The material will be available to you throughout the semester, but once a quiz due date passes, this means that you can no longer access the quiz. This means that both of your quiz attempts must be completed by midnight. If you only attempt a quiz once before due date, that quiz grade is the only one that will count. (See below for more info on quizzes).

**Tips for Success**
After teaching online for 10 years, I’ve accumulated some tried and true tips for success in an online course. These are real tips from my past students:

- Schedule "class times" for yourself. It is important to do the coursework on time each week.
- Read ALL of the material contained on this site. There is a lot of helpful information that can save you time and help you meet the objectives of the course.
- Do not wait to ask questions! Waiting to ask a question might cause you to miss a due date.
- Don’t wait for the last minute. Even a little bit of deadline anxiety can affect your performance. Give yourself some breathing room.
- Always have a backup plan: do you have the power cord ready in case your battery goes down in the middle of an exam? What if your internet is out on the day of any exam?
- Use the learning objectives to study! (of students who regularly use the learning objectives, 100% said they were extremely helpful and valuable).

**Grading**
Students grades will be determined through three proctored exams, low stakes quizzes, two assignments, discussion and participation, and a final project.
Exams
Three proctored, non-cumulative exams will be administered throughout the semester. Each exam is worth 18% of your grade. All exams will be proctored. Exam dates will be announced during the first week of class, but you can see where they fall in the semester in the list to topics above. If an exam is taken without approved proctoring arrangements and without adhering to proctoring criteria (eyes only on the screen, closed book/notes, no talking or other devices, etc) credit will not be given and the score will be a zero. If it is detected that a student’s LMS account was signed into by more than one instance during an exam (i.e., two individuals signed into the same student account during an assessment), credit will not be given and the score will be zero.

There are no make-ups for exams without prior notification and proper documentation for an excused event or activity.

Quizzes
Brief quizzes will be given each week that cover each module. Quizzes can be taken up to two times each and only your highest score of each week’s quiz will be recorded for a grade. Your quiz average will count for 15% of your final grade. The 3 lowest quiz grades will be dropped. A missed quiz for any reason will be a zero and can count towards a quiz drop.

There are 15 total quizzes. One of the quizzes is a syllabus quiz to make sure the policies and format of the course are understood. Another quiz is an Honorlock practice quiz to ensure students understand the process to take an assessment with Honorlock.

Point Adjustment Requests
Following the close of each quiz window and for exams 1 and 2, you have 10 calendar days to contest your quiz/exam grade in an email. Any requests for points must include a clear justification of your response and why it is as complete or better than the correct one.

Please note that questions and comments about any quiz/exam question are welcome at any time during the semester for the purposes of understanding and education.

Research Activity Assignments
There will be two assignments (each worth 8% of final grade). Instructions will be given in class. The assignments are activities in which students analyze real genomic data from an ongoing study to identify associations between genetic variants and dietary traits. The students will then use online tools and resources, including those from NCBI and the primary literature to synthesize a biological hypothesis to support their associations and to contribute to the field of genomics.

Participation
Students will receive points for participation in Discussion Boards on Canvas. Participation is worth 2% of their final grade.

Final Project
A final paper/presentation will be worth 18% of your final grade. More details will be provided in class. Students will have the option to write a paper or prepare a brief video presentation on a recent genomic discovery or development of their choice. This assignment will allow students to explore a specific disease, treatment, or technology of interest more deeply. Students will use tools and resources such as PubMed, GenBank, GENE and other sites that they used in the course.

**Course Grade Breakdown:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tr>
<td>Exams (3 total each worth 18%)</td>
<td>54%</td>
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<tr>
<td>Final presentation</td>
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<td>Quizzes</td>
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<tr>
<td>Assignments</td>
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<td>Discussion</td>
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<td><strong>Total</strong></td>
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**Grading Scale:**

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<tr>
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<td>90 or above</td>
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<td>A-</td>
<td>87-89</td>
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<td>B+</td>
<td>84-86</td>
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<td>B</td>
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<td>B-</td>
<td>77-79</td>
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<tr>
<td>C+</td>
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<tr>
<td>C</td>
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<td>E</td>
<td>56 or below</td>
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**UF grading policies**

Please see the UF grading policies at this site: https://catalog.ufl.edu/GRD/academic-regulations/grades-grading-policies/

**Attendance policy**

Requirements for class attendance and make-up exams and assignments in this course are consistent with university policies that can be found at: catalog.ufl.edu/GRD/academic-regulations/attendance-policies/ Makeup exams will be provided for students who miss an exam due to extreme, documented circumstances that are consistent with the excused absences described in the university policy.
Students with Disabilities
Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, dso.ufl.edu/adc) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester. Please submit any accommodations by Sept 15 of the fall semester.

Course Evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via uf.bluerca.com/ufi/. Summaries of course evaluation results are available to students at gatorevals.aa.ufl.edu/public-results/.

E-learning system - Canvas
The course will be managed entirely through the e-Learning in Canvas. The LSS homepage contains tips and tutorials for students as well as computer requirements. It is your responsibility to become familiar with e-Learning in Canvas and to ensure that you have the appropriate browsers, settings, internet speed, etc. For any technical questions regarding Canvas, please visit the LSS site (https://wiki.helpdesk.ufl.edu/FAQs/E-Learning) and/or the UF Help desk (http://helpdesk.ufl.edu/). They can address technical issues such as not being able to view course materials, not being able to access the quizzes, not being able to send mail, etc. All technical issues/questions/comments should go to the Help Desk (352-392-HELP).

Student Computing Requirements
Please refer to the Student Computing Requirement policy from UF: https://it.ufl.edu/policies/student-computing-requirements/
Access to and on-going use of a computer is required for all students. Competency in the basic use of a computer is required. Course work will require use of a computer with a webcam for proctoring and a broadband connection to the internet.

Communications
All email communication regarding this course will be done through the Conversations tool (Inbox) of Canvas. This mail system is private and secure. I will respond to your questions and emails as promptly as I can. By maintaining all email communication through Canvas instead of other email domains, it reduces the chance that discussions will get lost among our outside accounts.

Announcements will be made regularly through the Announcement feature. It is your responsibility to check your Canvas mail and Announcements frequently to stay updated on the course. Please check the course site a minimum of two times per week to be certain that you are not missing any important communications.

Academic Honesty
UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the
following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (sccr.dso.ufl.edu/process/student-conduct-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Please see the Student Honor Code and Student Conduct Code here:
https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/

Additional comments regarding course decorum:
Students are encouraged to discuss material with each other from the course, help each other understand concepts, study together, and even discuss assessment questions with each other once the quiz window is closed. However, the following violate the student honor code:

- Have another person complete a quiz in this course
- Copy another student’s quiz in this course
- Collaborate with anyone while taking a quiz in this course
- Discuss the questions and answers of a quiz with other students while the quiz window is still open
- Manipulate and/or distribute any materials provided in this course for any purpose (including course lecture slides).

Campus Resources

1. Health and Wellness

_U Matter, We Care_: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit umatter.ufl.edu/ to refer or report a concern and a team member will reach out to the student in distress.

_Counseling and Wellness Center_: Visit counseling.ufl.edu/ or call 352-392-1575 for information on crisis services as well as non-crisis services.

_Student Health Care Center_: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit shcc.ufl.edu/.

_University Police Department_: Visit police.ufl.edu/ or call 352-392-1111 (or 9-1-1 for emergencies).

_UF Health Shands Emergency Room / Trauma Center_: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, ufhealth.org/emergency-room-trauma-center.
2. Academic Resources

*E-learning technical support*: Contact the UF Computing Help Desk at 352-392-4357 or via email at helpdesk@ufl.edu.

*Career Connections Center*: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services career.ufl.edu/.

*Library Support*: cms.uflib.ufl.edu/ask various ways to receive assistance with respect to using the libraries or finding resources.

*Teaching Center*: Broward Hall, 352-392-2010 or to make an appointment 352-392-6420. General study skills and tutoring. teachingcenter.ufl.edu/

*Writing Studio*: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers. writing.ufl.edu/writing-studio/

*Student Complaints On-Campus*: sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/

*On-Line Students Complaints*: distance.ufl.edu/student-complaint-process/
### Cover Sheet: Request 14338

**The Ecology of Climate Change**

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Committee

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Statewide
Course
Numbering
System

No document changes

Office of the Registrar

No document changes

Student
Academic
Support
System

No document changes

Catalog

No document changes

College
Notified

No document changes
Course|New for request 14338

Info
Request: The Ecology of Climate Change
Description of request: The Ecology of Climate Change will provide a broad overview of patterns and processes in climate change science. Students will gain an understanding of how climate change as well as other human disturbances impact ecological processes from the smallest gene to largest ecosystem level. We will focus on observed impacts rather than predicted impacts.
Submitter: Brett Scheffers brett.scheffers@ufl.edu
Created: 10/14/2019 2:33:04 PM
Form version: 2

Responses
Recommended Prefix WEC
Course Level 4
Number XXX
Category of Instruction Intermediate
Lab Code None
Course Title The Ecology of Climate Change
Transcript Title Ecology Climat Change
Degree Type Baccalaureate

Delivery Method(s) On-Campus
Co-Listing No

Effective Term Spring
Effective Year 2020
Rotating Topic? No
Repeatable Credit? No

Amount of Credit 3

S/U Only? No
Contact Type Regularly Scheduled
Weekly Contact Hours 3
Course Description This course provides a broad overview of the ecological responses to climate change on the Earth. Students will learn about ecological processes, spanning genetics, physiology and behavior, morphology, phenology and distribution, and up through species interaction, communities and ecosystems and how climate change impacts them.

Prerequisites Undergraduate Biology or at least one ecological sciences Course or permission of the instructor.
Co-requisites No co-requisites are required.
Rationale and Placement in Curriculum Climate change is arguably the single greatest threat to nature and society. The Ecology of Climate Change will provide a broad overview of ecological patterns and processes in climate change science. Students will gain an understanding of how climate change as well as other human disturbances impact ecological processes from the smallest gene to largest ecosystem level. We will focus on observed impacts rather than predicted impacts.
Course Objectives We will thoroughly discuss and critique a large literature that addresses the impacts of global change on a range of ecological processes from genes to entire biomes. The purpose of these discussions will be to assess the objectives of each published paper, determine whether the science appropriately matches the objectives and contrast findings to the larger literature within global change biology. Importantly, the literature will complement your research activities and add breadth to your observations and interpretations of results.

Our discussion format follows a "think-pair-share" format. This activity first asks students to consider a question on their own, and then provides an opportunity for students to discuss it in small groups, and finally together with the whole class.
This course is divided into three central components: 1) class lecture, 2) class discussion, and 3) natural history observation/out-of-class exercises.

The course will cover genetic, physiology and behavior, morphology of species, their phenology and distributions, up through species interaction, communities and ecosystems. Throughout the semester students will execute several research exercises that complement discussions and readings and emphasize the scientific process and how it is applied in climate change science.

Research Projects: Students will conduct a series of research activities on the morphology, physiology and activity patterns of animals. This includes a study on temperature across the UF campus and short projects involving the invasive brown anole (Anolis sagrei) between urban gardens and forested sites. Students visit the Butterfly Rainforest and other taxonomic collections available through the Florida Museum of Natural History. The objective of these short projects (and a broader objective of the class) is to allow each student the freedom to critically think about the research/scientific process and to allow students to build a personal research-based relationship with the content from their readings.

The content of this course is implemented through class lecture, class discussion, and natural history observation/out-of-class exercises that allows students to gain hands-on experience with the core ecological processes that they read about in their readings. Success of learning from class readings, lecture, and discussion is measured from a series of short quizzes and two exams and the critical application of this content is measured in a series of short research reports that students write for their short research exercises.

Course Textbook(s) and/or Other Assigned Reading The course will consist of discussions of readings from a wide variety of sources, including both technical (e.g., scientific literature) and non-technical material (e.g., newspaper articles, web links, video). My objective for readings is to teach climate change ecology to student by using the most up-to-date publications on the topic. As such, most readings in my course are published in the last 10 years.

Readings from beginning to end of class are as follows:

Williams et al. 2010 An integrated framework on assessing climate change vulnerability
Optional reading: IPCC 2014 (synthesis report)
Zeuss et al. 2013 on butterfly melanism
Pistone et al. 2014 Albedo and darkening of the Arctic
Laloe et al. 2014 Rising temperatures and sea turtle rookeries
Jensen et al 2016 Feminization of turtles
Fan et al 2014 Cyclic color change and photoperiods
Sunday et al 2014 Thermal safety margins across latitude
Sharma et al 2016 Monks record of climate change
Geerts et al 2015 Rapid evolution in water fleas
Franks 2008 Rapid evolution in plants
Sunday et al 2014 on thermal tolerance
Kelbo et al 2014 Brown anole minimum and maximum tolerable temperatures
Gils et al 2016 Red knot fitness and climate change
Agrawal 2001 Evolution and phenotypic plasticity
Phillips, Weeks, and Hoffman on genetic diversity
Georgina Mace’s “Who’s conservation” - ethics in conservation
Mayor et al 2017 Bird and plant phenology in North America
Optional reading: Gunderson and Leal 2012 Geographic variation in anole activity patterns
Araujo et al 2008 Quaternary climate change and frog diversity
Sandel et al 2011 Climate change velocity and endemism
De Frenne et al 2013 Microclimate moderates macroclimate warming
Scheffers et al 2017 Dispersal and arboreality
Freeman and Freeman 2014 Bird range shifts in PNG
Chen et al 2011 Global analysis of distribution shifts in animals
Optional reading: Poloczanska et al 2016 Marine fish distribution shifts in response to climate change
Frishkoff et al 2016 on habitat conversation and climate change favoring the same species
Group readings for puzzle:
1. Raffel et al 2015 Proc B
2. Puschendorf et al 2011 Cons Bio
3. Scheffers et al 2014 GCB

Kerr et al 2015 Climate change impacts on bumblebees
Verges et al 2014 Tropicalization of temperate zones
Optional reading: Fossheim et al 2015 Borealization of tundra zones
Stuart et al 2014 on rapid evolution in response to invasion
Optional reading: Gifford and Kozak 2012 Islands in the sky/squeezed at the top
Wernberg et al 2016 Phase/Regime shift in marine kelp forests
Bennett et al 2015 Tropical herbivores provide resilience against climate change

**Weekly Schedule of Topics** Below is a list of weekly scheduled topics

**Organisms**

- **Lecture Topics:** Course Introduction, IPCC, and climate change assessments
  - **Learning Objectives:** Obtain overview of current knowledge of climate change and how to assess organism vulnerability to climate change

- **Lecture Topics:** Climate change impacts on species morphology (color)
  - **Learning Objectives:** Discover how climate change interacts with species morphology traits (size, color, shape).

  - On-campus field trip - Visit to Butterfly Rainforest and McGuire Center - see how museums can be used in climate change ecology

- **Lecture Topics:** Climate change impacts on behavior and thermoregulation
  - **Learning Objectives:** Appreciate the complexity of climate change impacts

  - On-campus field trip - Visit to FLMNH and collections - see how museums can be used in climate change ecology

- **Lecture Topics:** Climate change impacts on physiology and genetics
  - **Learning Objectives:** What is phenotypic plasticity and why is it important under climate change

- **Lecture Topic:** Brown Anole ecology
  - **Learning Objectives:** Begin initial observations and construction of independent research on brown anoles

- **Lecture Topics:** Brown Anole survey Overview
  - **Learning Objectives:** Develop a better understanding of the basis for species distribution models

  - On-campus field trip - Visit to Harn Art Museum and art collections - merging art and science - thinking creatively about climate change

**Species and Populations**
Guest lecture by Dr. Matt Luskin of Nanyang Technological University
Lecture Topics: Climate change impacts on phenology
Learning Objectives: Seasonal shifts in life-history traits in animals

Guest Lecture – Rebecca Senior
Lecture Topics: Climate change in space and time
Learning Objectives: The importance of both historical and current climate in shaping species distributions

Lecture Topics: Species redistribution: what is a native species under climate change?
Learning Objectives: To what extent are species changing their distributions to climate change and does this change our traditional view of conservation

Lecture Topics: Synergistic effects of climate change and habitat loss
Learning Objectives: Climate change, habitat fragmentation and other disturbances are interacting with amplified impacts on species

Interactions Among Organisms
Lecture Topics: Community assembly/disassembly under climate change
Learning Objectives: The scale at which communities are re-distributing in response to climate change

Lecture Topics: Competitive interactions under climate change
Learning Objectives: Understand the complexity of ecological interactions and processes and how they complicate interpretations of climate change impacts

Lecture Topics: Phase/Regime shifts under climate change
Learning Objectives: Understand the sheer magnitude of ecosystem level responses to climate change

**Grading Scheme** To motivate students to do the reading prior to class and to get students thinking about the topic, there will be quizzes throughout the semester (in class); quizzes will cover readings & lecture material for the week.

Multiple writing assignments will be assignment throughout the semester. For example, students will perform a full climate change vulnerability assessment on a species of their choice.

Students will write two research reports on the research assignments. Each report will cover class research projects and the readings.

One exam will be provided at mid-semester and a final exam at the end of the semester. Exams will cover class readings, in-class discussion, and research projects.

There are:
7 quizzes at 5 points each - total 35 points
4 assignments: Integrated framework (10 points), initial design of brown anole (10 points), initial survey (5 points), survey data collection (12 points) - total 37 points
2 written reports/essays - Temperature gradients and thermoregulation (20 points) and Anole distributions in urban landscapes (22 points) - total 42 points
2 exams - Mid-term exam (10 points) and Final exam (27 points) - total 37 points

Of 151 possible points assignment breakdown by percentages as such:
Quizzes - 23%
Assignments - 24.5%
Reports - 28%
Exams - 24.5%

Letter Grade in order:
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<th>Grade</th>
<th>Percentage</th>
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**Instructor(s)** Brett Scheffers
**Attendance & Make-up** Yes
**Accomodations** Yes
**UF Grading Policies for assigning Grade Points** Yes
**Course Evaluation Policy** Yes
FW: followup: consult

Hellgren,Eric C

Tue 8/13/2019 10:07 AM

To:Scheffers,Brett <brett.scheffers@ufl.edu>

Brett:

See consult from Marta Wayne, Chair of Biology. Please include this email in your course request process. I think your current title is fine as is.

Cheers,

ECH

From: Wayne,Marta L <mlwayne@ufl.edu>
Sent: Thursday, August 1, 2019 2:52 PM
To: Hellgren,Eric C <hellgren@ufl.edu>
Subject: followup: consult

Dear Eric,

Apologies, I have been traveling. My faculty have replied that there is not currently a lot of overlap between our relevant courses (BSC3307, Climate Change Biology; and BSC2862, Global Ecology and Sustainability) and your proposed offering. In order to make the courses obviously different to the students, we would like to ask if you all might be willing to use a course title and catalog description that is more focused on how climate change affects wildlife ecology and physiology (which seems to be what most of the course is about). Our courses are more about carbon cycling and Earth systems. For example, the WEC course title could be something like "Climate change impacts on wildlife". If we’ve misconstrued the course and that’s a crazy title, or I have misunderstood something else, just let me know.

Yours from the UK (back Monday)
Marta
FW: Course Consult - The Ecology of Climate Change

Hellgren, Eric C
Thu 7/25/2019 4:55 PM
To: Scheffers, Brett <brett.scheffers@ufl.edu>

Brett:

See consult from the Department of Geological Sciences. Upload this email to the Academic Approval website when you start the process (https://approval.ufl.edu/). I am waiting on Biology, which may be a while.

Cheers,

ECH

From: Foster, David A <dafoster@ufl.edu>
Sent: Thursday, July 25, 2019 4:37 PM
To: Hellgren, Eric C <hellgren@ufl.edu>
Cc: Foster, David A <dafoster@ufl.edu>
Subject: Re: Course Consult - The Ecology of Climate Change

Hi Eric,

The undergraduate committee in the Department of Geological Sciences has reviewed the course proposal and sees no conflict with the climate change courses that we offer. I think the course will be highly complementary to what we offer.

Regards,
David

David A. Foster
Professor and Chair
Department of Geological Sciences
PO Box 112120
University of Florida
Gainesville, FL 32611

Dept. office: 3523922231
On Jul 17, 2019, at 9:07 AM, Hellgren, Eric C <hellgren@ufl.edu> wrote:

Hi David:

WEC is requesting approval for a new upper-division undergraduate course taught by Brett Scheffers: The Ecology of Climate Change. It has been taught under special topics number WIS 4934 since spring 2017, and covers how climate change affects ecological responses of organisms.

I have attached the syllabi and the UCC consult form for the consideration of the Department of Geological Sciences. Ellen Martin and Andrew Zimmerman would be appropriate reviewers.

Thank you!

Cheers,

ECH

Eric C Hellgren
Professor and Chair
Department of Wildlife Ecology and Conservation
Institute of Food and Agricultural Sciences
University of Florida
Gainesville, FL 32611
Ph. 352-846-0552
http://wec.ufl.edu/

<u>uccconsult.pdf>\<Syllabus_WIS 4934_The Ecology of Climate_Change_2019_FINAL.docx</u>
The Ecology of Climate Change

Dr. Scheffers and I discussed the title, both before and after the consults from other departments. Brett’s course covers climate change impacts beyond wildlife ecology and physiology. It includes those areas, but also how climate change will affect ecological processes from gene to ecosystem levels. He believes, and I support him, that the current proposed title is the most appropriate and will be able to clearly attract students. He may provide additional background.

Cheers,

ECH

Eric C Hellgren
Professor and Chair
Department of Wildlife Ecology and Conservation
Institute of Food and Agricultural Sciences
University of Florida
Gainesville, FL 32611
Ph. 352-846-0552
https://wec.ifas.ufl.edu/
The Ecology of Climate Change, WIS 4934, Section 1410
Spring 2020

SYLLABUS 2020

Class Periods:
Tuesday; period 2-3 (08:30 – 10:25 am)
Thursday; period 3 (09:35 -10:25 am)
Room: 238 Mechanical and Aerospace Engineering, building B

Instructor: Dr. Brett Scheffers
Office: Building 0087 (South of Newins Ziegler)
Email: brett.scheffers@ufl.edu
Phone: 352.846.0570
Contact/Office hours: Tuesdays 1030 am-12pm in office #7; building 87. Feel free to email me at any time. I will do my best to respond to emails within 24 hours. (Please email the instructor on Canvas).
Weekly course schedule: See below

Summary: course objective, description and format [See extended detailed summary below]

Objective:
The Ecology of Climate Change will provide a broad overview of patterns and processes in climate change science. Students will gain an understanding of how climate change as well as other human disturbances impact ecological processes from the smallest gene to largest ecosystem level. We will focus on observed impacts rather than predicted impacts.

Description and format:
The course will consist of discussions of readings from a wide variety of sources, including both technical (e.g., scientific literature) and non-technical material (e.g., newspaper articles, web links, video).

The course will cover genetic, physiology and behavior, morphology of species, their phenology and distributions, up through species interaction, communities and ecosystems. Throughout the semester students will execute several research exercises that complement discussions and readings and emphasize the scientific process and how it is applied in climate change science.

Research Projects: You will conduct a series of research activities on the morphology, physiology and activity patterns of animals. This includes a study on temperature across the UF campus and short projects involving the invasive brown anole (Anolis sagrei) between urban gardens and forested sites. We will visit the Butterfly Rainforest and other taxonomic collections available through the Florida Museum of Natural History. The objective of these projects (and a broader objective of the class) is to allow you the freedom to critically think about the research/scientific process and to allow you to build a personal research-based relationship with the content from your
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readings.

Discussion: We will thoroughly discuss and critique a large literature that addresses the impacts of global change on a range of ecological processes from genes to entire biomes. The purpose of these discussions will be to assess the objectives of each published paper, determine whether the science appropriately matches the objectives and contrast findings to the larger literature within global change biology. Importantly, the literature will complement your research activities and add breadth to your observations and interpretations of results.

Our discussion format follows a “think-pair-share” format. This activity first asks students to consider a question on their own, and then provides an opportunity for students to discuss it in small groups, and finally together with the whole class.

Course Format: This course is divided into three central components: 1) class lecture, 2) class discussion, and 3) natural history observation/out-of-class exercises. Various materials will be posted for students to download at the course Canvas site.

Course materials/website: All course readings, announcements, links to videos, grades, etc will be available on the Canvas e-learning website. All email exchanges with the instructor should also occur in Canvas. You will need your Gatorlink username and password to log into Canvas at http://elearning.ufl.edu/

Canvas site navigation (3 important tabs to remember): Home has background information for course; Syllabus contains the syllabus for the course as a download; Modules contains all content for course (this is a very important tab for getting week-to-week information for each class period).

Course readings/course text: All readings are found on the Modules tab for each week or under the Files tab. There is no assigned textbook for this course.

UF course catalog description: A broad overview of the impacts of climate change on plants and animals

Suggested Text: There are no textbooks for this course. Please see the outline of readings below.

Course Requirements: Undergraduate Biology, at least one Ecology Course or permission of the instructor.

Course breakdown: In total, students will review 20-30 academic and popular articles (depending on class momentum) pertaining to climate change and global change biology. The class receives ~24 hours of lecture, 7 quizzes on readings, 2 research/writing activities and 4 assignments. There will be a mid-term and final exam. Please see the assignment table for a break down of assignments, grades, and workload intensity for the semester.
Assessments:

**Quizzes:** Tentatively, there are 7 quizzes given during the course (~1 quiz per week). Quiz questions are derived from information delivered in class lectures, assigned readings, and short research activities (when applicable).

The number of readings covered by a particular quiz varies from 1-3, depending on the assigned readings in a week. Read the reading assignments before you attempt the quizzes! You must take quizzes online in Canvas at the beginning of class. Quiz questions are multiple choice and true/false. Questions are randomly drawn from a larger pool by the Canvas system. Each quiz has 5-10 questions. Quizzes are timed, and the time allotted for each quiz is proportional to the number of questions. Once you start a quiz in Canvas you must finish it in the allotted time—the “clock keeps ticking” in Canvas as soon as you open a quiz and only stops after the allotted time has passed. Quizzes must be completed before their closing date and time.

Weekly quizzes (including the Syllabus Quiz) are worth a total of 35 points (each question is worth 0.5 - 1 point). Consult the Critical Dates & Deadlines table below for a list of quizzes. In order to “make-up” a quiz, students must provide a legitimate, documented excuse for not completing the quiz on time. Access quizzes at the Module page in Canvas.

**Missed Quizzes** can only be taken with instructor approval. To make up a missed semester quiz students must provide a legitimate, documented excuse as to why the exam was missed. Please make arrangements with the instructor ahead of time or immediately following a missed exam. Depending on the circumstance, students may be required to take a cumulative, written assignment at the end of the semester to make up for a missed semester quiz.

**Assignments:** There are 4 assignments and 2 written reports/essays. Please see the below syllabus, assignment table for details pertaining to points and due dates.

**Exam:** There will be a exam that covers readings, class discussions and assignments.

**Communication Policy:** Your questions and comments are very important to me. I will strive to respond to all emails within 24 hours (48 hours over weekends and holidays).

**Attendance and Assignment Make-up Policy:**
Students are expected to attend and participate during the assigned class time. Assignment due dates are listed in the syllabus. Assignments are due at the beginning of class. Assignments can be turned in within 24 hours of the due date for 15% off, and 48 hours for 30% off. No late assignments will be accepted after 48 hours.

We abide by the university attendance regulations. Please see the university attendance policy for acceptable absences, documentation required and policies for any missed assignments. You must contact me within 24 hours of an approved
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absence to arrange for make-ups or any late assignments (if appropriate).
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Extra Credit
There are no extra credit assignments planned for the course. However, extra credit may be offered at the discretion of the instructor.

Assignments & Grading:
- To motivate you to do the reading prior to class and to get you thinking about the topic, there will be quizzes throughout the semester (in class); quizzes will cover readings & lecture material for the week.
- Multiple writing assignments will be assignment throughout the semester. Each report will cover class research projects.; due dates are listed below (but are subject to change, please keep updated on Canvas) and in the excel assignment table. Detailed instructions for each assignment will be provided on Canvas. Instructions will be provided on Canvas.
- One exam will be provided towards the end of the semester. This exam will cover class readings, in-class discussion and presentations and research projects.

Points and Final Grade (may be adjusted slightly during semester):

<table>
<thead>
<tr>
<th>Points</th>
<th>% of Total</th>
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</thead>
<tbody>
<tr>
<td>Quizzes (7)</td>
<td>35 pts.</td>
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<tr>
<td>Assignments (4)</td>
<td>37 pts.</td>
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<tr>
<td>Exam (2)</td>
<td>37 pts.</td>
</tr>
<tr>
<td>Reports (2)</td>
<td>42 pts.</td>
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<tr>
<td>Total</td>
<td>151 pts.</td>
</tr>
</tbody>
</table>

Letter grades will be assigned according to the following scale.

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>A</th>
<th>A-</th>
<th>B+</th>
<th>B</th>
<th>B-</th>
<th>C+</th>
<th>C</th>
<th>C-</th>
<th>D+</th>
<th>D</th>
<th>D-</th>
<th>F</th>
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<tbody>
<tr>
<td>%</td>
<td>93-100</td>
<td>90-92.9</td>
<td>87-89.9</td>
<td>83-86.9</td>
<td>80-82.9</td>
<td>77-79.9</td>
<td>73-76.9</td>
<td>70-72.9</td>
<td>67-69.9</td>
<td>63-66.9</td>
<td>60-62.9</td>
<td>&lt;60</td>
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</tbody>
</table>

Information on the UF grading policy for assigning grade points can be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx
### The Ecology of Climate Change, **WIS 4934, Section 1410**  
**Spring 2020**

**Spring 2019 – small adjustments may be made pending visiting speakers and out-of-classroom, on-campus field trips – To be changed for Spring 2020**

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture Topics</th>
<th>Readings for date of class (see Canvas for .pdfs or links to readings)</th>
<th>Discussions In-class Activities In-class Assignment In-class Assignment assigned for future class</th>
</tr>
</thead>
</table>
| 1    | Jan. 8 | **Lecture Topics:** Course Introduction, IPCC, and climate change assessments  
Learning Objectives: Obtain overview of current knowledge of climate change and how to assess organism vulnerability to climate change | **What is science? Owell versus Wells (click above link)**  
**Williams et al. 2010 An integrated framework**  
**Optional reading:** IPCC 2014 (synthesis report) | **Discussion/Activity:**  
Discussion on purpose of science  
Create vulnerability framework  
Record student schedules for future copper pipe experiment  
**Assignment due In-class:** None.  
**Assignment assigned for future class:** Framework |
| Jan. 10 | **Discussion** | Discussion | | |
| 2    | **Lecture Topics:** Climate change | **Zeuss et al. 2013 on butterfly melanism** | | **Discussion/Activity:**  
Presentation of species-level climate change assessments  
**Assignment assigned for future class:** Quiz 1 |
### Jan. 15
<table>
<thead>
<tr>
<th><strong>Learning Objectives:</strong></th>
<th><strong>Pistone et al. 2014 Albedo and darkening of the Arctic</strong></th>
<th><strong>and variance</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>impacts on species morphology (color)</td>
<td></td>
<td>Assignment In-class:</td>
</tr>
<tr>
<td><strong>Optional reading:</strong></td>
<td><strong>Weins 1989</strong></td>
<td>Quiz 1</td>
</tr>
<tr>
<td><strong>Assignment assigned for future class:</strong></td>
<td></td>
<td>Framework</td>
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<tr>
<td></td>
<td></td>
<td>Quiz 2</td>
</tr>
</tbody>
</table>

### Jan. 17
<table>
<thead>
<tr>
<th><strong>On-campus field trip</strong></th>
<th><strong>Butterfly Rainforest</strong></th>
<th><strong>Establishing a baseline Section 1: Butterfly Rainforest</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Visit to Butterfly Rainforest and McGuire Center</td>
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</tr>
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</table>

### 3 Jan. 22
<table>
<thead>
<tr>
<th><strong>Lecture Topics:</strong></th>
<th><strong>Laloe et al. 2014 Rising temperatures and sea turtle rookeries</strong></th>
<th><strong>Discussion/Activity:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate change impacts on behavior and thermoregulation</td>
<td>Jensen et al 2016 Feminization of turtles</td>
<td>Complex interactions and consequences of climate change</td>
</tr>
<tr>
<td><strong>Learning Objectives:</strong></td>
<td><strong>Optional reading:</strong></td>
<td>Copper pipe experiment (see handout on canvas; The importance of operative temperature)</td>
</tr>
<tr>
<td>Appreciate the complexity of climate change impacts</td>
<td>Fan et al 2014 Cyclic color change and photoperiods</td>
<td>Assignment In-class:</td>
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<tr>
<td></td>
<td>Sunday et al 2014 Thermal safety margins across latitude</td>
<td>Quiz 2</td>
</tr>
<tr>
<td>Assignment assigned for future class:</td>
<td></td>
<td>Copper pipe data collection and Hypothesis/Objectives</td>
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<td></td>
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<td>Quiz 3</td>
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</tbody>
</table>

### Jan. 24
<table>
<thead>
<tr>
<th><strong>On-campus field trip</strong></th>
<th><strong>Sharma et al 2016 Monks record of climate change</strong></th>
<th><strong>Establishing a baseline Section 2: Florida Museum of Natural History</strong></th>
</tr>
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<tbody>
<tr>
<td>- Visit to FLMNH and</td>
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<tr>
<td>Date</td>
<td>Lecture Topics</td>
<td>Learning Objectives</td>
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</tbody>
</table>
| Jan. 29 | Climate change impacts on physiology and genetics | What is phenotypic plasticity and why is it important under climate change | Geerts et al 2015 Rapid evolution in water flea  
**Optional reading:**  
Franks 2008 Rapid evolution in plants  
Sunday et al 2014 on thermal tolerance  
Different ways to study climate change  
Fundamentals to an occupancy model – Why zeros are important  
Review Brown Anole survey methods and create schedule  
**Assignment In-class:**  
Quiz 3  
Copper pipe data collection and Hypothesis/Objectives  
**Assignment assigned for future class:**  
Operative temperature Report  
Brown anole surveys – preliminary |
| Jan. 31 | Brown Anole ecology | Begin initial observations and construction of independent research on brown anoles | On-campus field trip – Brown Anole  
**Assignment:**  
Brown Anole Research Project – Understanding the optimum temperatures and species distributions of animals in Northern Florida. |
| 5 | Kolbe et al 2014 Brown anole | | Discussion/Activity: |
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#### Spring 2020

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Learning Objectives</th>
<th>Activity</th>
<th>Assignment In-class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb 5</td>
<td>Brown Anole survey Overview</td>
<td>Develop a better understanding of the basis for species distribution models</td>
<td><em>minimum and maximum tolerable temperatures</em></td>
<td>Survey of brown anole distributions/observations</td>
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<td>Guidance with analysis and interpretation of operative data</td>
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<td>List of predictions based on operative model report about brown anole distribution in urban versus forested areas</td>
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<td>Assignment In-class: None.</td>
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<td>Assignment assigned for future class: Operative temperature Report Brown anole surveys Brown anole predictions Quiz 4</td>
</tr>
<tr>
<td>Feb 7</td>
<td>On-campus field trip -Visit to Harn Art Museum and art collections</td>
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<td>On-campus field trip</td>
<td>Establishing a baseline Section 3: Harn Art Museum</td>
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<tr>
<td></td>
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<td>Species and Populations</td>
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<tr>
<td>Feb 12</td>
<td>Lecture Topics: Climate change impacts on morphology (shape)</td>
<td>Appreciate the link between phenotypic</td>
<td>Gils et al 2016 Red knot fitness and climate change</td>
<td>Discussion/Activity: Review predictions and initial results from Anole survey / analysis</td>
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<tr>
<td>Date</td>
<td>Event Description</td>
<td>Learning Objectives</td>
<td>Assignment In-class</td>
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<tr>
<td>Feb 14</td>
<td>Guest lecture by Leslie Thiele of University of Florida</td>
<td>Rethinking population-level conservation under climate change</td>
<td>Brown anole predictions</td>
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<td></td>
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<td>Critically think about traditional conservation science and how it might change in the future</td>
<td>Assignment assigned for future class:</td>
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<td>Brown anole data analysis</td>
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<td>Brown anole report</td>
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<tr>
<td>Feb 19</td>
<td><strong>Lecture Topics:</strong> Rethinking population-level conservation under climate change</td>
<td>Phillips, Weeks, and Hoffman on genetic diversity (click link above)</td>
<td><strong>Discussion/Activity:</strong></td>
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<td></td>
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<td>Georgina Mace's &quot;Who's conservation&quot;</td>
<td>What is conservation science and why is it important?</td>
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<td>Do we abandon traditional conservation practices under climate change?</td>
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<td>Specific questions to consider: What is a species?</td>
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<td>How do we manage species and to what end? The role of protected areas now and in the future? Is triage necessary under climate change? How much should people intervene?</td>
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<td>Assignment assigned for future class:</td>
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<td>Brown Anole Surveys complete – data entry</td>
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<td><strong>Assignments:</strong></td>
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<td></td>
<td>Brown anole report</td>
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<td>Perspective on conservation ethics</td>
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<td>Quiz 5</td>
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<tr>
<td>Feb 21</td>
<td>Guest lecture by Dr. Matt Luskin of Nanyang Technological</td>
<td></td>
<td>Climate change impacts SE Asian mast fruiting and trophic cascades</td>
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</tbody>
</table>
### The Ecology of Climate Change, WIS 4934, Section 1410
**Spring 2020**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Lecture Topics:</th>
<th>Learning Objectives:</th>
<th>Discussion/Activity:</th>
<th>Assignment In-class:</th>
<th>Assignment assigned for future class:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb 26</td>
<td><strong>University</strong></td>
<td><strong>2017 Bird and plant phenology in North America</strong></td>
<td><strong>Seasonal shifts in life-history traits in animals</strong></td>
<td><strong>Phenology: Temperate versus Tropical</strong></td>
<td>Quiz 5</td>
<td>Brown anole data analysis</td>
</tr>
<tr>
<td>Feb 28</td>
<td><strong>Guest Lecture – Rebecca Senior</strong></td>
<td><strong>Spring Break</strong></td>
<td><strong>Thermal connectivity and changing landscapes</strong></td>
<td><strong>Assignment In-class:</strong></td>
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<tr>
<td>Mar 5</td>
<td><strong>Spring Break</strong></td>
<td><strong>Spring Break</strong></td>
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<td><strong>Assignment In-class:</strong></td>
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<tr>
<td>Mar 7</td>
<td><strong>Spring Break</strong></td>
<td><strong>Spring Break</strong></td>
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<td><strong>Assignment In-class:</strong></td>
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</tr>
<tr>
<td>Mar 10</td>
<td><strong>Lecture Topics:</strong></td>
<td><strong>2008 Quaternary climate change and frog diversity</strong></td>
<td></td>
<td><strong>Assignment In-class:</strong></td>
<td></td>
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<tr>
<td>Mar 12</td>
<td></td>
<td><strong>Optional reading:</strong></td>
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<td><strong>Assignment In-class:</strong></td>
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<td><strong>2011 Climate change velocity and endemism</strong></td>
<td><strong>Assignment In-class:</strong></td>
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<td><strong>2013 Microclimate moderates macroclimate warming</strong></td>
<td><strong>Assignment In-class:</strong></td>
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<td></td>
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<td><strong>2017 Dispersal and arboreality</strong></td>
<td><strong>Assignment In-class:</strong></td>
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</tbody>
</table>
The Ecology of Climate Change, **WIS 4934, Section 1410**
Spring 2020

<table>
<thead>
<tr>
<th>Mar. 14</th>
<th>Discussion</th>
<th>Discussion</th>
<th>Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 Mar. 19</td>
<td>Lecture Topics: Species redistribution: what is a native species under climate change?</td>
<td>Freeman and Freeman 2014 Bird range shifts in PNG</td>
<td>Discussion/Activity: Personal statement on the definition of a native species – define the new normal/baseline</td>
</tr>
<tr>
<td></td>
<td>Learning Objectives: To what extent are species changing their distributions to climate change and does this change our traditional view of conservation</td>
<td>Chen et al 2011 Global analysis of distribution shifts in animals</td>
<td>Address your perception of what constitutes a native species and how this might change</td>
</tr>
<tr>
<td></td>
<td>Optional reading: Połoczanska et al 2016 Marine fish distribution shifts in response to climate change</td>
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<td>Assignment In-class: Quiz 7</td>
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<td>Assignment assigned for future class: Perspective – Personal Essay Exam (April 11)</td>
<td></td>
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<table>
<thead>
<tr>
<th>Mar. 21</th>
<th>Discussion</th>
<th>Discussion</th>
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<tbody>
<tr>
<td>12 Mar. 26</td>
<td>Lecture Topics: Synergistic effects of climate change and habitat loss</td>
<td>Frishkoff et al 2016 on habitat conversation and climate change favoring the same species</td>
<td>Discussion/Activity: Disease and Climate Change puzzle</td>
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<tr>
<td></td>
<td></td>
<td>Optional reading:</td>
<td>Assignment assigned for future class: Exam (April 11)</td>
</tr>
<tr>
<td>Date</td>
<td>Time</td>
<td>Topic</td>
<td>Reading/Activity</td>
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<tr>
<td>Mar. 28</td>
<td>13:00</td>
<td><strong>Lecture Topics:</strong> Community assembly/disassembly under climate change</td>
<td><strong>Discussion</strong>&lt;br&gt;<strong>Verges et al 2014 Tropicalization of temperate zones</strong>&lt;br&gt;<strong>Hunting urban coyotes</strong> (click above link)&lt;br&gt;<strong>Optional reading:</strong> Fossheim et al 2015 Borealization of tundra zones&lt;br&gt;<strong>Discussion/Activity:</strong> Discuss the importance of ecological baselines&lt;br&gt;<strong>Assignment In-class:</strong> None&lt;br&gt;<strong>Assignment assigned for future class:</strong> Exam (April 11)</td>
</tr>
<tr>
<td>Apr.  2</td>
<td>14:00</td>
<td><strong>Lecture Topics:</strong> Competitive interactions under climate change</td>
<td><strong>Discussion</strong>&lt;br&gt;<strong>Stuart et al 2014 on rapid evolution in response to invasion</strong>&lt;br&gt;<strong>Optional reading:</strong> Gifford and Kozak 2012 Islands in the sky/squeezed at the top&lt;br&gt;<strong>Discussion/Activity:</strong> Revisiting the climate change vulnerability assessment framework&lt;br&gt;<strong>Student reading of personal statements of Conservation Ethics and/or What is native?</strong>&lt;br&gt;<strong>Assignment In-class:</strong> None&lt;br&gt;<strong>Assignment assigned for future class:</strong> Exam (April 11)</td>
</tr>
<tr>
<td>Date</td>
<td>Discussion</td>
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<td>Apr. 11</td>
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<tr>
<td>Apr. 15</td>
<td><strong>Lecture Topics:</strong> Phase/Regime shifts under climate change</td>
<td><strong>Wernberg et al 2016 Phase/Regime shift in marine kelp forests</strong></td>
<td><strong>Assignment In-class:</strong> Exam</td>
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<tr>
<td>Apr. 16</td>
<td><strong>Learning Objectives:</strong> Bennett et al 2015 Tropical herbivores provide resilience against climate change</td>
<td><strong>Optional reading:</strong> Parmesan et al 2011 Overstretching attribution on climate change (Figure presented in class; Identify adequate levels of attribution and identify co-dependence and relationships among different framework levels)</td>
<td><strong>Discussion/Activity:</strong> Revisit prior discussion of baselines</td>
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<td><strong>Student reading of personal statements of Conservation Ethics and/or What is native?</strong></td>
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<td>Apr. 18</td>
<td>Discussion</td>
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<td><strong>Assignment assigned for future class:</strong> None</td>
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<td><strong>Discussion</strong></td>
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</table>
Classroom demeanor and Professional conduct: This class will be conducted in an atmosphere of mutual respect and your active participation in class discussions is encouraged. Strongly differing opinions are encouraged and welcome. The orderly questioning of the ideas of others, including mine, is similarly welcome. You should expect that if your conduct during class discussions seriously disrupts the atmosphere of mutual respect I expect in this class, you will not be permitted to participate further.

Electronic Device Policy: Students are permitted to use computers during class for note-taking and other class-related work only. Those using computers during class for work not related to that class must leave the classroom for the remainder of the class period. The use of cell phones, smart phones, or other mobile communication devices is disruptive, and is therefore prohibited during class. Except in emergencies, those using such devices must leave the classroom for the remainder of the class period.

Academic Honesty: Students are expected to become familiar with and follow current University Policy (see http://www.dso.ufl.edu/sscr/process/student-conduct-honor-code/). On all work submitted for credit by students at the university, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." Students should report any condition that facilitates dishonesty to the instructor, department chair, college dean, Student Honor Council, or Student Conduct and Conflict Resolution in the Dean of Students Office (Source: 2013-2014 Undergraduate Catalog). It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor.

Plagiarism: As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writing etc., which belong to another. In accordance with this definition: THE STUDENT IS COMMITTING PLAGARISM IF HE OR SHE COPIES THE WORK OF ANOTHER PERSON AND TURNS IT IN AS HIS OR HER OWN, EVEN IF PERMISSION BY THAT PERSON HAS BEEN GRANTED. Plagiarism will not be tolerated in this course. Offenders of this policy will be punished according to University policies. In addition, there will be no cheating of any type tolerated in this course. This policy will be vigorously upheld at all times in this course.
http://web.uflib.ufl.edu/msl/07b/studentplagiarism.html,
http://flexible.dce.ufl.edu/Data/Sites/39/media/uf-policy_student-conduct1.pdf

Software Use
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 use the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. University Counseling & Wellness Center, 3190 Radio Road, 352.392.1575, www.counseling.ufl.edu/cwc/. Resources are also available on campus for students lacking clear career or academic goals, which interfere with their academic performance. Career Resource Center, First Floor JWRU, 352.392.1601, www.crc.ufl.edu.

Students with Disabilities:
The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Room 001 Reid Hall, 352.392.8565, www.dso.ufl.edu/drc/.

Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

Course evaluation: Students are expected to provide feedback on the quality of instruction in this course. These evaluations are conducted online at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results.

Academic Resources Available:
E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml
Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling. https://career.ufl.edu/
Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.
Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. http://teachingcenter.ufl.edu/
Student Complaints On-Campus: https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/
On-Line Students Complaints: http://distance.ufl.edu/student-complaint-process/
Extended outline of Course

The Ecology of Climate Change (WIS 4934-1410) is a course primarily focused on climate change science but also relates underlying processes and impacts of climate change to other dominant conservation fields such as habitat fragmentation, invasive species, and urbanization. The course covers in detail ecological principles and theory and uses activities and discussion, with an emphasis on the scientific process (observation, questions, data collection, analysis, and critique), as a means to better understand climate change science.

The course is designed around an integrative framework for assessing species vulnerability to climate change. The framework balances intrinsic (species sensitivity) versus extrinsic (exposure) factors. Intrinsic factors center around the ecology, physiology and genetic diversity of a species, which influences adaptive capacity and resilience to climate change whereas extrinsic factors center around species exposure to microhabitat/topographic buffering of climate as well as regional climatic change.

At the beginning of the semester each student will execute an exercise, without any knowledge of the framework or readings for support, to construct their own framework (based on their current knowledge of ecology and common sense) for assessing species vulnerability for their chosen taxa. This framework will serve as the reference point for each student moving forward throughout the semester and will be adapted as knowledge is acquired.

We will then build on this understanding of the key components of the framework with a series of papers on observed impacts of climate change ranging from genetic diversity, phenotypic variation (morphology and physiology), phenology, distributions, population dynamics, community interactions, and ecosystem phase shifts. Students will also learn about general issues relating to scaling (both time and space) in ecology, biodiversity and climate gradients, thermal optimization curves, and species distribution and occupancy models, all of which are important concepts that support climate change science.

The short research activities are designed to help students integrate the theory they learned from academic articles into real-life scientific discovery. Importantly, by the end of each activity, students will have researched the key criteria of intrinsic and extrinsic factors from the integrated framework required for assessing species responses to climate change. At the beginning of each activity, students will form groups and each student group will plan and execute a small research project. There were 2-3 projects all tackling different sets of questions ranging from physiological tolerance to temperature, activity patterns within forest and urban environments as they relate to ambient versus operative temperature, and morphological traits that interact with climate. Throughout the course, students will peer-review each other's projects and provided constructive feedback for improvement.
Cover Sheet: Request 14326

Request to drop prerequisite for ORH 3815C

<table>
<thead>
<tr>
<th>Info</th>
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<tr>
<td>Process</td>
<td>Course</td>
</tr>
<tr>
<td>Status</td>
<td>Pending at CALS - College of Agricultural and Life Sciences</td>
</tr>
<tr>
<td>Submitter</td>
<td>Sandra Wilson <a href="mailto:sbwilson@ufl.edu">sbwilson@ufl.edu</a></td>
</tr>
<tr>
<td>Created</td>
<td>10/8/2019 11:48:50 AM</td>
</tr>
<tr>
<td>Updated</td>
<td>10/8/2019 5:24:28 PM</td>
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<tr>
<td>Description of request</td>
<td>We are requesting the prerequisite to be dropped from ORH 3815C, Florida Native Landscaping. This was entered in error 20 years ago when I developed the class and I have never required it. Thanks so much! sandy</td>
</tr>
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<table>
<thead>
<tr>
<th>Actions</th>
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<tbody>
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<td>No document changes</td>
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</table>
Course|Modify for request 14326

Info

Request: Request to drop prerequisite for ORH 3815C
Description of request: We are requesting the prerequisite to be dropped from ORH 3815C, Florida Native Landscaping. This was entered in error 20 years ago when I developed the class and I have never required it.
Thanks so much!
sandy
Submitter: Sandra Wilson sbwilson@ufl.edu
Created: 10/8/2019 11:34:13 AM
Form version: 1

Responses
Current Prefix ORH
Course Level 3
Number 815
Lab Code C
Course Title Florida Native Landscaping
Effective Term Earliest Available
Effective Year 2020
Requested Action Other (selecting this option opens additional form fields below)
Change Course Prefix? No

Change Course Level? No
Change Course Number? No
Change Lab Code? No
Change Course Title? No
Change Transcript Title? No
Change Credit Hours? No
Change Variable Credit? No
Change S/U Only? No
Change Contact Type? No
Change Rotating Topic Designation? No
Change Repeatable Credit? No
Maximum Repeatable Credits 3
Change Course Description? No
Change Prerequisites? Yes
Current Prerequisites ORH3513
Proposed Prerequisites none

Change Co-requisites? No

Rationale Hi Joel,
I am the sole developer and instructor of this class. I have been teaching this elective course for nearly 20 years and have NEVER required this prerequisite. It must have been entered wrong when I originally developed the class. This hasn't been a problem until recently with the new system that is preventing students from self registering unless they have this prerequisite. Thanks so much for your help. This is scheduled for Spring 2020.
Please say hello to everyone at the CCC for me!
Best Regards,
Sandy
Syllabus
ORH 3815C Florida Native Landscaping
Spring 2020 Gainesville
3 credits

instructor
Dr. Sandra Wilson,
Professor,
ENV. HORT GNV
(772) 834-7619
sbwilson@ufl.edu

Teaching Assistant
Julia Rycyna (GNV)
(433)624-0523
juliarycyna@ufl.edu
101 Mehrhof Hall
Gainesville

Course Description:
This is an upper-division environmental horticulture course designed to encourage students to have an interest, understanding, and appreciation of Florida’s native flora. Weekly lectures will cover plant nomenclature, effective utilization, and design elements of native plants that are commercially available for landscape use. Web-based topical lectures will be provided from experts who have a range of knowledge in the field. Weekly lab exercises will cover some of best native plants for our area, propagation of native plants, and incorporation of native plants into gardens and landscapes.

Prerequisite:
None

Materials and Supply Fee: $50.00

Class Meeting Time and Location:
Wednesdays (2:00 pm-6:00 pm). Additional online lectures are listed below.

Gainesville meeting location: Greenhouse complex, PSF5.

*The class may meet at alternate locations as needed such as Mehrhof Gardens, the UF Tree Unit, and the UF Herbarium.

Office Hours:
Please feel free to email the instructor at any time to meet. Office: Mehrhof Hall, Bldg 559, Room 108. Or contact by email, canvas, or text.

Learning Objectives:
At the conclusion of this course, the student will be able to:

1. Identify 50+ species that are native to Florida and used in landscapes
2. Examine the aesthetic and functional value of native plants and how they can be better incorporated into landscapes
3. Characterize underutilized natives using learned taxonomic descriptions, species distinctions among shared genera, herbarium sampling, and photography
4. Associate original plant ecosystems with selection, use, establishment and maintenance of natives in modified landscapes
5. Determine propagation and production practices for natives
6. Distinguish between native and non-native cultivars

Course Website:
CANVAS (for lecture print-outs, recorded lectures, additional readings, group assignment descriptions, discussions, etc.) http://elearning.ufl.edu/

Native Landscaping website: http://irrecenvhort.ifas.ufl.edu/FNL/Index.htm

Course Textbook:

Other Useful Book References: *desk copies can be found in the instructor's office


Rogers, G.K. 2011. Landscape Plants for South Florida. George Rogers Publishing, Palm Beach Gardens, FL. (Recommended)


**Student Responsibilities:**

- ✓ **Attendance:** You are expected to attend all classes and activities
- ✓ **Preparation:** You are responsible for retrieving and/or printing course materials
- ✓ **Plant ID Quizzes:** In order to do well, you will need to spend considerable time studying the live plants and PowerPoints presented, and practicing rote memorization of the scientific and common names. There are no make-up quizzes unless prior approval is granted for extreme circumstances.
- ✓ **Handing in written assignments:** Unless otherwise stated, all assignments must be posted in e-learning and/or turned in prior to class on the due date.
- ✓ **Late or make-up assignments:** Assignments will be marked down 5 percentage points for each day late. Please remember, homework is assigned to prepare the student for class discussions. If you do not complete the assignments, your participation will suffer.
- ✓ **Completion of all assignments:** You must complete all assignments and participate in class in order to pass the course.

**Student Evaluation:**
EXAMS
Midterm exam ................................................................. 100 pts
Final exam ................................................................. 100 pts

ID QUIZZES
Quiz 1 (plants 1-20) ......................................................... 20 pts
Quiz 2 (plants 1-40) ......................................................... 20 pts
Quiz 3 (plants 1-50) ......................................................... 40 pts

ASSIGNMENTS
Assignment 1- Germination of native seed ................. 10 pts
Assignment 2- Small container project ..................... 5 pts
Assignment 3- Plant lecture presentation ................. 10 pts
Assignment 4- Guest lecture questions and answers (5) ... 10 pts
Assignment 5- Field trip 1 summary report ................. 5 pts

PARTICIPATION
Active attendance and participation in class and lab .... 5 pts
Participation in landscape design and installation ... 5 pts

TOTAL=330 POINTS

Format:
- Hands-on Activities: The use of tools and some outdoor, physical work can be expected. These outdoor activities are indicated in the syllabus so that you can dress appropriately.

- Plant Identification: Students will be exposed to almost 200 different plant species but only quizzed on 50 plants. There will be three cumulative ID exams. On test days, plan on taking a 20-minute quiz followed by other scheduled lab activities. Grading will be designated as follows: 4 points for genus, 4 points for species, 1 point for common name, 1 point for spelling. The quizzes are cumulative, meaning that by the end of the semester the identification test will cover all 50 plants.

- Germination of Native Seed: Each student will germinate one or more flats of seed provided in lab and monitor its growth and development. You will be responsible for the care of the seeded trays and present the seedling performance orally and in written format. Germination should be monitored and recorded once a week and graphed as percent germination over time. This assignment is worth 10 points and will be graded using a rubric.

- Small Container Project: Each student will be given a container for greenhouse plants to be transplanted into (you will choose the design and plants for your individual container). You will be responsible for caring for your container garden. This includes watering, fertilizing, weeding, protecting from unusual cold temperatures, etc. You will orally present your container garden to the class, after which you will be able to take it home. This assignment is worth 5 points.
- **Plant Lecture Presentation:** Students will either work independently or pair in teams of two or three depending on the size of the class. Your instructor will determine this at the beginning of the semester. Each group will choose the number of plants that represents the number of people in the group. Plants should be selected from: 1) the list of plants that are NOT highlighted in your comprehensive plant list (i.e., not covered by the instructor in class), 2) plants in the greenhouse or landscape, or 3) other plants that are suitable for landscape use. A detailed species report (plant data sheet) will be prepared and presented to the class. The lecture should include: scientific name, common name, family botanical description, native range in Florida and the U.S. when applicable, growth form, size, flower description, culture, tolerances, propagation and use. Photos and information on closely related species, or other available cultivars are encouraged. Presentations may use PowerPoint, video, photography, hands-on activities, or other methods. Presentations should be downloadable in e-learning prior to assignment due date. This assignment is worth 10 points and will be graded using a rubric.

- **Guest Lecture Questions:** From the guest speakers, students will be asked to submit potential questions that the instructor may select to include on an exam. A total of five questions (with answers) are to be submitted in e-learning from any of the guest lectures. Questions are due 5 days prior to either the mid-term or final exam. Choose which exam you would like to submit questions for. If one of your questions is selected, a total of 2 pts will be added to your total exam score! This assignment is worth 10 points.

- **Field Trip:** During a scheduled class day we will take a field trip to a native plant nursery and 100% native yard. Students will summarize the nursery operation and/or yard in a one page or less report and submit the following week. This assignment is worth 5 points.

- **Landscape Installation Project:** As a group, students will design, install and maintain a section of Mehrhof Gardens. This activity is worth 5 points for participation.

**Grading Policy**

Final grades will be based on the follow scale:

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<thead>
<tr>
<th>Percentage</th>
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<td>93.5-100%</td>
<td>A</td>
<td>309-330 pts</td>
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<tr>
<td>89.5-93.4%</td>
<td>A-</td>
<td>296-308 pts</td>
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<tr>
<td>86.5-89.4%</td>
<td>B+</td>
<td>286-295 pts</td>
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<tr>
<td>82.5-86.4%</td>
<td>B</td>
<td>273-285 pts</td>
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<tr>
<td>79.5-82.4%</td>
<td>B-</td>
<td>263-272 pts</td>
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<tr>
<td>76.5-79.4%</td>
<td>C+</td>
<td>253-262 pts</td>
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<tr>
<td>72.5-76.4%</td>
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<td>240-252 pts</td>
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<tr>
<td>69.5-72.4%</td>
<td>C-</td>
<td>230-239 pts</td>
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<td>66.5-69.4%</td>
<td>D+</td>
<td>220-229 pts</td>
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<td>62.5-66.4%</td>
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<td>207-219 pts</td>
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<td>59.5-62.4%</td>
<td>D-</td>
<td>197-206 pts</td>
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<tr>
<td>≤59.4%</td>
<td>E</td>
<td>≤196 pts</td>
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<tr>
<td>1</td>
<td>Jan 8</td>
<td>Introduction of students/faculty; Brian Owens-greenhouse safety; Tour of greenhouses; Propagation of natives: Plug planting 1, Seed germination 1</td>
</tr>
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| 2    | Jan 15| Lecture: Defining Native Plants  
E-learning Speaker: Cammie Donaldson, Executive Director, Florida Association of Native Nurseries/Native Plant Horticulture Foundation-  
"Securing our Future with Native Plants"  
Plug planting 2; Seed germination 2; cutting propagation 1 |
| 3    | Jan 22| Invited Speaker: Dr. Bart Schutzman, Lecturer- "A Review of Native Plant Morphology"  
Wilson- Plant ID List 1  
| 4    | Jan 29| Crop management  
E-learning Speaker: Lloyd Singleton, Former Extension Agent, Florida-Friendly Landscaping. "Native Plant Use in Managed Communities"  
E-learning Speaker: Claudia Larsen, Owner, Micanopy Wildflowers "Rewards and Challenges of Growing Florida Wildflowers". |
| 5    | Feb 5 | Lecture: Right plant/right place-how native ecosystem associations can help  
HERBARIUM VISIT:  
UF Herbarium, Florida Museum of Natural History (https://www.floridamuseum.ufl.edu/herbarium/), 379 Dickinson Hall. Tour provided by Dr. Marc Frank, Extension Botanist “Florida’s Flora and How to Prepare Voucher Specimens”  
ID Quiz 1 (plants 1-20) |
| 6    | Feb 12| FIELD TRIP  
Green Isle Gardens Native Plant Nursery (http://www.greenislegardens.com/) and visit to The Villages, FL -100% native yard; plan for an all-day event with vans leaving at 8:00am. Address 6043 Lake Erie Rd, Groveland, FL and 1895 Gasparilla Place, The Villages, FL |
| 7    | Feb 19| TREE UNIT VISIT, 2077 SW 23rd Terrace Bldg 1356. UF, Gainesville  
Chris Harchick-Biological Scientist—"Years of Research used to Guide Growers and Arborists in Pruning and Planting Practices of Native Trees"  
Wilson-Plant ID List 3 |
| 8    | Feb 26| Individual Container Planting  
E-learning Speaker: Meg Whitmer, Landscape Architect- “Native Designs that Work” |
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Event Details</th>
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</thead>
<tbody>
<tr>
<td>9</td>
<td>March 4</td>
<td><strong>Spring Break</strong></td>
</tr>
<tr>
<td></td>
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<td>Lecture: Native Alternatives to Ornamental Invasive Plants</td>
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<tr>
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<td>Wilson-Plant ID List 4</td>
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<tr>
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<td>E-learning Speaker: Dr. Rachel Mallinger, Assistant Professor, Dept. Entomology and Nematology. “How can we support native wild bees in our Florida landscapes?”</td>
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<tr>
<td>10</td>
<td>March 11</td>
<td>FIELD TRIP</td>
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<td></td>
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<td>Gainesville- Florida Wildflower Growers Cooperative (<a href="http://www.floridawildflowers.com">http://www.floridawildflowers.com</a>) P.O. Box 776, Crescent City, Florida 32112; vans will leave at 2:00 pm and return by 6:00 pm</td>
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<tr>
<td>11</td>
<td>March 18</td>
<td>E-learning Speaker: Dr. Gail Hansen, Associate Professor- “Novel landscapes: alternatives to traditional landscapes”- UF’s master landscape plan is discussed</td>
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<td><strong>Individual Container Planting Presentations, Seedling Presentations</strong></td>
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<td>ID Quiz 2 (plants 1-40)</td>
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<td>E-learning Speaker: Dr. Jeff Norcini-OecoHort Consulting, FDOT State Wildflower Specialist- “Native Wildflower Gardening for Residential Landscapes”</td>
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<td><strong>Student Plant Lecture Presentations-continued</strong></td>
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<td>Lecture: Research findings pertinent to native plant propagation and production</td>
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**Attendance Policy**
Students are responsible for satisfying all academic objectives as defined by the instructor. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: http://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/. In the case of excused absences, assignments will be marked down 10% each day they are late.

**Students Requiring Accommodations**

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, https://www.dso.ufl.edu/drc) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

**Course Evaluation**

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu/evals. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

**University Honesty Policy**

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (https://www.dso.ufl.edu/sscr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

**Software Use**

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. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

**Student Privacy**

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html
Campus Resources:
Health and Wellness

U Matter, We Care:
If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.


Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.


# Cover Sheet: Request 14328

**Change of prerequisite for ORH4804 Annual and Perennial Gardening**

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Course|Modify for request 14328

Info

Request: Change of prerequisite for ORH4804 Annual and Perennial Gardening
Description of request: This request is to change the prerequisites for the Annual and Perennial Gardening courses (ORH4804, ORH4804L, ORH4804C, and ORH5026C) from two upper division courses (ORH3513 and PLS3223) to Junior standing.
Submitter: Mack Thelford thelford@ufl.edu
Created: 10/8/2019 8:44:05 PM
Form version: 1

Responses
Current Prefix ORH
Course Level 4
Number 804
Lab Code L
Course Title Annual and Perennial Gardening
Effective Term Earliest Available
Effective Year 2020
Requested Action Other (selecting this option opens additional form fields below)
Change Course Prefix? No

Change Course Level? No
Change Course Number? No
Change Lab Code? No
Change Course Title? No
Change Transcript Title? No
Change Credit Hours? No
Change Variable Credit? No
Change S/U Only? No
Change Contact Type? No
Change Rotating Topic Designation? No
Change Repeatable Credit? No
Maximum Repeatable Credits 2
Change Course Description? No
Change Prerequisites? Yes
**Current Prerequisites**  Prereq: ORH 3513C and PLS 3223; Coreq: ORH 4804L

**Proposed Prerequisites**  Junior standing

**Change Co-requisites?**  No

**Rationale**  The present prerequisites are difficult for the students to obtain (difficulty in sequencing the offering of the three courses) in order to take advantage of the alternate year offering of this course. The plant identification skills available for the presently listed prerequisites are obtained in the preadmission biology requirements (lower division course requirements) for the plant science curriculum. I have taught the course for over 10 years to students who did not have these two course requirements and they have performed very well with the skills and knowledge obtained in the lower division biology courses.

This change in prerequisite should be applied to all forms of the course (ORH4804C, ORH4804L, ORH5026C)
Cover Sheet: Request 14393

Terminate Wetland Sciences (CALS) Graduate Certificate

**Info**

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Certificate|Close-Modify for request 14393

Info

Request: Terminate Wetland Sciences (CALS) Graduate Certificate
Description of request: The Wetland Sciences graduate certificate was to be transferred from CALS to Engineering Academic Approval Request # 10423 but then it was determined by the Graduate School that a new request for the certificate was the better way to go. Therefore, a new request was made and it was approved in January of this year Academic Approval Request # 11865. The new graduate certificate in Wetland Sciences is now housed in College of Engineering with re-structured course plan/requirements.
Submitter: Michael Sisk mjsisk@ufl.edu
Created: 10/29/2019 4:24:26 PM
Form version: 1

Responses
Current Certificate Name Wetland Sciences (CALS)
Effective Term Earliest Available
Effective Year Earliest Available
Requested Action Terminate Certificate

Current Transcript Name Wetland Sciences

Assessment Data Review N/A
Cover Sheet: Request 14329

Modification of Hydrologic Sciences Concentration

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<td>Joel H Brendemuhl</td>
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Concentration|Modify for request 14329

Info
Request: Modification of Hydrologic Sciences Concentration
Description of request: It is proposed to change PhD requirements for the Concentration to have all graduate students be required to complete one subsurface hydrology course from Topic 1 and one surface hydrology course from Topic 2, and at least one course in two of the four remaining Topics. For the current list of approved courses see https://hydrology.uff.edu/curriculum/
Submitter: Robyn Screws pippi@uff.edu
Created: 10/10/2019 12:21:30 PM
Form version: 2

Responses
Degree Level D - Doctoral Degree
Thesis or Non-Thesis Thesis
Concentration Hydrologic Sciences
Effective Term Earliest Available
Effective Year Earliest Available
Is this an undergraduate Innovation Academy Program No
Department/Degree/Majors to Offer Concentration Agricultural and Biological Engineering: PhD in Agricultural Production
Agricultural and Biological Engineering: PhD in Biological Engineering
Agricultural and Biological Engineering: PhD in Information Systems
Agricultural and Biological Engineering: PhD in Land and Water Resources
Civil & Coastal Engineering: PhD in Air Resources
Civil & Coastal Engineering: PhD in Coastal & Oceanographic Engineering
Civil & Coastal Engineering: PhD in Coastal Ecosystem Dynamics
Civil & Coastal Engineering: PhD in Engineering Education Collaborative
Civil & Coastal Engineering: PhD in Environmental Nanotechnology
Civil & Coastal Engineering: PhD in Geosystems Engineering
Civil & Coastal Engineering: PhD in Materials & Pavement
Civil & Coastal Engineering: PhD in Public Works
Civil & Coastal Engineering: PhD in Structural Engineering
Civil & Coastal Engineering: PhD in Sustainable Construction Engineering
Civil & Coastal Engineering: PhD in Systems Ecology and Ecological Engineering
Civil & Coastal Engineering: PhD in Transportation Engineering
Civil & Coastal Engineering: PhD in Water Systems
Environmental Engineering Sciences: PhD in Air Resources
Environmental Engineering Sciences: PhD in Coastal Ecosystem Dynamics
Environmental Engineering Sciences: PhD in Environmental Nanotechnology
Environmental Engineering Sciences: PhD in Systems Ecology and Ecological Engineering
Environmental Engineering Sciences: PhD in Water Systems
School of Forest Resource & Conservation: PhD in Fisheries & Aquatic Sciences
School of Forest Resource & Conservation: PhD in Forest Resources & Conservation
Geography: PhD in Geospatial Analysis & Techniques
Geography: PhD in Medical Geography in Global Health
Geography: PhD in Earth System Science
Geography: PhD in Global Environmental and Social Change
Geology: PhD in Environmental Science and Hydrology
Geology: PhD in Paleoclimatology and Paleolimnology
Geology: PhD in Marine and Coastal Geology
Geology: PhD in Tectonics and Geodynamics
Geology: PhD in Geochemistry
Geology: PhD in Mineralogy and Petrology
Geology: PhD in Paleomagnetism and Environmental Magnetism
Rinker School of Construction Management: PhD in Construction Management
Natural Resources and Environment: PhD in Interdisciplinary Ecology
Soil and Water Sciences: PhD in Soil and Water Science
Current Curriculum for Concentration One course from each of six topics to equal 18 credit hours total. Topics: (1) Subsurface Hydrology; (2) Surface Hydrology; (3) Hydrologic Chemistry; (4) Hydrologic Biology; (5) Hydrologic Analysis & Techniques; and (6) Hydrologic Policy & Management. For the current list of approved courses see https://hydrology.ufl.edu/curriculum/

Proposed Concentration Changes It is proposed to change PhD requirements for the Concentration to be the same as the current Masters Concentration, thus creating one graduate Hydrologic Sciences Academic Concentration available to either Masters or Ph. D students. All graduate students will be required to complete one subsurface hydrology course from Topic 1 and one surface hydrology course from Topic 2, and at least one course in two of the four remaining Topics. For the current list of approved courses see https://hydrology.ufl.edu/curriculum/

Pedagogical Rationale/Justification In many of the participating departments Ph D. coursework requirements have been decreased since the Hydrologic Sciences Academic Concentration was first approved in 1993, making it difficult for some Ph. D. students to fit it into their programs. After review of other graduate concentrations both at UF and elsewhere the faculty of the Hydrologic Sciences Coordinating Committee decided to reduce the concentration coursework requirements for Ph. D. students to make completing the concentration feasible for more students.

Impacts on other programs It is anticipated that consolidating the Hydrologic Sciences Academic Concentration into one graduate program, with reduced coursework requirements for Ph. D. Students, will increase the total number of students enrolling in, and graduating from, the Concentration.

Assessment Data Review The Hydrologic Sciences Academic Concentration (HSAC) for graduate studies is a unique interdisciplinary program designed to broaden the skills of science and engineering graduate students who are interested in all aspects of water; i.e., occurrence and quantity, distribution, circulation, quality, and management/policy use. The HSAC program emphasizes broad and rigorous training in a wide range of areas of expertise.

Program requirements recognize the diversity in academic backgrounds and professional goals of graduate students. Thus, flexibility in selection of courses is an essential feature of the program. Students develop individualized academic plans of study that meet the overall goals and objectives of the Hydrologic Sciences Academic Concentration and those of their own degree programs. Each student's plan of study is reviewed and approved by the faculty of the Hydrologic Sciences Coordinating Committee to ensure appropriate depth and breadth of the curriculum. See https://hydrology.ufl.edu/wp-content/uploads/2016-HSAC-By-Laws.pdf

Academic Learning Compact and Academic Assessment Plan Program requirements recognize the diversity in academic backgrounds and professional goals of graduate students. Thus, flexibility in selection of courses is an essential feature of the program. Students develop individualized academic plans of study that meet the overall goals and objectives of the Hydrologic Sciences Academic Concentration and those of their own degree programs. Each student's plan of study is reviewed and approved by the faculty of the Hydrologic Sciences Coordinating Committee to ensure appropriate depth and breadth of the curriculum. See https://hydrology.ufl.edu/wp-content/uploads/2016-HSAC-By-Laws.pdf
Hydrologic Sciences

Interdisciplinary graduate studies in hydrologic sciences are for science and engineering students seeking advanced training in diverse aspects of water quantity and quality, and water-use issues. This concentration emphasizes (1) understanding the physical, chemical, and biological processes occurring over broad spatial and temporal scales; and (2) skills in hydrologic policy and management based on a strong background in natural and social sciences and engineering.

Graduate Faculty from nine schools and departments in four colleges contribute to this interdisciplinary concentration. Depending on academic background and research interests, students may earn a degree in any one of the following departments: Agricultural and Biological Engineering, Civil and Coastal Engineering, Environmental Engineering Sciences, Forest Resources and Conservation, Geography, Geological Sciences, Rinker School of Construction Management, School of Natural Resource and Environment and Soil and Water Science.

The Hydrologic Sciences Concentration is available to M.S. (thesis and non-thesis option) and Ph.D. students in participating departments. Interdisciplinary graduate requirements recognize diversity in the academic backgrounds and professional goals of the students. A core curriculum (12 credits) provides broad training in six topics: subsurface hydrology surface hydrology, hydrologic chemistry, hydrologic biology, hydrologic analysis and techniques, and hydrologic policy and management. Research projects involving faculty from several academic units can provide the basis for thesis and dissertation research topics.

Students with B.S. or M.S. degrees in any of the following disciplines are encouraged to consider this specialization in their graduate program: engineering (agricultural, chemical, civil, environmental); natural sciences (physics, biology, chemistry); social sciences (agricultural and resource economics); forestry; and earth sciences (geography, geology, soil and water science).

For more information, contact Dr. Wendy Graham, UF Water Institute, P.O. Box 116601, Gainesville FL 32611, Phone (352) 392-5893, E-mail water-institute@ufl.edu; or visit the Hydrologic Sciences Academic Concentration website (https://hydrology.ufl.edu/ http://www.hydrology.ufl.edu).
# Cover Sheet: Request 14426

**Plant Breeding - New Graduate Degree Program**

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<td>Eliana Kampf <a href="mailto:elianak@ufl.edu">elianak@ufl.edu</a></td>
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Plant Breeding (CALS)

College
College of Agricultural and Life Sciences

Department/School
Plant Breeding Graduate Program

Plant Breeding Graduate Program Information

Breeding is an interdisciplinary and interdepartmental graduate program that provides comprehensive plant breeding training to form well-rounded and career-ready plant breeders for academic, industry, non-profit and other sectors. Our integrated curriculum equips students with traditional and contemporary breeding methodologies, including analysis of breeding trials, breeding methods and techniques, bioinformatics, gene editing, genomic prediction and quantitative genetics.

The Plant Breeding Graduate Program offers a Doctor of Philosophy degree that provides students with a strong background in experimental design and analysis during the first semester, and plant breeding theory and methods during the second semester. Our plant breeding faculty work with 50 plant species and represent diverse disciplines including: cell biology, genomics, molecular genetics, plant pathology, quantitative genetics & biometrics. For a complete faculty listing, please see the last page of this document.

Six core courses are required (STA6093 Introduction to Applied Statistics for Agriculture & Life Sciences, AGR5266C Field Plot Techniques, AGR5321 Genetic Improvement of Plants, HOS6932 Special Topics – Survey of Breeding Methods, AGR6325 Plant Breeding Techniques, HOS6932 Special Topics - Journal Colloquium) and must be taken during the first fall and spring semesters (with the exception of AGR6325 which can be taken any semester). Additionally, students must take at least two additional courses (minimum of six credits) from a list of elective courses (see below). Additional elective courses may be taken with approval of the student’s supervisory committee.

Minimum requirements for this degree are available in the Graduate Degrees section of this catalog. Successful applicants should have a B.S. or M.S. in agricultural, horticultural, forestry, biological or chemical sciences with desirable advanced undergraduate coursework in genetics, statistics, plant breeding, and biochemistry. However, outstanding students from a broad range of science and engineering disciplines will be considered.

All doctoral students must have at least one first author publication submitted to a peer-reviewed journal in their research field before graduation. Our students are strongly encouraged to publish before graduating.

Contact program coordinator Eliana Kampf at elianak@ufl.edu, Dr. Vance Whitaker at vwhitaker@ufl.edu, or visit the program's website at TBD (Note: Plant Breeding website under construction).

Degrees Offered with a Major in Plant Breeding
Doctor of Philosophy

Plant Breeding Courses
Core Courses:

STA6093 Introduction to Applied Statistics for Agriculture & Life Sciences
AGR5266C Field Plot Techniques
AGR5321 Genetic Improvement of Plants
HOS6932 Special Topics – Survey of Breeding Methods
AGR6325 Plant Breeding Techniques
HOS6932 Special Topics - Journal Colloquium

Elective Courses:

HOS6201 Breeding Perennial Cultivars
PCB5065 Advanced Genetics
AGR5307 Molecular Genetics for Crop Improvement
HOS5242 Genetic and Breeding of Vegetable Crops
GMS6231 Genomics and Bioinformatics
AGR6932 Plant Chromosomes and Genomes
PCB6555 Introduction to Quantitative Genetics
HOS6236 Molecular Marker-Assisted Plant Breeding
AGR6322 Advanced Plant Breeding

Dissertation Research:

HOS7979 Advanced Research
HOS7980 Doctoral Research

Plant Breeding Faculty listing

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<td>Agronomy</td>
<td>Professor</td>
<td>Elephantgrass, Bahiagrass, Napiergrass, Sugar Cane</td>
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<tr>
<td>Babar, Md Ali</td>
<td>Agronomy</td>
<td>Assistant Professor</td>
<td>Grains (wheat, oats and triticale)</td>
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<tr>
<td>Blount, Ann</td>
<td>Agronomy, NFREC</td>
<td>Professor</td>
<td>Small Grains (Oat, Triticale), Forage (Annual Ryegrass), Perennial Peanut</td>
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<td>Chambers, Alan</td>
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<td>Assistant Professor</td>
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<td>Clark, David G.</td>
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<td>Ornamentals, Coleus, Basil</td>
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<td>Deng, Zhanao</td>
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Board of Governors, State University System of Florida

Request to Offer a New Degree Program

(Please do not revise this proposal format without prior approval from Board staff)

University of Florida

University Submitting Proposal
College of Agricultural and Life Sciences
Name of College(s) or School(s)
Plant Breeding
Academic Specialty or Field
01.1104

Proposed CIP Code
The submission of this proposal constitutes a commitment by the university that, if the proposal is approved, the necessary financial resources and the criteria for establishing new programs have been met prior to the initiation of the program.

Date Approved by the University Board of Trustees

Signature of Chair, Board of Trustees

Date

President

Date

Vice President for Academic Affairs

Date

Fall 2021

Proposed Implementation Term
Horticultural Sciences, Agronomy, School of Forest Resources and Conservation, Environmental Horticulture

Name of Department(s)/Division(s)
Doctor of Philosophy

Complete Name of Degree

Proposed Implementation Term
Horticultural Sciences, Agronomy, School of Forest Resources and Conservation, Environmental Horticulture

Name of Department(s)/Division(s)
Doctor of Philosophy

Complete Name of Degree

Provide headcount (HC) and full-time equivalent (FTE) student estimates of majors for Years 1 through 5. HC and FTE estimates should be identical to those in Table 1 in Appendix A. Indicate the program costs for the first and fifth years of implementation as shown in the appropriate columns in Table 2 in Appendix A. Calculate an Educational and General (E&G) cost per FTE for Years 1 and 5 (Total E&G divided by FTE).

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Note: This outline and the questions pertaining to each section must be reproduced within the body of the proposal to ensure that all sections have been satisfactorily addressed. Tables 1 through 4 are to be included as Appendix A and not reproduced within the body of the proposals because this often causes errors in the automatic calculations.
INTRODUCTION

I. Program Description and Relationship to System-Level Goals

A. Briefly describe within a few paragraphs the degree program under consideration, including (a) level; (b) emphases, including majors, concentrations, tracks, or specializations; (c) total number of credit hours; and (d) overall purpose, including examples of employment or education opportunities that may be available to program graduates.

The University of Florida is one of the most active and innovative land-grant universities in plant breeding and variety licensing in the country. The university employs 27 faculty positions, breeding 50 plant species in four academic departments (Agronomy, Horticultural Sciences, Environmental Horticulture, and the School of Forest Resources and Conservation - SFRC). However, we are the largest land-grant university in the country without a formal plant breeding graduate education program. Furthermore, a plant breeding graduate degree program is currently not offered in the state of Florida.

The interdisciplinary Ph.D. degree in Plant Breeding is proposed to fill the demand for breeding research and for training new plant breeding graduates. The program will create a framework and administrative structure to leverage resources, faculty, courses, and student recruitment, which will attract federal and private funding and increase the number of graduate STEM degrees awarded at UF. It will be administered by the College of Agricultural and Life Sciences to provide a comprehensive plant breeding education. Our integrated curriculum will equip students with traditional and contemporary breeding methodologies, including molecular techniques (e.g. genomic prediction and genome editing), quantitative genetics, and analysis of breeding trials. Our curriculum was developed upon consultation with industry, non-profit, and academic sectors. The UF/IFAS plant breeding graduate program will train and educate breeders proficient to work in both academia and industry, and thus supply the large demand that exists for plant breeders.

The proposed Ph.D. degree will require a minimum of 90 credit hours beyond the bachelor’s degree. The coursework will include core classes (14 credits), to provide a strong foundation in experimentation, data analysis and plant breeding; followed by an array of electives (minimum of 6 credits); and dissertation research credits. Approved elective courses will be drawn both from within IFAS as well as existing UF areas of expertise outside of IFAS in genetics, statistics, biology, molecular biology, bioinformatics, and genomics.

Over the past 30 years, 113 plant breeding alumni have graduated from the four UF/IFAS departments mentioned above; however, none of them graduated with a formal plant breeding degree. We expect extensive student interest in this interdisciplinary STEM program. Dozens of inquiries from prospective students are received by each of the 27 UF plant breeders every year, and there is an extraordinary demand from the private sector for highly-qualified, specialized plant breeders (see Appendix E).

B. Please provide the date when the pre-proposal was presented to CAVP (Council of Academic Vice Presidents) Academic Program Coordination review group. Identify any concerns that the CAVP review group raised with the pre-proposed program and provide a brief narrative explaining how each of these concerns has been or is being addressed.
The pre-proposal was presented to the CAVP Academic Program Coordination review group on February 22, 2019. No major concerns were raised.

C. If this is a doctoral level program please include the external consultant’s report at the end of the proposal as Appendix D. Please provide a few highlights from the report and describe ways in which the report affected the approval process at the university.

The request for external consultant’s assessment will be submitted after receiving the CALS deans’ review.

D. Describe how the proposed program is consistent with the current State University System (SUS) Strategic Planning Goals. Identify which specific goals the program will directly support and which goals the program will indirectly support (see link to the SUS Strategic Plan on the resource page for new program proposal).

The proposed degree program is consistent with the current State University System’s (SUS) 2025 Strategic Planning Goals, which focus on excellence, productivity and strategic priorities for a knowledge economy. Specifically, the proposed degree program directly supports the strategic goals as follows:

I. Excellence. The Board of Governors continues to expect the state universities to provide academic programs of the highest quality, to produce world class, consequential research, and to reach out and engage Florida’s communities and businesses in a meaningful and measurable way.

The proposed Plant Breeding (PB) doctoral program will create a new highly renowned STEM program. The new program will strengthen the reputation of the academic programs at the University of Florida and thus the state. Plant Breeding is a well-recognized field both nationally and internationally. Many AAU Universities offer a doctoral program in this area. However, none are located in the state of Florida or the Southeast. Faculty at UF are well recognized in different sub-areas of plant breeding and formalizing the PB program will create greater visibility and increase recruitment of top state, national and international students further strengthening the reputation of this UF program and aligning it with state pre-eminence goals. The PB Ph.D. degree will provide a strong basis for conducting research that examines new potential crops for a local need with a global impact, as well as the continued improvement of crops that support Florida’s rural economies. UF Plant Breeders, as a part of the land-grant mission, are already engaged with stakeholders. This program will strengthen relationships with Florida stakeholders through increased awareness of our programs and by providing graduates to work in our industries.

II. Productivity. Florida must become more competitive in the national and global economy. To accomplish this, the state must increase the educational attainment levels of its citizens and the state universities must respond by awarding more degrees in specific high demand programs, particularly the STEM disciplines.

Currently all plant breeding faculty are training the next generation of doctorate plant breeders. However, this is done across multiple departments that have different curriculum and graduation requirements. The creation of the new PB Ph.D. program will streamline the requirements for
graduation by formalizing the program, ensuring high quality, increasing efficiency and streamlining the degree requirements. A streamlined program will be more attractive to potential students and increase the number of degrees awarded. Plant breeders at UF/IFAS are inventors of new cultivars with high productivity. In the last 10 years more than 300 plant varieties have been released. We expect that by formalizing the new program more funding and more highly-qualified Ph.D. students will contribute to increasing the productivity in the development of new plant cultivars, and in engaging Florida business and community.

UF/IFAS Plant Breeders are already contributing to UF’s diversity goal of training the next generation, where currently 40% of students are women and 19% are Hispanic/Latino. The new Ph.D. program will boost the cultural, ethnic, gender, and socio-economic diversity by recruiting under-represented students in STEM (including women, returning adult, distance learning and international students). The PB program will further support faculty in their recruitment of students from around the world, supporting the global impact of our plant breeding programs and highlighting the potential for UF to become a global leader in plant breeding given the unique diversity of crops in Florida.

III. Strategic priorities. The Board of Governors acknowledges that simply producing more with greater efficiencies is not inherently strategic, so this plan also has a focus on Strategic Priorities within each of the tripartite missions that need to be prioritized to better align university outputs with state economic and workforce needs.

UF/IFAS plant breeding programs have long enjoyed a strong partnership with Florida’s agricultural and natural resources industries. By being strategically located in the center of production of their respective crops, breeders located in Gainesville and at Research and Education Centers throughout the state have become integral components of these industries. The agronomic, horticultural, and ornamental varieties they develop are used by farmers, ranchers, and homeowners in Florida, the nation, and the world.

Offering a diverse educational and interdisciplinary program will increase the number of students and faculty engaged in collaborative research and plant breeding efforts worldwide. A Ph.D. program in plant breeding will increase the cultural, ethnic, gender, and socio-economic diversity of students, faculty and staff reflecting the breadth of thought essential for state, national and world preeminence. The Florida Department of Economic Opportunity projects that life scientist jobs will increase by 12.5% in the next eight years. This category includes the occupations of soil and plant scientists (8.4% growth) and biological scientist (9.3% growth). Plant breeders fall into both plant scientist and biological scientist categories.

Additionally, plant breeding faculty have a strong track-record of successful grantsmanship and will continue to attract external funding from federal and private organizations, therefore promoting more collaboration with private industry on research projects. The external support coming from industry through plant breeding royalties has increased by $1 million each year. The external funding is being re-invested to increase fellowships and research, thus increasing the productivity and reputation of UF plant breeding.

E. If the program is to be included in a category within the Programs of Strategic Emphasis as described in the SUS Strategic Plan, please indicate the category and the justification for inclusion.
   The Programs of Strategic Emphasis Categories:
   1. Critical Workforce:

3
• Education
• Health
• Gap Analysis

2. Economic Development:
• Global Competitiveness

3. Science, Technology, Engineering, and Math (STEM)

Please see the Programs of Strategic Emphasis (PSE) methodology for additional explanations on program inclusion criteria at the resource page for new program proposal.

The new degree proposed should be included in the Science, Technology, Engineering, and Math (STEM) Program of Strategic Emphasis as described in the SUS Strategic Plan, further classified as STEM CIP (Classification of Instructional Programs) 01.11 Plant Sciences and, more specifically, as 01.1104 Agricultural and Horticultural Plant Breeding.

The proposed program will focus on the application of genetics and genetic engineering to the improvement of agricultural plant health, the development of new plant varieties, and the selective improvement of agricultural plant populations. Doctoral students in this program will be trained in genetics, genetic engineering, population genetics, agronomy, plant protection, and biotechnology as well as biological sciences related to plant reproduction, molecular biology and genetics. This new STEM Ph.D. degree will provide qualified students with core scientific skills necessary for success, which in turn will strengthen our ability to recruit the top students to UF (as opposed to broader agronomic or horticultural skills).

F. Identify any established or planned educational sites at which the program is expected to be offered and indicate whether it will be offered only at sites other than the main campus.

Courses for the plant breeding Ph.D. program will initially be offered on main campus with the goal of on-site and on-line delivery. Plant breeders are located on the main campus in Gainesville and at six off-campus Research and Educational Centers (RECs) across the state from Homestead in Miami-Dade County all the way to Marianna in Jackson County. Classes will mostly be delivered from main campus but made available for students on and off main campus through on-line technologies that will allow graduate students located at RECs to remain close to their crop’s center of production. This increases opportunities for students to engage with and advance their education combined with a full immersion from stakeholders in the production systems and the associated advantages and challenges of producing food, feed, and fiber for the local, national and global economies.

INSTITUTIONAL AND STATE LEVEL ACCOUNTABILITY

II. Need and Demand

A. Need: Describe national, state, and/or local data that support the need for more people to be prepared in this program at this level. Reference national, state, and/or local plans or reports that support the need for this program and requests for the proposed program which have emanated from a perceived need by agencies or industries in your service area. Cite any specific need for research and service
that the program would fulfill.

An unmet need for plant breeding training in both traditional and genomic methodologies is widely recognized. The need to train future plant breeders in specialty crops, the integration of molecular tools, and the fact that graduate education has become concentrated in a small number of universities focused on a few major row crops was highlighted by The National Plant Breeding Coordinating Committee (http://cuke.hort.ncsu.edu/apb/pr/pbcsdescription.html) as major issues facing plant breeding nationally and internationally.

There is an imbalance in student training between the western and southeastern regions of the United States. The top universities in a national survey (Guner and Wehner, 2003) focus on a small number of major crops; in contrast, the University of Florida has highly regarded breeding programs for a diversity of crops, including several specialty crops of regional and international importance. This is largely owed to Florida’s tropical and subtropical environments which allow breeding and production of specialty crops that cannot be grown in other areas of the U.S. These facts further emphasize the University of Florida’s unique situation and bring an enormous opportunity for UF to become a leader in Plant Breeding education among its peer institutions.

We have assessed the needs for more people to be trained in Plant Breeding based on different sources and approaches. At a regional level, and according to the Florida Department of Economic Opportunity, it is forecasted that life scientist jobs will increase by 12.5% in the next eight years. This category includes the occupations of soil and plant scientist (8.4% growth) and biological scientist (9.3% growth), Plant breeders fall into both plant scientist and biological scientist categories. Moreover, the Bureau of Labor and Statistics (https://www.bls.gov/home.htm) estimates a national growth of 8.8% in plant science careers, and within this group, a growth of 17.8% in research and development. Following these expected increases in job opportunities, a 2015 survey of private breeding programs and U.S. university plant-breeding programs reported that there were approximately 1/3 more entry-level positions available for Ph.D.-level plant breeders in private industry compared to academia in the U.S. and nearly three times as many available globally (Sylak-Glassman et al., 2016). When the private sector was asked if they had enough qualified applicants for plant breeding positions, the majority of the responses indicated that there were not enough well-trained and qualified applicants.

This result is supported by a statement from The National Association of Plant Breeders (https://www.plantbreeding.org/) publicizing a lack of trained plant breeders, especially in specialty crops. To build on this survey carried out by Sylak-Glassman et al. (2016), we have reached out to industry representatives of different crops nationally and internationally. We collected letters of support from nine companies covering the two highest global acreage row crops (Corteva and Monsanto) and additional seven letters from fruit and vegetable companies (see Appendix E). The general consensus is that there is demand for Ph.D. level plant breeders, and they supported the creation of a formal graduate program in plant breeding at UF/IFAS. Finally, the USDA Roadmap for Plant Breeding (USDA Plant Breeding Working Group, 2015) emphasizes that stakeholders have continued to call for increased USDA involvement in training of plant breeding professionals.

Altogether, we observe a strong need for more professionals at the regional, national and international level, and an opportunity to position the University of Florida at the forefront of plant breeding training. The proposed program will address these issues by increasing the
number of Ph.D. degrees in plant breeding awarded at UF and improve UF’s visibility at the state, national, and international levels. As a result, UF’s plant breeding programs will more easily compete for federal and private funds.

B. Demand: Describe data that support the assumption that students will enroll in the proposed program. Include descriptions of surveys or other communications with prospective students.

We expect extensive student interest in this interdisciplinary STEM program. Dozens of inquiries from prospective students are received by each of the 27 UF plant breeders every year, and there is extraordinary demand from the private sector for high-quality plant breeders. In the last 30 years, 113 plant breeding alumni have graduated from four UF/IFAS departments (Horticultural Sciences, Environmental Horticulture, Agronomy and School of Forest Resources and Conservation). However, none of them graduated with a formal plant breeding degree. No students are currently enrolled in similar programs in the state of Florida.

Moreover, the National Plant Breeding Coordinating Committee (http://cuke.hort.ncsu.edu/gpb/mr/pbcmnain.html) points out that education of plant breeders has become concentrated in a small number of universities focused on major row crops. The University of Florida is located in a sub-tropical location with a unique emphasis on specialty crops. The climate of Florida and broad programs at UF/IFAS position the proposed program to lead plant breeding training and education of specialty crops both nationally and globally.

We have surveyed current and former University of Florida students as well as AAU land-grant institutions that offer comparable doctoral programs to access the demand for a Ph.D. in Plant Breeding. Among 34 public and 26 private AAU universities only five offer comparable doctoral programs and only one is located in the Southeast. Among the 74 APLU land-grant universities (including Land-grant institutions as designated by the state legislature, Historically Black colleges or Universities and Hispanic serving institutions) there are only five universities that offer a doctoral degree in Plant Breeding.

We surveyed four out of the five universities with similar graduate degrees in plant breeding: University of Wisconsin, University of California Davis, University of Texas A&M, and Cornell University. In general, the representatives from these institutions all indicated either a stable number of students going into their programs or an increase in interest in their program, given by the number of students applying. Each year, these programs each have 5-8 new students which is similar to the projected number of students in this new UF/IFAS graduate proposal. Cornell University indicated they only accept 10% of the applicants, which means between 50-80 applications per year. University of Wisconsin indicated they have graduated 337 students in their program since their founding in 1968 and that the program is still running strong.

In addition, we sent a survey to 49 graduate students enrolled as of June 2018 in four UF/IFAS Departments (Agronomy, Horticultural Sciences, School of Forest Resources and Conservation, Environmental Horticulture) pursuing degrees related to plant breeding. The response success was 86% and students were asked, if given the option, to choose which three Ph.D. degree titles would be more beneficial for their career plans. Forty-eight percent of the students indicated that they would prefer a Ph.D. in Plant Breeding with formal and structured graduate training tailored to all relevant aspects of plant breeding that would form career-ready plant breeders. Forty-five percent of the students surveyed indicated they would prefer a Ph.D. with a concentration in
plant breeding while only 7% of the students preferred to keep the same degree title as currently awarded by these four UF Departments.

C. If substantially similar programs (generally at the four-digit CIP Code or 60 percent similar in core courses), either private or public exist in the state, identify the institution(s) and geographic location(s). Summarize the outcome(s) of communication with such programs with regard to the potential impact on their enrollment and opportunities for possible collaboration (instruction and research). In Appendix C, provide data that support the need for an additional program.

There are no similar private or public programs in the state of Florida.

D. Use Table 1 in Appendix A (1-A for undergraduate and 1-B for graduate) to categorize projected student headcount (HC) and Full Time Equivalents (FTE) according to primary sources. Generally undergraduate FTE will be calculated as 30 credit hours per year and graduate FTE will be calculated as 24 credit hours per year. Describe the rationale underlying enrollment projections. If students within the institution are expected to change majors to enroll in the proposed program at its inception, describe the shifts from disciplines that will likely occur.

We anticipate that the majority of our students will register as full-time students, generally taking 24 credits per year (0.75 FTE). We expect that students who graduated from a preceding degree program at other Florida public universities, out-of-state residents and international students will account for the initial applicants to our doctoral program in the first year.

We also anticipate that students who have recently graduated with a master's degree in one of the four Departments (Hort. Sciences, Environmental Horticulture, SFRC and Agronomy) that offer a degree related to plant breeding might apply to our program in this first year. However, we will not allow current Ph.D. students in any of the four UF departments mentioned above to transfer to our proposed plant breeding doctoral program for the first four years of our program.

In addition, we expect that we will attract non-traditional students from state and local industries. This expectation stems from the strong partnerships that UF plant breeding faculty have with Florida’s agricultural and natural resources industries.

In years 2 to 4, we expect to focus our recruitment efforts on attracting high-quality students who have completed M.S. degrees in other majors from other Florida or out-of-state universities, with special attention to underrepresented minorities of ethnic/racial populations, low-income or first-generation college students. Over time, students from other universities within the state, as well as out-of-state residents and international students and those from industry will be drawn to our program and will account for the majority of our students. We base this on the results of surveys of current and former students, as well as our survey of other comparable programs across the country.

Furthermore, several plant breeding faculty have participated in the interdisciplinary Plant Molecular and Cellular Biology (PMCB) Graduate Program, established 30 years ago and well-recognized nationwide as a center of excellence for plant biology faculty focusing on genetic, molecular, and cellular research. PMCB was in the top 10-15% of 118 Plant Sciences Graduate programs in the 2010 National Research Council rankings. Similarly to PMCB, plant breeding faculty have excellent productivity within UF/IFAS plant sciences. We will draw on PMCB’s experiences, especially by recruiting highly qualified students, utilizing an innovative curriculum and other preparatory mechanisms to train students for competitive placement in high-impact...
positions in research, teaching and industry and strive to have a high job placement.

In conjunction with UF/IFAS Communications, the UF/IFAS Plant Breeders Working Group is establishing a marketing and branding campaign to recruit high-quality students. This recruiting investment for the new graduate program will attract more student applications to UF/IFAS overall and in particular to other graduate programs and departments at UF. The program will only accept 5-6 students a year in the first five cycles, which should result in top applicants being re-directed to other departmental graduate programs.

E. If the proposed program substantially duplicates a program at FAMU or FIU, provide, (in consultation with the affected university), an analysis of how the program might have an impact upon that university's ability to attract students of races different from that which is predominant on their campus in the subject program. The university's Equal Opportunity Officer shall review this section of the proposal and then sign and date Appendix B to indicate that the analysis required by this subsection has been completed.

The proposed program does not duplicate any program at FAMU or FIU.

By creating a diverse, robust educational and interdisciplinary area of excellence our goal is to support an exceptional academic environment where students, faculty, and staff members with diverse experiences and backgrounds can achieve their goals.

Plant Breeders at UF are already contributing to UF's diversity goal: as of June 2018 there were 40% women and 19% Hispanic/Latino enrolled in plant breeding related programs within the four UF departments. Faculty have and will continue to attract students from around the world, supporting the global impact of our plant breeding programs and highlighting the potential to become a global leader in plant breeding given the diversity of crops in Florida.

To help ensure racial and ethnic diversity inclusion and equity we intend to actively work on recruiting efforts with several UF offices including the recently created position of Chief Diversity Officer, the Office of Graduate Diversity Initiatives (OGDI) and the Office of Graduate International Outreach (OGIO). These collaborations will include participating in graduate recruitment fairs; partnering with foundations, community and student support organizations; providing scholarships and assistantships for underrepresented students; and providing students with opportunities to participate in retention and professional development workshops.

We will also leverage resources and make use of opportunities focused on international outreach and student success offered by the OGIO. With Florida's geographical location, Latin America has been identified as a target for OGIO's recruitment efforts, through the formation of agreements with sponsoring agencies to enroll Latin American graduate students with government funding. We also hope to further increase female enrollment in this important STEM discipline. Our faculty have served as advisors to the UF Plant Science Council, where women have served as presidents, vice-presidents and other leadership roles. Besides their annual spring workshop, professional development activities and discussions, they recently organized a Women in STEM discussion panel that highlighted the experiences of women working in the plant sciences.

III. Budget
A. Use Table 2 in Appendix A to display projected costs and associated funding sources for Year 1 and Year 5 of program operation. Use Table 3 in Appendix A to show how existing Education & General funds will be shifted to support the new program in Year 1. In narrative form, summarize the contents of both tables, identifying the source of both current and new resources to be devoted to the proposed program. (Data for Year 1 and Year 5 reflect snapshots in time rather than cumulative costs.)

The University of Florida is one of the most active and innovative land-grant universities in plant breeding and cultivar licensing in the country. The university employs 27 plant breeding faculty positions, breeding 50 plant species in four academic departments (Agronomy, Horticultural Sciences, Environmental Horticulture, and the SFRC). Faculty within these departments contribute to the three-fold land grant mission of teaching, research and extension within the Institute of Food and Agricultural Sciences (IFAS), as well as academic units within the College of Agricultural and Life Sciences (CALS) at the University of Florida. As a result, funding sources vary depending on the faculty member’s appointment.

The primary costs of the Ph.D. program will be faculty and staff salaries and benefits. The faculty reallocated E&G is calculated based upon 1% of teaching of all teaching faculty salaries/benefits funded through E&G. As a result of UF’s preeminence faculty hiring efforts, we expect that at least two tenure track faculty will be hired in the next five years and housed in either HOS, ENH, SFRC, or Agronomy. These faculty will be expected to contribute to our new graduate teaching and advising efforts. We expect that by Year 5, new faculty “hire 1” will contribute 0.1 FTE while new faculty “hire 2” will contribute 1.0 FTE (50% teaching) towards the new plant breeding program. The faculty continuing E&G in Year 5 represents a cumulative value across all plant breeding teaching faculty contributing to the new program.

We also anticipate hiring an academic advisor to work half-time in the first two years, to become full time by the third year, as the program grows. This position is needed to coordinate all academic (recruitment, advising, course scheduling, among others) and administrative activities associated with successfully managing this new graduate program. The A&P continuing E&G in Year 5 represents the full-time salary and benefits for the academic advisor.

Furthermore, we also project an increase in the philanthropic endowments represented by the Plant Breeding Graduate Initiative (PBGI). This initiative represents an annual funding opportunity provided by UF/IFAS Research and the Florida Foundation Seed Producers, a Direct Support Organization (DSO) that supports the plant breeding programs. IFAS Research currently funds $60,000 per cohort per year, while the plant breeders provide $60,000, translating to three student scholarships per year. We are predicting that with the success of the program, the plant breeders will expand their support by Year 5 for a total of $90,000 per cohort year. Furthermore, we are estimating that the program will obtain support for one GSF scholarship by Year 5, in addition to the $30,000 provided by IFAS for the PBGI program (total of $60,000 by year 5).

In the last 10 years, 27 IFAS plant breeding faculty have secured approximately $60 million in federal and private funding. As the program grows in the number of students, we project an increase in the allocation of C&G funds secured by the plant breeders and used to support the enrollment growth over five years.
As shown in Tables 2 and 3, the funding for the program will primarily come from the reallocation of existing resources. Our estimates are conservative. We assumed a total increase in faculty and staff salaries and benefits of only three percent over the next five years. We assumed zero increase in state operating funds over the five-year period. Based on projected enrollment trends (Table 1-B), the E&G cost per student FTE decreases from $34,763 in Year 1 to $18,823 in Year 5. Total projected E&G costs for Year 1 are $121,672 and for Year 5 are $268,222. The visibility provided by the graduate program will also increase UF/IFAS chances to obtain industry support targeting training of new plant breeders.

B. Please explain whether the university intends to operate the program through continuing education on a cost-recovery basis, seek approval for market tuition rate, or establish differentiated graduate-level tuition. Provide a rationale for doing so and a timeline for seeking Board of Governors’ approval, if appropriate. Please include the expected rate of tuition that the university plans to charge for this program and use this amount when calculating cost entries in Table 2.

We do not intend to operate the program through continuing education on a cost-recovery basis, seek approval for market tuition rate, or establish differentiated graduate-level tuition. The expected rate of tuition and fees will be based on the University’s standard costs and projected estimates, which is $528.69 per credit hour for the 2019-2020 academic year for Florida residents.

C. If other programs will be impacted by a reallocation of resources for the proposed program, identify the program and provide a justification for reallocating resources. Specifically address the potential negative impacts that implementation of the proposed program will have on related undergraduate programs (i.e., shift in faculty effort, reallocation of instructional resources, reduced enrollment rates, greater use of adjunct faculty and teaching assistants). Explain what steps will be taken to mitigate any such impacts. Also, discuss the potential positive impacts that the proposed program might have on related undergraduate programs (i.e., increased undergraduate research opportunities, improved quality of instruction associated with cutting-edge research, improved labs and library resources).

We anticipate that the Ph.D. program will have no negative impacts on existing undergraduate nor graduate programs but will rather have a variety of positive impacts across all the departments involved. Students will not be allowed to transfer from current departmental Ph.D. degrees into the plant breeding Ph.D. program for the first five years, thus ensuring the new program will avoid any potential negative impact due to migration of current Ph.D. students. This program will create a curriculum that can be advertised and promoted. With this increased visibility, we expect more support and recognition from the industry and funding agencies. The new program will be promoted and carry global enrollment practices, thus competing with other national and international plant breeding universities for top students while avoiding competition within and among UF/IFAS departments. This will also provide an opportunity for our best undergraduate students to pursue graduate studies at UF instead of enrolling in other universities.

This program is expected to recruit top students with interest in plant breeding (maximum of 5 students per year in the first cycle). This net increase in UF/IFAS students will increase the number of students taking graduate classes already offered by plant breeders and other faculties.
within each department. This program, with current support of the Plant Breeders Workgroup (PBWG) and IFAS Research via the Plant Breeding Graduate Initiative, will ensure scholarships for 3-4 students annually, therefore achieving more than 60-80% of the recruitment goal through internal scholarships, while the remaining support will be covered by individual plant breeding programs at UF.

UF/IFAS plant breeders are housed in different departments and different research and education centers across the state. This interdisciplinary program will unify faculty working in breeding and formalize a training program that is currently underway. The Ph.D. program will increase strong, collaborative research teams involving multiple faculty, Ph.D. students, master’s students, and undergraduates. Thus, undergraduate involvement in these teams will prepare them for research careers and graduate programs in related fields. The interdisciplinary nature of the program will provide opportunities for undergraduates to perform high quality research under the mentoring of graduate students.

Because the curriculum of the program relies on current coursework being taught in the involved department, most faculty will not see a change in their responsibilities, or their time assigned to the new program. In the meanwhile, the department may see an increase in Ph.D. students taking these courses in a regular basis. The proposed program attempts to minimize the effects of the reallocation of teaching resources by re-allocating only 1% per teaching faculty FTE to the new program. A few members of the faculty will be devoting more time and energy to the graduate program because of the need to lead the new program. However, a rotational leadership is proposed, which will minimize the time faculty devote to the program in the long-term.

We do not anticipate the use of adjunct faculty or additional funding for doctoral students to provide teaching assistance. Our doctoral students will be well-prepared to teach undergraduate courses under the supervision of an experienced faculty member, assuring quality educational delivery to undergraduates. This doctoral program, based on advanced methods of plant breeding with an interdisciplinary focus, will generate knowledge for new courses and content in the undergraduate program across UF/IFAS, enriching the current offerings and providing the most current and relevant information for research careers.

Once the program is established and recognized, the possibility of creating a certificate with a strong distance education focus will be evaluated. This program will target a different and complementary population not covered by the Ph.D. graduate program, primarily industry breeders seeking continuing education. We expect it will bring off-book revenues as additional recognition for UF/IFAS and the departments. Finally, the new doctoral program will be positioned to attract additional funding and resources, both internally and externally, which will have broad benefits for all aspects of the program.

D. Describe other potential impacts on related programs or departments (e.g., increased need for general education or common prerequisite courses, or increased need for required or elective courses outside of the proposed major).

Given the distinctive nature of this doctoral degree program, we anticipate primarily positive effects to related programs and departments. Most of the courses in the proposed curriculum currently exist and are service courses for numerous graduate programs in the biological sciences. Consequently, they will not be impacted by the additional student numbers generated after the program is approved.
This program will create a curriculum that can be advertised and promoted. With this increased visibility, we expect more support and recognition from the industry and funding agencies. The newly created program will invest in recruiting top students interested in plant breeding. The recruitment investment as well as the establishment of this new program will attract more students to consider the plant breeding programs at UF/IFAS and also other departments and programs at UF/IFAS.

We expect that this effort will increase the net number of applicants to UF/IFAS. The program will only accept a maximum of 5 students each year in the first five cycles, which should in turn result in top applicants being re-directed to the departmental graduate programs. We have seen this kind of cross-departmental benefit from the recruiting efforts of the PCCB graduate program in the past.

Furthermore, a recent study of all graduates for each plant breeding faculty since the beginning of their career at UF in each of the four Departments (HOS, EH, SFRC, AGR) indicated that the 27 plant breeding faculty are not exclusively focused on training students as breeders. Out of a total of 241 students under plant breeder supervision 113 students (46%) were trained as breeders while 128 students (54%) were trained in other traditional areas of specialization in their respective departments such as agronomy, horticulture, floriculture, pest management, plant physiology, nutrition, weed science, plant management, crop production, molecular and cellular biology and landscape management.

E. Describe what steps have been taken to obtain information regarding resources (financial and in-kind) available outside the institution (businesses, industrial organizations, governmental entities, etc.). Describe the external resources that appear to be available to support the proposed program.

Initially the program will be internally funded through royalty proceeds from plant breeding faculty via the UF/IFAS Plant Breeders Working Group (PBWG). However, as soon as the program is approved, we are strongly committed to identifying sources of extramural funding, a crucial element required to support graduate student research and competitive assistantships that will attract and retain outstanding students. The plant breeders are actively engaged in grantsmanship and have had success securing funding from both public and private institutions. The list of public institutions includes awards from NSF, DOE, and USDA-NIFA, while the list of private institutions includes many of the main breeding companies in several different crops.

We have conducted a survey with all UF plant breeders to estimate the amount of plant breeding related external support that they have received in the last 10 years (both public and private). The average total support comes to $3 million per breeder. In addition, we have spoken with industry representatives from different crops important for the state's agriculture. While no funding is currently committed at this stage, we have obtained several letters of support indicating significant interest in maintaining the collaboration with UF and in the creation of the program. Furthermore, the Plant Breeders Working Group has recently initiated, with the support of IFAS advancement, a campaign to communicate the impact that UF plant breeding has had to Florida and the world. We expect that this effort will lead to fundraising, which could in part be directed to support plant breeding students. Finally, the PBWG and IFAS Research have established an initiative to continually fund students trained in plant breeding. The Plant Breeding Graduate
Initiative is currently funding 3-4 students every year and expected to increase the number of funding scholarships in the future.

The breeders have also identified additional federal programs to which we could apply for support of our plant breeding graduate program:

- Global Partnership Initiative for Plant Breeding Capacity Building (http://km.fao.org/gipb/)
- USDA-CSREES Agriculture and Food Research Initiative (http://www.csrees.usda.gov/far/agricultureandfoodresearchinitiativeafri.cfm)

IV. Projected Benefit of the Program to the University, Local Community, and State

Use information from Tables 1 and 2 in Appendix A, and the supporting narrative for “Need and Demand” to prepare a concise statement that describes the projected benefit to the university, local community, and the state if the program is implemented. The projected benefits can be both quantitative and qualitative in nature, but there needs to be a clear distinction made between the two in the narrative.

A cross-departmental, interdisciplinary Ph.D. program in Plant Breeding will benefit the University of Florida and SUS as it will support their missions by providing premier graduate education, increasing scholarship, research, and innovation. Specifically, the program supports the SUS 2025 Strategic Plan by increasing research activity and the number of graduates with interdisciplinary STEM training and credentials, expanding commercialization activities that will attract more research funding from federal and private sources, and promoting more collaboration with the private industry sectors. There is no such program in the state, thus this could be added to the list of specializations that the state and UF will be providing. This new degree will create a framework and administrative structure to leverage resources, faculty, courses, and student recruitment, which we expect will attract more federal and private funding.

The contribution that plant breeding has brought to local communities has been very evident in Florida. In 2019, 90% of the strawberry acreage and 100% of the blueberry acreage in Florida is occupied by UF-bred varieties. It was only in the last decade that Florida became a leader in blueberry production, in part because the UF/IFAS blueberry breeding program developed new varieties well adapted the Florida. We aim to build from these proven successes by continuing to grow current industries and creating new agricultural commodities in Florida.

Currently, plant breeders continue working at the community level to understand and solve the challenges of our stakeholders through better varieties. This results in producer profitability and industry sustainability. These industries in turn support other aspects of the local economy including packaging, food processing, transportation and finance.

Our proposed degree program will enrich UF’s land-grant core mission by being among the top plant breeding programs in the nation and the world. Other benefits include the following:

Quantitative:
• Increasing the number of highly qualified graduate students to align UF with other peer
APLU land-grant universities by addressing local, state, and national needs and demands in
plant breeding.
• Increasing the cultural, ethnic, gender, socio-economic and international diversity of
students, especially those under-represented in STEM discipline (i.e. women, African
Americans, etc.) to reflect the breadth of thought essential for state, national, and world
preeminence.
• Increasing the number of high-impact scholarly publications and creative works generated.
• Attracting more federal and private graduate funding, grants for student research training,
and increasing graduate student mentored undergraduate research.
• Increasing private and public funding from UF intellectual property, endowments, and
federal sources.
• Boosting intellectual property income and the number of commercial products developed by
plant breeders, which will have a local and statewide economic impact and generate
employment opportunities.

Qualitative:
• Fostering the development of the “talent pipeline” that must exist to create the multi-
disciplinary expertise needed to build the knowledge and innovation economy envisioned by
the Florida Board of Governors.
• Increasing the visibility of faculty will increase their national and international leadership and
recognition, expanding UF’s competitive advantage for extramural funding and standing
among AAU universities, particularly among those with similar programs.
• Augmenting the numbers of successful and proud UF alumni donating to endowments,
offering internships and employment opportunities, and engaging in student recruitment.
• Developing the knowledge base needed to create improved policies and transformative
programs that benefit plant breeding stakeholders in an increasingly dynamic and global
society and economy.
• Providing expert professional leadership and capacity in the public, private, and nonprofit
sectors to address critical problems and needs of local stakeholders.

V. Access and Articulation – Bachelor’s Degrees Only

A. If the total number of credit hours to earn a degree exceeds 120, provide a
justification for an exception to the policy of a 120 maximum and submit a separate
request to the Board of Governors for an exception along with notification of the
program’s approval. (See criteria in Board of Governors Regulation 6C-8.014)

Not applicable.

B. List program prerequisites and provide assurance that they are the same as the
approved common prerequisites for other such degree programs within the SUS
(see link to the Common Prerequisite Manual on the resource page for new program
proposal). The courses in the Common Prerequisite Counseling Manual are
intended to be those that are required of both native and transfer students prior to
entrance to the major program, not simply lower-level courses that are required
prior to graduation. The common prerequisites and substitute courses are
mandatory for all institution programs listed, and must be approved by the
Articulation Coordinating Committee (ACC). This requirement includes those
programs designated as “limited access.”
If the proposed prerequisites are not listed in the Manual, provide a rationale for a request for exception to the policy of common prerequisites. NOTE: Typically, all lower-division courses required for admission into the major will be considered prerequisites. The curriculum can require lower-division courses that are not prerequisites for admission into the major, as long as those courses are built into the curriculum for the upper-level 60 credit hours. If there are already common prerequisites for other degree programs with the same proposed CIP, every effort must be made to utilize the previously approved prerequisites instead of recommending an additional “track” of prerequisites for that CIP. Additional tracks may not be approved by the ACC, thereby holding up the full approval of the degree program. Programs will not be entered into the State University System Inventory until any exceptions to the approved common prerequisites are approved by the ACC.

Not applicable.

C. If the university intends to seek formal Limited Access status for the proposed program, provide a rationale that includes an analysis of diversity issues with respect to such a designation. Explain how the university will ensure that Florida College System transfer students are not disadvantaged by the Limited Access status. NOTE: The policy and criteria for Limited Access are identified in Board of Governors Regulation 6C-8.013. Submit the Limited Access Program Request form along with this document.

Not applicable.

D. If the proposed program is an AS-to-BS capstone, ensure that it adheres to the guidelines approved by the Articulation Coordinating Committee for such programs, as set forth in Rule 6A-10.024 (see link to the Statewide Articulation Manual on the resource page for new program proposal). List the prerequisites, if any, including the specific AS degrees which may transfer into the program.

Not applicable.

INSTITUTIONAL READINESS

VI. Related Institutional Mission and Strength

A. Describe how the goals of the proposed program relate to the institutional mission statement as contained in the SUS Strategic Plan and the University Strategic Plan (see link to the SUS Strategic Plan on the resource page for new program proposal).

The SUS strategic plan has set goals to increase the number of graduates with degrees in STEM fields. More specifically, the UF Strategic Plan listed Biological Sciences as an area of emphasis. Plant Breeding is an integrative science that requires training in biology, genetics, chemistry, statistics, and computer science. Additionally, it draws support from many STEM disciplines within UF/IFAS including Agronomy, Horticultural Science, Plant Pathology, Entomology & Nematology, Forestry, Biology, Genetics, Plant Molecular & Cellular Biology, and Experimental Statistics. Well trained plant breeders must be able to draw on information and expertise in these
fields and incorporate the art of selection for desirable attributes in the final product of released varieties. As indicated in sections above, national and international groups have recognized that prior investments in training of plant breeders in the 1970s and 1980s is being lost to retirement and program closures. The University of Florida is unique in having a diversity of plant breeding programs focused on specialty horticultural, ornamental, and unique agronomic and forage crops. With this focus, a UF degree in plant breeding is well positioned to fill the need for plant breeders with diverse training that few, if any, other institutions can accomplish. The abundance of resources available for graduate students at UF provides an exceptionally wide spectrum of research opportunities that are not available at typical mid-western land grant institutions that are narrowly focused on two or three major cereal crops. In addition to adding a relevant and valuable STEM graduate program that supports one of the major agricultural sectors in the state of Florida, this program will help meet SUS metrics such as higher numbers of graduate degrees in STEM, and an increase in the number of patents, licenses and options executed. The latter increases results from UF/IFAS plant breeding programs' development of plant cultivars that are patented and/or licensed to be grown over thousands of acres which return royalties to the UF/IFAS system in support of the research and education programs.

B. Describe how the proposed program specifically relates to existing institutional strengths, such as programs of emphasis, other academic programs, and/or institutes and centers.

The new interdisciplinary program will take advantage of existing institutional strengths by building upon the robust group of plant breeding programs currently ongoing at the University of Florida, IFAS, and by coordination across a wide array of academic courses in plant breeding and genetics, and support disciplines that are already in place but are scattered across a number of academic units. This new interdisciplinary program will help to focus faculty around a common core of academic work and strengthen our ability to recruit the best students into our program. The vitality of the current faculty is indicated by a steady climb in royalty income generated by released UF/IFAS cultivars, which approached $15 million in 2018. The UF/IFAS Plant Breeders Working Group has committed part of these resources to support this graduate training program. The faculty involved in the proposed interdisciplinary plant breeding program are from diverse backgrounds, and most have contributed their expertise in plant breeding through leadership roles in professional societies, including service as editors of major refereed journals in the field. These faculty associated with the plant breeding program are nationally and internationally recognized, and have an impressive list of achievements and awards, including presidents and fellows of the Crop Science Society of America, the American Society of Horticultural Science, and the National Association of Plant Breeders, which is commensurate with other top-tier institutions. In addition, plant breeding faculty at UF have a rich history of training students that become well positioned in academia and private industry sectors. These practicing professionals will be an excellent resource for recruitment of new students.

C. Provide a narrative of the planning process leading up to submission of this proposal. Include a chronology in table format of the activities, listing both university personnel directly involved and external individuals who participated in planning. Provide a timetable of events necessary for the implementation of the proposed program.

Previous reviews of four IFAS departments of Agronomy, Horticulture Sciences, Environmental Horticulture and School of Forest Resources and Conservation have recognized that plant
breeding and genetics faculty were strengths of these units but have pointed out that programs were fragmented and sometimes lacked focused interaction with other departments.

The UF/IFAS Plant Breeders Working Group (PBWG) has met annually since the early-1990s to discuss and review issues relevant to cultivar development, and matters concerning training of graduate students in plant breeding. At the 2007 PBWG annual meeting a committee was organized to begin the process of consideration of an interdepartmental graduate program. At that time the planning committee consisted of Drs. Dave Clark and Maria Gallo as co-chairs, Barry Tillman, Eileen Kabelka, Kevin Kenworthy, and Ken Quisenberry. A draft proposal was developed in 2009, but it was never formally submitted due to changes in requirements and committee members.

Considering the increasing demand for plant breeders and their roles in addressing future societal challenges, the interdisciplinary graduate program was added as one of the goals in the 2016-2019 Plant Breeders Working Group strategic plan. Our vision is to be a global leader in plant breeding training, education and germplasm/cultivar development and our mission is to ensure the viability of agriculture through exceptional plant breeding programs. One of the strategic goals is solely dedicated to establishing a graduate degree program in plant breeding. The expected key outcomes are to increase enrollment of high quality domestic and international graduate students and improve program visibility by delivering next generation breeders to institutions and key agricultural companies.

Several action steps were defined as a measure of success for this strategic goal. These include: (i) identify core plant breeding competencies, using the previously proposed curriculum as a resource; (ii) identify and hire a staff member to shepherd the proposed degree program to final approval; (iii) develop and submit the degree program proposal to CALS and university curriculum committees; and (iv) implement a new Ph.D. graduate program.

In January 2018, Ms. Eliana Kampf was hired as a graduate program coordinator. A Plant Breeding Committee (PBC) consisting of Dr. Patricio Munoz, Dr. Marcio Resende, and Ms. Eliana Kampf, under the supervision of the PBWG Executive Committee, initiated the development of the pre-proposal. The PBC conducted surveys of current students, alumni, industry, and other universities. The PBC also met with the College of Agriculture and Life Sciences (CALS) deans and UF/IFAS Research dean several times during Spring and Summer 2018. These leaders in agricultural teaching and research were very supportive of this initiative and have assisted immensely with documentation and with proposal development. The PBC also met with faculty from the CALS Department of Family Youth and Community Sciences to gain insights of their pre-proposal development process (their Ph.D. degree program was approved in 2017).

In August 15, 2018 the first draft of the pre-proposal was reviewed by PBWG members during our 2018 UF/IFAS Plant Breeders Working Group Annual Meeting and further developed during Fall 2018. During Fall 2018 the PBC and the PBWG executive committee met with the chairs of the four departments involved, and all chairs fully supported the creation of a plant breeding degree. The pre-proposal was signed by Dr. Rob Gilbert (Agronomy Chair), Dr. Red Baker (School of Forest Resources and Conservation Chair), Dr. Chris Chase (Horticultural Sciences Interim Chair) and Dr. Dean Kopsell (Environmental Horticulture Chair) and in November 2018 it was reviewed by Dr. Turner (CALS Dean). The pre-proposal was then sent to the Provost’s Office and in December 2018, the pre-proposal was endorsed by Dr. Chris J. Hass, Associate
Provost for Academic and Faculty Affairs, who praised the group for a “well-written, substantive and enticing pre-proposal.” In February 2019 the pre-proposal was approved by the Council of Academic Vice Presidents (CAVP) Academic Program Coordination review group with no major concerns.

### Planning Process

<table>
<thead>
<tr>
<th>Date</th>
<th>Participants</th>
<th>Planning Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>Plant Breeding Working Group Annual Meeting members</td>
<td>Committee formed for proposal development</td>
</tr>
<tr>
<td>2008</td>
<td>Drs. Dave Clark and Maria Gallo as co-chairs, Barry Tillman, Eliene Kabelka, Kevin Kenworthy, and Ken Quesenberry</td>
<td>Proposal development</td>
</tr>
<tr>
<td>Fall 2008</td>
<td>Dr. Kirby Barrick, Dean of the College of Agricultural and Life Sciences and Dr. Mark McLellan Dean for Research and Director Florida Agricultural Experiment Station</td>
<td>Review of proposal draft</td>
</tr>
<tr>
<td>2016</td>
<td>PBWG</td>
<td>2016-2019 PBWG Strategic Plan created</td>
</tr>
<tr>
<td>Jan. 2018</td>
<td>PBWG Executive Committee</td>
<td>Plant Breeding Graduate Program coordinator hired</td>
</tr>
<tr>
<td>Spring and Summer 2018</td>
<td>Dr. Patricio Munoz, Dr. Marcio Resende, and Ms. Eliana Kampf</td>
<td>Development of a new pre-proposal following the 2016 streamlined guidelines</td>
</tr>
<tr>
<td>Spring and Summer 2018</td>
<td>Dr. Elaine Turner, College of Agriculture and Life Sciences (CALS) dean and Dr. Jackie Burns, UF/IFAS Research dean</td>
<td>Review of pre-proposal and suggested revisions</td>
</tr>
<tr>
<td>Summer 2018</td>
<td>Drs. Rob Gilbert (Agronomy), Red Baker (SFRC), Chris Chase (Horticultural Sciences), Dean Kopsell (Environmental Horticulture)</td>
<td>Pre-proposal presentation to the chairs of these 4 departments</td>
</tr>
<tr>
<td>Fall 2018</td>
<td>Drs. Rob Gilbert (Agronomy), Red Baker (SFRC), Chris Chase (Horticultural Sciences), Dean Kopsell (Environmental Horticulture)</td>
<td>Pre-proposal signed by chairs of these 4 departments</td>
</tr>
<tr>
<td>Nov. 2018</td>
<td>Dr. Turner, CALS Dean</td>
<td>Pre-proposal final review</td>
</tr>
<tr>
<td>Dec. 2018</td>
<td>Dr. Chris J. Hass, Associate Provost for Academic Affairs</td>
<td>Pre-proposal review</td>
</tr>
<tr>
<td>Feb. 2019</td>
<td>Council of Academic Vice Presidents (CAVP) Academic Program Coordination review group</td>
<td>Pre-proposal approval (no major concerns)</td>
</tr>
</tbody>
</table>

In Spring-Fall 2019 the PBC, with the support of the PBWG executive committee, worked toward this full proposal. In November 2019 this full proposal will be presented to the PBWG executive committee for review and then to CALS Deans for review. The full proposal will be submitted to the CALS Curriculum Committee in December 2019.

### Timeline of Events Leading to Implementation

<table>
<thead>
<tr>
<th>Date</th>
<th>Implementation Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov. 2018</td>
<td>Pre-proposal vetted by Dr. Turner, CALS Dean</td>
</tr>
<tr>
<td>Date</td>
<td>Event Description</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Dec. 2018</td>
<td>Pre-proposal approved by Associate Provost for Academic Affairs</td>
</tr>
<tr>
<td>Feb. 2019</td>
<td>Pre-proposal approved by Council of Academic Vice Presidents (CAVP)</td>
</tr>
<tr>
<td>Dec. 2019</td>
<td>Full Proposal submitted to CALS Curriculum Committee</td>
</tr>
<tr>
<td>Spring 2020</td>
<td>UF Graduate School Technical review</td>
</tr>
<tr>
<td>Spring 2020</td>
<td>Graduate Council Review and Discussion</td>
</tr>
<tr>
<td>Spring 2020</td>
<td>Graduate Council approval</td>
</tr>
<tr>
<td>Spring/Summer 2020</td>
<td>University Curriculum Committee Information Item</td>
</tr>
<tr>
<td>Spring/Summer 2020</td>
<td>Faculty Senate Steering Committee approval</td>
</tr>
<tr>
<td>Spring/Summer 2020</td>
<td>Faculty Senate review and approval</td>
</tr>
<tr>
<td>Fall 2020</td>
<td>UF Academic Affairs Approval</td>
</tr>
<tr>
<td>Fall 2020</td>
<td>Board of Trustees review and approval</td>
</tr>
<tr>
<td>Spring 2021</td>
<td>Submission for February 2021 consideration by the Board of Governors</td>
</tr>
<tr>
<td>Fall 2021</td>
<td>Plant Breeding Ph.D. Program implementation</td>
</tr>
</tbody>
</table>

VII. Program Quality Indicators - Reviews and Accreditation

Identify program reviews, accreditation visits, or internal reviews for any university degree programs related to the proposed program, especially any within the same academic unit. List all recommendations and summarize the institution's progress in implementing the recommendations.

This section is based on the 2009-2016 State Board of Governors (BOG) Academic Program Reviews (conducted every 7 years) for plant breeding related Ph.D. degrees in three CALS departments, one school and one interdisciplinary program; respectively, Agronomy (AGR), Horticulture Sciences (HOS), Environmental Horticulture (ENH) Departments, School of Forest Resources and Conservation (SFRC), and Plant Molecular and Cellular Biology (PMCB) Graduate Program.

Previous reviews of these four IFAS departments (AGR, HOS, ENH and SFRC) have recognized that plant breeding and genetics faculty were strengths of these units but pointed out that programs were fragmented and sometime lacked focused interaction with other departments. Despite being the largest land-grant university without a formal plant breeding graduate program, UF/IFAS has the largest number of plant breeding faculty of any university in the nation, we have one of the largest cultivar development programs, and we are one of the few universities working with specialty crops. The proposed interdisciplinary program will unify UF/IFAS faculty working in breeding and formalize a training program that is already underway. This program will create a curriculum that can be advertised and promoted. The increased national and international visibility is expected to generate more support from industry and funding agencies and increase the number and quality of our graduate students.

Some of the departments have also indicated the need to recruit more highly qualified graduate students. For example, the SFRC Advisory Board conducted a full SWOT review and recommended focusing recruiting on quality and diversity of applicants, as part of making UF a "Top 10 University". HOS and ENH pointed out the steep competition for high caliber students from other peer universities. Likewise, PMCB has listed recruitment and securing enrollment of
top graduate students among their top five impediments. The proposed program will invest in recruiting, enrolling and graduating highly competitive plant breeding graduate students. We expect that this effort will increase the net number of applicants to UF/IFAS. The recruitment investment will bring more students to consider not only plant breeding programs but also other departments and programs at UF/IFAS. The program will only accept 5-6 students per year in the first cycle, which should in turn result in top applicants being re-directed to other UF departmental graduate programs. We have seen this kind of cross-departmental benefit from the recruiting efforts of the PMCB graduate program in the past. This increase in UF/IFAS students will also increase the number of students taking graduate classes already offered by plant breeders and other faculty within each department.

Another common issue identified by these departments is the limited funding for fellowships and assistantships to support graduate students. HOS and ENH pointed out that their graduate assistants are mainly supported by funding from individual faculty members’ research programs and this limitation allows only a sub-set of faculty members to participate in active graduate student recruitment and training. PMCB notes that limited internal funding to support a competitive stipend means the best applicants frequently accept offers from competing universities that offer better benefits. The new plant breeding program, with current support of the Plant Breeders Workgroup (PBWG) and IFAS-Research via the Plant Breeding Graduate Initiative intends to address this limitation by providing funds to early career faculty who are still building their research programs. The PBGI will ensure assistantships for 3-4 students annually and thus more than 60-80% of the recruitment goal will be achieved with internal assistantships.

Agronomy’s last external review in 2012 identified opportunities to more closely involve off-campus faculty in graduate education. HOS and ENH also pointed out in their 2015 BOG report that the lack of online/distance courses hinders the participation of off-campus faculty and students. The HOS graduate program has few online courses and even though some classes are available via video conferencing to students located in Research and Education Centers, further efforts are needed to offer courses via distance education. The Environmental Horticulture program also needs more online graduate level course offerings. SFRC plans to add graduate level courses to supplement all Ph.D. students’ choice of courses and will increase their distance education portfolio in a strategic manner to support graduate education. SFRC faculty are spread throughout the state, limiting their collaboration. One of the goals in the 2016-2019 Plant Breeders Working Group Strategic Plan is to expand online instruction with credit-based courses, short courses, and webinars. This plan is currently being implemented and four out of the six proposed core courses will be available for online delivery in 2020. The proposed plant breeding program will improve efficiency of graduate education by unifying on-campus and off-campus faculty already working together in plant breeding and formalizing a training program currently underway but with more emphasis in online delivery to further integrate off-campus faculty. Synergy and collaborative research and extension between the REC's and the main campus is an added strength.

The Department of Agronomy emphasizes that future research endeavors will be increasingly interdisciplinary, specifically requiring partnerships with statistics, food science, economics, environmental horticulture, environmental engineering, hydrology, agricultural engineering, and microbiology. SFRC also works with a diversity of departments around UF to identify appropriate courses for Ph.D. students to provide a high quality, holistic education. HOS, ENH and Agronomy take note of their critical mass of renowned plant breeders and geneticists specializing in field production of vegetables and fruit crops, forages, plant breeding, molecular
genetics, crop physiology and management. Research programs are internationally recognized and are highly successful in securing national competitive funding and provide an excellent opportunity to train students in crop breeding with the latest tools of the field. Another of the strengths of the new plant breeding degree is its interdisciplinary emphasis and ability to educate well rounded breeders that could work in academia and industry. This will be achieved by focusing on traditional and advanced methods that will incorporate different disciplines and experts from the university.

Plant breeding faculty in the involved departments and units have excellent collaboration and ongoing research projects with private industry. The impact of research discoveries linked to the proposed program will expand since between 30-70% of net royalties from licensed cultivars are returned to UF/IFAS plant breeding research programs. With a robust graduate program there are more opportunities for students to connect their research with producers and industry (R&D) and become the next face of workforce innovation in plant breeding. Graduate students in this new program will have an opportunity to gain from a diverse array of research programs and the program’s research expertise and student training will make our graduates highly competitive in the job market.

Once the program is established and recognized, the program will evaluate the possibility of creating a certificate with a strong distance education focus. This program will target primarily industry breeders seeking continuing education, which is a different and complementary population not covered by a traditional Ph.D. graduate program. We expect it will bring off-book revenues as well as additional recognition for UF/IFAS and its departments.

VIII. Curriculum

A. Describe the specific expected student learning outcomes associated with the proposed program. If a bachelor's degree program, include a web link to the Academic Learning Compact or include the document itself as an appendix.

Knowledge

Outcomes
- Students will be able to develop science-based proposal research to understand complex problems in plant breeding and genetics. Targeted outcome: 100% of the graduating students will demonstrate this knowledge.
- Students will be able to associate genetic inheritance theory to breeding targets and thus develop the best strategy for trait improvement. Targeted outcome: 100% of the graduating students will demonstrate this knowledge.

Assessment Methods
- Evaluation of the student's program of study by the supervisory committee.
- Evaluation of the student's knowledge as expressed during the proposal defense and qualifying examinations by the supervisory committee.
- Successful defense of qualifying exam, dissertation proposal and final dissertation as judged by a supervisory committee.

Skills

Outcomes
- Students will be able to conduct independent research to plan, design, analyze, and
interpret needs and opportunities for crop producers, in the context of plant breeding and cultivar development. Targeted outcome: 100% of the graduating students will demonstrate this skill.

- Students will be able to communicate research findings to peers and colleagues working in extension helping producers. Targeted outcome: 90% of the graduating students will demonstrate this skill.

Assessment Methods
- Successful defense of a dissertation as judged by a supervisory committee.
- Preparation of one or more manuscripts judged ready for submission in peer-reviewed research journals, at professional conferences, and/or at industry field days.

Professional Behavior

Outcomes
- Students will demonstrate ethical behavior, cultural sensitivity, teamwork, and effective communication to interact in professional environments. Targeted Outcome: 100% of the graduating students will demonstrate these professional behaviors.
- Students will become competent and professional scientists capable of leading breeding programs with private companies or as faculty members at institutions of higher learning. Targeted Outcome: 100% of the graduating students will demonstrate this professional behavior.

Assessment Methods
- Consistent adherence during the degree program to the University of Florida’s Honor Code.
- Observation by faculty advisor during class activities, seminars, research work, dissertation defense and participation in the faculty’s department seminar program and professional societies.
- The program will maintain contact with graduates to follow their careers.
- Students will adhere to all policies of the Institutional Review Board of the University of Florida during the research process.

B. Describe the admission standards and graduation requirements for the program.

Admission will require a recognized baccalaureate or graduate degree from a regionally accredited U.S. institution or a comparable degree from an international institution. The process will consider the verbal and quantitative GRE scores, and a minimum undergraduate GPA for students without an M.S. degree. Additional requirements include a minimum of three letters of reference, a statement of purpose, and a resume, which the plant breeding admissions committee will use to assess the student’s qualifications for admission to the program and potential for research scholarship. International students must comply with current UF standards for admission to the Graduate School, including requirements for English language competency and financial responsibility.

Applicants should have a B.S. or M.S. in agricultural, horticultural, forestry, biological or chemical sciences with desirable advanced undergraduate coursework in genetics, statistics, plant breeding, and biochemistry. However, outstanding students from a broad range of science and engineering disciplines will be considered. Prior completion of a master’s degree from a
regionally accredited institution or international equivalent is desirable, preferably in a field of study that provides the student with a solid grounding in the scientific method and plant sciences.

The plant breeding doctoral degree requires a minimum of 90 credit hours beyond a bachelor’s degree. Students entering the doctoral program with a completed master’s degree may transfer up to 30 hours of graduate credits, subject to existing UF Graduate School policies. Five core courses, listed in VIII section C, are required for a total of 14 credit hours and must be taken during the first fall and spring semesters. AGR6325 Plant Breeding Techniques is also required but can be taken anytime during the course of their graduate studies. Students need to obtain a grade of at least B or above in each of these courses. If similar level course(s) were taken prior to the doctoral degree, a petition must be submitted by the student’s supervisory committee chair to exclude and/or replace specific core courses. Additionally, students must take at least two additional courses (minimum of six credits) from the list of elective courses provided in VIII section C.

Doctoral students must complete an Individual Development Plan (IDP), conduct independent research satisfactorily and maintain a 3.0 GPA. Students must establish a supervisory committee by the end of the first year, comprised of at least three plant breeding faculty members and one external faculty member. A written and oral qualifying examination is required for all candidates for a Ph.D. degree following the graduate school requirements. It is recommended that the examination is completed by the end of the second year. Students complete the qualifying examinations according to standards determined by the student’s supervisory committee. The student is considered to have satisfactorily passed the qualifying exam when the decision of the supervisory committee is unanimously affirmed. If the examination is unsatisfactory, the supervisory committee may permit a second examination or deny the student from continuing in the program.

For completion of their degree, all doctoral students must have at least one first author publication submitted in a peer-reviewed journal in their research field before graduation; students will be strongly encouraged to publish before graduating. This requirement may be waived under extenuating circumstances, as approved by the supervisory committee. Students will be expected to participate every year in the Plant Breeders Working Group annual meetings.

Doctoral students should also pass a final examination, administered by the student’s supervisory committee. The examination format is at the discretion of the supervisory committee and consistent with the UF Graduate School policies. The graduate supervisory committee will assess the written dissertation and will examine the student’s overall comprehension and knowledge in a final defense of the dissertation.

C. Describe the curricular framework for the proposed program, including number of credit hours and composition of required core courses, restricted electives, unrestricted electives, thesis requirements, and dissertation requirements. Identify the total numbers of semester credit hours for the degree.

The Ph.D. will require a minimum of 90 post-baccalaureate credit hours. Up to 30 credits may be transferred from an M.S. or other master’s program from a regionally accredited institution or international equivalent. The doctoral course work will include core courses (14 credits), elective courses (6 credits), and dissertation research.
The curriculum was designed to provide the student with a strong background in the scientific method, data collection and analysis of data during the first semester, and plant breeding during the second semester. This ensures that students will be prepared to take specialized courses and have the ability to formulate their dissertation studies.

**Curriculum Overview**

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
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<tr>
<td></td>
<td>Fall</td>
<td>Spring</td>
<td>Summer</td>
<td>Fall</td>
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<td>Core Courses</td>
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<tr>
<td>STA6093</td>
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<td>Elective Courses</td>
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<tr>
<td>Research</td>
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<td>Qualifying Exam</td>
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<td>Journal Article</td>
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<tr>
<td>Final Exam</td>
<td></td>
<td></td>
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</tbody>
</table>

1 Journal Colloquium
2 Survey of Breeding Tools & Methods

Students are required to take the core courses listed below:

**Required Core Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>STA6093</td>
<td>Introduction to Applied Statistics for Agricultural and Life Sciences</td>
<td>3</td>
</tr>
<tr>
<td>AGR5266C</td>
<td>Field Plot Techniques</td>
<td>3</td>
</tr>
<tr>
<td>HOS6932</td>
<td>Journal Colloquium</td>
<td>2</td>
</tr>
<tr>
<td>AGR5321</td>
<td>Genetic Improvement of Plants</td>
<td>3</td>
</tr>
<tr>
<td>HOS6932</td>
<td>Survey of Breeding Methods</td>
<td>3</td>
</tr>
<tr>
<td>AGR6325</td>
<td>Plant Breeding Techniques*</td>
<td>1</td>
</tr>
</tbody>
</table>

* Required, but students can take it any semester in coordination with their supervisory committee

Students must choose a minimum of 6 additional credits from the following list of elective courses or as determined by the supervisory committee.

**Elective Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOS6201</td>
<td>Breeding Perennial Cultivars</td>
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<tr>
<td>PCB3065</td>
<td>Advanced Genetics</td>
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<tr>
<td>AGR5307</td>
<td>Molecular Genetics for Crop Improvement</td>
<td>3</td>
</tr>
<tr>
<td>HOS5242</td>
<td>Genetic and Breeding of Vegetable Crops</td>
<td>3</td>
</tr>
<tr>
<td>GMS6231</td>
<td>Genomics and Bioinformatics</td>
<td>3</td>
</tr>
<tr>
<td>AGR6932</td>
<td>Plant Chromosomes and Genomes</td>
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</tr>
<tr>
<td>PCB6555</td>
<td>Introduction to Quantitative Genetics</td>
<td>3</td>
</tr>
<tr>
<td>HOS6236</td>
<td>Molecular Marker-Assisted Plant Breeding</td>
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</tr>
<tr>
<td>AGR6322</td>
<td>Advanced Plant Breeding</td>
<td>3</td>
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</table>

Additional support courses may be determined by the doctoral supervisory committee accordingly to the area of study (ex. plant pathology, entomology, etc.).

**Dissertation Research**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit hours</th>
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<tbody>
<tr>
<td>HOS7979</td>
<td>Advanced Research</td>
<td>variable</td>
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</tbody>
</table>
D. Provide a sequenced course of study for all majors, concentrations, or areas of emphasis within the proposed program.

Proposed Plan of Study for a Ph.D. student in Plant Breeding:

<table>
<thead>
<tr>
<th>Term</th>
<th>Course</th>
<th>Credits</th>
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<tr>
<td>Fall Year 1</td>
<td>STA 6093 Introduction to Applied Statistics for Agricultural and Life Sciences 3</td>
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<td></td>
<td>AGR5266C Field Plot Techniques</td>
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<td></td>
<td>HOS6932 Journal Colloquium</td>
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<tr>
<td></td>
<td>HOS7979 Advanced Research</td>
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<tr>
<td></td>
<td>Total</td>
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<tr>
<td>Spring Year 1</td>
<td>AGR5321 Genetic Improvement of Plants</td>
<td>3</td>
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<td></td>
<td>HOS6932 Survey of Breeding Tools &amp; Methods</td>
<td>3</td>
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<tr>
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<td>HOS6932 Journal Colloquium</td>
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<tr>
<td>Summer Year 1</td>
<td>HOS7979 Advanced Research</td>
<td>6</td>
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<tr>
<td>Fall Year 1</td>
<td>Elective course(s)</td>
<td>3-6</td>
</tr>
<tr>
<td></td>
<td>HOS7979 Advanced Research</td>
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<td></td>
<td>HOS7979 Advanced Research</td>
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<tr>
<td></td>
<td>AGR6525 Plant Breeding Techniques</td>
<td>1</td>
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<tr>
<td>Summer Year 2</td>
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<td>Fall Year 3</td>
<td>HOS7980 Doctoral Research</td>
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<td>Spring Year 3</td>
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<td>Fall Year 4</td>
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<td>Spring Year 4</td>
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<td></td>
<td>Total</td>
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<tr>
<td>Summer Year 4</td>
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<td>6</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6</td>
</tr>
</tbody>
</table>
E. Provide a one- or two-sentence description of each required or elective course.

Core Courses:

**STA6093** Introduction to Applied Statistics for Agriculture & Life Sciences (3 credits)
Provides students with a conceptual and practical understanding of the application of statistics in agricultural and life sciences. A combination of lectures, programming demonstrations, data exercises using the programming language R, group activities, and primary literature will be used.

**AGR5266C** Field Plot Technique (3 credits)
Techniques and procedures used in planning, design and analysis of field plot, greenhouse, and laboratory research experiments. Application of research methodology, the analysis and interpretation of research results. Students work in a project with emphasis in the scientific method and strong experimental design. Offered fall term. Prerequisite: STA3023 or equivalent.

**AGR5321** Genetic Improvement of Plants (3 credits)
Genetic basis for crop improvement including methods for improving crop yield, pest resistance, and adaptability. Emphasis on manipulating genetic variability in self- and cross-pollinated annual and perennial crop plants. Offered fall term. Prerequisite: AGR 3303 or equivalent.

**HOS6932** Special Topics - Survey of Breeding Methods (3 credits)
A complete survey of methods and strategies commonly used in plant breeding and cultivar development. Course will cover, in a modular fashion, methodologies from traditional plant breeding methods to molecular methods. Lectures and/or hands-on activities will be taught by experts currently using these methods. Offered spring term. Prerequisites: AGR5321 or equivalent.

**AGR6325** Plant Breeding Techniques (1 credit)
Examination of various breeding techniques used by agronomic and horticultural crop breeders in Florida. Field and lab visits to active plant breeding programs, with discussion led by a specific breeder each week. Hands-on experience in breeding programs. Offered spring term in odd-numbered years. Prerequisite: AGR 3303 or equivalent.

**HOS6932** Special Topics - Journal Colloquium (1 credit)
Course will focus on critical discussion and presentation of contemporary plant breeding topics. A forum for students to explore the role of research, research paradigms, critical issues, emerging events, and scholarly writings through interactions with speakers, faculty and each other. Offered spring and fall terms.

Elective Courses:

**HOS6201** Breeding Perennial Cultivars (3 credits)
Methods of breeding perennial fruit and ornamental cultivars using mutations, cell and tissue culture, polyploidy, recurrent selection, and wide hybridization. Conservation and domestication of wild plants. Offered odd-numbered years in fall. Prerequisite: AGR 3303.
PCB5065 Advanced Genetics (4 credits)
Examines genetic principles including gene and gene function; recombination and linkage; molecular markers, multipoint linkage analysis, and positional cloning; and quantitative, population, developmental, and non-Mendelian genetics. For graduate students in any life science discipline. Offered in fall term. Prerequisite: AGR 3303 or PCB 3063 and BCH 4024 or BCH 5045.

AGR5307 Molecular Genetics for Crop Improvement (3 credits)
Lectures and laboratory demonstrations for a thorough understanding of concepts and applied aspects of plant molecular and cellular biology. Discussion of current research in plant biotechnology and functional genomics. Offered spring term. Prerequisite: AGR 3303.

HOS5242 Genetic and Breeding of Vegetable Crops (3 credits)
Traditional and molecular breeding methods for vegetable crops and the influence of scientific research, government policies, and consumer preferences on vegetable crop improvement. Prerequisite: AGR 3303 or equivalent.

GMS6231 Genomics and Bioinformatics (3 credits)
Principles of genomic characterization and bioinformatic analysis of eukaryotes. Prerequisite: STA 6166 and PCB 5065 or consent of instructor.

AGR6932 Plant Chromosomes and Genomes (3 credits)
This course is designed to introduce students to plant chromosome structures, inheritance, and the basic genomic tools to analyze plant genomes. Concepts to be introduced include plant DNA organization in chromosome structure, principles and technologies of cytogenetics, plant genomic DNA structure and function, transcriptome, DNA sequencing technologies/applications, basic tools for nucleotide sequence analysis, and plant genomic database exploring. Prerequisites AGR3303 Genetics or PCB 5063 Genetics

PCB6555 Introduction to Quantitative Genetics (3 credits)
Intended for students of all disciplines who are interested in genetic principles and biometric evaluation of characters that exhibit continuous variation in natural populations or breeding programs. Prerequisite: STA 6166.

HOS6236 Molecular Marker-Assisted Plant Breeding (3 credits)
This course provides theory, methods and procedures required to apply molecular information in plant breeding programs. The course will be based on lectures and multiple hands-on activities that apply what is learned. Frequent evaluations will occur during the semester by topic. Offered fall term of odd years. Prerequisite: STA6093 and AGR532 or equivalents.

AGR6322 Advanced Plant Breeding (3 credits)
This course focuses on practical application of plant breeding, genetics, and statistics to devise effective approaches to meet particular breeding goals. Highlighting real-life situations and key decisions that plant breeders face, the course builds upon knowledge of plant breeding methods and quantitative genetic theory. Four specific functional areas, which somewhat reflect divisions of labor in breeding programs and seed industry, are addressed: population development, population evaluation, trait integration, and product commercialization and supply. Offered spring term in even-numbered years. Prerequisite: AGR 3303, 4231, AGR 6311, and STA 6167.
Dissertation Research:

HOS7979 Advanced Research (Variable credits)
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy. S/U.

HOS7980 Doctoral Research (Variable credits)

F. For degree programs in the science and technology disciplines, discuss how industry-driven competencies were identified and incorporated into the curriculum and indicate whether any industry advisory council exists to provide input for curriculum development and student assessment.

Our integrated curriculum will equip students with traditional and contemporary breeding methodologies, including molecular techniques (e.g.: genomic prediction and editing), quantitative genetics, and analysis of breeding trials. Our curriculum was developed upon consultation with industry, non-profit, and academic sectors. While there are currently no specific guidelines for industry-driven competencies, our faculty interact regularly with industry stakeholders and many of our students that were trained in plant breeding have secured jobs in the private sector. Industry representatives from different crops provided their input with regards to the curriculum and one multinational offered to participate as a member of an advisory board (see support letters). We plan to implement a program advisory board with internal and external academic representatives as well as stakeholders including the private sector. The board will meet every five years to review and update the strategic plan for the program, including a review of the curriculum.

G. For all programs, list the specialized accreditation agencies and learned societies that would be concerned with the proposed program. Will the university seek accreditation for the program if it is available? If not, why? Provide a brief timeline for seeking accreditation, if appropriate.

No accreditations will be required for this proposed graduate program. The American learned societies with interest in this program include: Crop Science Society of America (CSSA, crops.org), American Society for Horticultural Science (ASHS, ahs.org), National Association of Plant Breeders (NAPB, plantbreeding.org), Plant Breeding Coordinating Committee (PBCC, plantbreeding.org/content/pbcc), and their equivalent international societies, such as the Consultative Group on International Agricultural Research Consultative (CGIAR, ciga.org), the European Association for Research on Plant Breeding (EUCARPIA, eucarпа.org), International Society for Horticultural Science (ISHS, ishs.org) and the Global Partnership Initiative for Plant Breeding (GIPB, fao.org/in-action/plant-breeding/en). While we expect that our students and faculty will interact closely with these societies, none of these societies accredit academic programs in the area of plant breeding.

H. For doctoral programs, list the accreditation agencies and learned societies that would be concerned with corresponding bachelor's or master's programs associated with the proposed program. Are the programs accredited? If not, why?
There are no learned societies or accrediting organizations for corresponding bachelor’s or master’s programs in the area of plant breeding.

I. Briefly describe the anticipated delivery system for the proposed program (e.g., traditional delivery on main campus; traditional delivery at branch campuses or centers; or nontraditional delivery such as distance or distributed learning, self-paced instruction, or external degree programs). If the proposed delivery system will require specialized services or greater than normal financial support, include projected costs in Table 2 in Appendix A. Provide a narrative describing the feasibility of delivering the proposed program through collaboration with other universities, both public and private. Cite specific queries made of other institutions with respect to shared courses, distance/distributed learning technologies, and joint-use facilities for research or internships.

This program will be a hybrid of traditional and distance delivery methods to graduate students residing on the main campus of the University of Florida and at the Research and Education Centers (RECs) located throughout Florida using existing faculty from the Departments of Agronomy, Environmental Horticulture, School of Forest Resources and Horticultural Sciences.

The delivery system for this program will be a mix of traditional delivery to students present on main campus and nontraditional delivery by distance learning to students across the state in the different RECs. The long-term aim is to have all courses include an online component. Some of the courses, such as PCB6555 Introduction to Quantitative Genetics are currently being offered fully online while AGR5321 Genetic Improvement of Plants is scheduled to be offered online in the Spring 2020. All courses currently offer the possibility of distance learning through synchronous online delivery. This proven method has worked well and received positive feedback from students and faculty located across the state at the RECs. Since approximately 60% of plant breeding faculty are located in six RECs located across the state from Marianna to Homestead, it is crucial that students advised by off-campus faculty and conducting research at these locations be able to attend classes remotely with the aid of technology.

No specialized services are needed for the proposed delivery system nor do we expect it to require greater than normal financial support. It is not anticipated that the proposed PB graduate program will involve other universities and no such queries have been submitted. Collaboration with other universities in the state is limited since we are proposing the first plant breeding graduate program in Florida.

IX. Faculty Participation

A. Use Table 4 in Appendix A to identify existing and anticipated full-time (not visiting or adjunct) faculty who will participate in the proposed program through Year 5. Include (a) faculty code associated with the source of funding for the position; (b) name; (c) highest degree held; (d) academic discipline or specialization; (e) contract status (tenure, tenure-earning, or multi-year annual [MYA]); (f) contract length in months; and (g) percent of annual effort that will be directed toward the proposed program (instruction, advising, supervising internships and practica, and supervising thesis or dissertation hours).

Table 4 lists the Graduate Faculty who will participate in the PB graduate program and will serve as chairs or members of supervisory committees of students. External members of these
committees will be chosen from the graduate faculty members not affiliated with the PB program. We anticipate that by Year 5 of the program, we will have two additional new hires at the assistant professor level.

B. Use Table 2 in Appendix A to display the costs and associated funding resources for existing and anticipated full-time faculty (as identified in Table 4 in Appendix A). Costs for visiting and adjunct faculty should be included in the category of Other Personnel Services (OPS). Provide a narrative summarizing projected costs and funding sources.

One of the primary costs of the Ph.D. program will be faculty and staff salaries and benefits. The reallocated E&G base is calculated based upon the percentage of faculty and staff salaries/benefits funded through E&G for the effort proposed on Table 4. We are also assuming an annual salary increase of 3% for faculty and staff. Based on projected enrollment trends (Table 1-B), the E&G cost per student FTE decreases from $37,049 in Year 1 to $17,820 in Year 5. Total projected E&G costs for Year 1 are $129,672 and for Year 5 are $253,937.

C. Provide in the appendices the abbreviated curriculum vitae (CV) for each existing faculty member (do not include information for visiting or adjunct faculty).

This information is provided in Appendix C.

D. Provide evidence that the academic unit(s) associated with this new degree have been productive in teaching, research, and service. Such evidence may include trends over time for average course load, FTE productivity, student HC in major or service courses, degrees granted, external funding attracted, as well as qualitative indicators of excellence.

As mentioned before, the proposed Ph.D. degree will be an interdisciplinary degree involving four IFAS departments (AGR, HOS, ENH and SFRC) which will be administrated under the Horticultural Sciences Department where most of the plant breeders are housed. While statistics and academic indicators have not been generated for the subset of faculty working in plant breeding in each of these departments, we nevertheless collected productivity and quality indicators across these departments and among the PBWG to demonstrate that breeding faculty are active in research, teaching and extension. Plant breeding faculty are nationally and internationally recognized and have an impressive list of achievements and awards commensurate with top-tier institutions.

The table below shows the total number of faculty, the number of plant breeding faculty and their corresponding percentage in each of these four IFAS departments. These faculty have research, teaching and extension responsibilities, thus fulfilling the land-grant mission.

<table>
<thead>
<tr>
<th>Department</th>
<th>Total Faculty</th>
<th>Plant Breeders</th>
<th>Percentage of Total Departmental Faculty in Plant Breeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agronomy</td>
<td>30</td>
<td>7</td>
<td>23%</td>
</tr>
<tr>
<td>Environmental Horticulture</td>
<td>34</td>
<td>3</td>
<td>9%</td>
</tr>
<tr>
<td>Horticultural Science</td>
<td>58</td>
<td>15</td>
<td>26%</td>
</tr>
<tr>
<td>SFRC</td>
<td>73</td>
<td>2</td>
<td>3%</td>
</tr>
</tbody>
</table>

30
In their last academic program review (2009-2016) the average graduate student enrollment for five years across these departments was 50.4 for AGR, 71.6 for HOS and ENH combined (since their Ph.D. degree is jointly administered by ENH and HOS), and 98.6 for SFRC. All these departments had a significant increase in student enrollment during this last review. For instance, AGR increased their enrollment by 58% from 2011 to 2015; HOS combined with ENH had an increase of 30% from 2010 to 2011; and SFRC had an increase of 66% from 2011 to 2015. This high enrollment trend has been retained to date. Plant breeders in these departments have chaired and successfully graduated a total of 128 graduate students, with 50 graduates in AGR, 66 in HOS and ENH, and 22 in SFRC. Given the recent increase in the number of faculty focusing in plant breeding (27 currently) student enrollment are expected to grow in the near future.

In the last 10 years, plant breeding faculty have secured external support of approximately $60 million in federal and private funding, bringing the average total support to nearly $3 million per breeder. Such external funding includes research grants from the National Institutes of Health, National Science Foundation, and the United States Department of Agriculture and contracts through private industry. The development of cultivars and varieties by IFAS plant breeders not only contribute to augment Florida’s agricultural industry but its positive impact have also significantly increased globally. For instance, in the last 10 years, more than 300 cultivars have been developed by the University of Florida and cultivars for each of our 50 crops continue to grow year after year. Licensing of these cultivars has generated royalties that have seen an increase of $1 million per year in the last seven years, currently appraised at more than $14 million. With one of the most aggressive royalty re-investments initiatives of the nation, between 30-70% of this revenue is returned to research programs dedicated to developing cultivars and training students. This re-investment initiative has positively impacted the quantity and quality of research carried by plant breeding faculty in IFAS.

In their last academic program review, HOS generated an average of 77 scientific publications per year. ENH reported a similar number and AGR produced an annual average of 86 publications. SFRC reported a total of 140 publications in 2015. Faculty scholarly activity has increased steadily as can be seen in 2018 when HOS reported over 120 scientific publications. The impact of publications measured by the i10-index (number of publications with at least 10 citations) for HOS and ENH with a weighted average (by faculty tenure level) was 41, and 18, respectively.

Graduate students working with plant breeding faculty regularly publish their research in top-rated per-review agriculture, horticulture, forestry and plant breeding journals, including: Crop Science, Journal of the American Society of Horticultural Sciences, HortScience, Plant Breeding, Molecular Breeding, Genetics, Plant Molecular Biology, Plant Genome, Theoretical and Applied Genetics, The Plant Cell, and Proceedings of the National Academy of Sciences. This clearly demonstrates the capacity of plant breeders to successfully train the new generation of plant breeders.

Data on the program’s enrollments (SCH and FTE), majors, degrees granted, faculty, and financial profile from the time of the last program review to the present date.

**Agronomy (AGR) Department:**
The following table shows total Agronomy graduate student enrollment for the period of 2010-2016. Data are from Fall semester each year except 2016. Average enrollment for the previous seven years was 34.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Enrollment</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>FTE (Fall term)</td>
<td>36</td>
<td>43</td>
<td>45</td>
<td>44</td>
<td>52</td>
<td>68</td>
<td>69</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>27</td>
<td>26</td>
<td>27</td>
<td>26</td>
<td>33</td>
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<td>37</td>
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<tr>
<td>M.S.</td>
<td>9</td>
<td>17</td>
<td>18</td>
<td>18</td>
<td>19</td>
<td>31</td>
<td>32</td>
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</tbody>
</table>

*Source – Wendy Williams, CALS*

Academic year fundable graduate credit hours for the Agronomy Department are shown below. The average over the previous seven years was 866.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Agronomy</td>
<td>815</td>
<td>1031</td>
<td>1035</td>
<td>964</td>
<td>866</td>
<td>1001</td>
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</tbody>
</table>

*Source – UF Enterprise Reporting*

The Agronomy department has 27 tenure-track faculty (includes the department chair) one lecturer and two research scientists. Thirteen faculty are located at off-campus Research and Education Centers (five different locations). Grant funding and IDC for 2013-2015 are shown below.

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
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<td>Grant Funds</td>
<td>$2,522,023.57</td>
<td>$1,922,923.63</td>
<td>$2,414,619.42</td>
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<tr>
<td>IDC</td>
<td>$676,484.17</td>
<td>$365,932.32</td>
<td>$774,650.11</td>
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</tbody>
</table>

**Departments of Horticultural Sciences (HOS) and Environmental Horticulture (ENH):**

HOS and ENH granted 58 M.S. degrees since 2009 and 50 Ph.D. degrees since 2009.

<table>
<thead>
<tr>
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<tr>
<td>Total HOS</td>
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<td></td>
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<tr>
<td>Graduate SCH</td>
<td>2088*</td>
<td>1,384</td>
<td>1,582</td>
<td>1,930</td>
<td>1,989</td>
<td>1,844</td>
<td>1,282</td>
</tr>
<tr>
<td>Total ENH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate SCH</td>
<td>2088*</td>
<td>575</td>
<td>637</td>
<td>483</td>
<td>484</td>
<td>403</td>
<td>427</td>
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</table>

*Includes SCH for the Environmental Horticulture Department as the data for this was not yet split for the two departments.*

**Total FTE**

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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Horticultural Sciences</td>
<td>66*</td>
<td>44</td>
<td>51</td>
<td>56</td>
<td>62</td>
<td>63</td>
<td>59</td>
<td>40</td>
</tr>
<tr>
<td>Environmental Horticulture</td>
<td>66*</td>
<td>19</td>
<td>21</td>
<td>16</td>
<td>16</td>
<td>14</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

*Includes FTE for the Environmental Horticulture Department as the data for this was not yet split for the two departments.*

**Enrollment for the period of 2009-2015, fall term***

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<tr>
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</thead>
<tbody>
<tr>
<td>Total graduate</td>
<td>55</td>
<td>56</td>
<td>73</td>
<td>71</td>
<td>75</td>
<td>68</td>
<td>71</td>
</tr>
</tbody>
</table>
students

| Total Ph.D. students | 31 | 41 | 44 | 43 | 49 | 45 | 44 |

*We have a M.S. thesis degree, a M.S. non-thesis degree and a Ph.D. degree program.

Research and scholarly activity of the Horticultural Sciences and Environmental Horticulture faculty is evident from the number of refereed publications, grant money received, and scholarly publication indices that reflect productivity and impact. The h-index measures frequency of citations by other authors, and the number of citations. The i10-index tabulates the number of publications that have been cited at least 10 times. These data are reported below:

<table>
<thead>
<tr>
<th>Refereed publications for UF Horticultural Sciences faculty from 2009-2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grant funding and IDC for UF Horticultural Sciences faculty from 2009 - 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grant Funds</td>
</tr>
<tr>
<td>IDC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Citation frequency and indices for UF Horticultural Sciences faculty as of December 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rank</td>
</tr>
<tr>
<td>Assistant (n=4)</td>
</tr>
<tr>
<td>Associate (n=7)</td>
</tr>
<tr>
<td>Full (n=12)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Refereed publications for UF Environmental Horticulture faculty from 2009-2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>86</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grant funding and IDC for UF Environmental Horticulture faculty from 2009-2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grant Funds</td>
</tr>
<tr>
<td>IDC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Citation frequency and indices for UF Environmental Horticulture faculty as of Dec 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rank</td>
</tr>
<tr>
<td>Assistant (n=4)</td>
</tr>
<tr>
<td>Associate (n=6)</td>
</tr>
<tr>
<td>Full (n=11)</td>
</tr>
</tbody>
</table>
School of Forest Resources and Conservation (SFRC):

SFRC has 73 faculty, of which 49 are state-funded. During the 2015-2016 fiscal year faculty generated $24,540,000 in expenditures, of which less than 40% were from state-appropriated funds. During 2015 these faculty also produced 140 refereed publications. Enrollment in all four majors offered at the bachelor's-level continues to expand. Total enrollment has expanded by 148.4% since the last review in 2010.

[Graph of SFRC Undergraduate Enrollment]

Enrollment in both majors offered at the graduate-level continues to expand. “Other” refers to students majoring in other academic units, but were advised by SFRC faculty. “Total Grad” does not include Other students. Total enrollment expanded by 68.3% since the last review in 2010.

[Graph of SFRC Graduate Enrollment]

Student Contact Hours continue to expand, rising 23.2% since the last review in 2010.
SFRC includes 73 faculty, of which 49 are state-funded. Among state-funded faculty, 2% are Distinguished Faculty, 37% are Full Professor, 31% are Associate Professor, 27% are Assistant Professor, and 4% are Non-Tenure Track. Total expenditures expanded by 63.3% since the last review in 2010.

**X. Non-Faculty Resources**

A. Describe library resources currently available to implement and/or sustain the proposed program through Year 5. Provide the total number of volumes and serials available in this discipline and related fields. List major journals that are available to the university’s students. Include a signed statement from the Library Director that this subsection and subsection B have been reviewed and approved.

The Libraries of the University of Florida form the largest information resource system in the state of Florida. The libraries hold 6,169,930 print volumes, 1,489,569 e-books (books in digital format), 145,280 full-text e-journal titles, and 1,092 electronic databases as of 2018. The George A. Smathers Libraries of the University of Florida, a system of six research libraries, includes libraries for sciences, humanities & social sciences, architecture & fine arts, education, and
health sciences. The UF Levin School of Law supports a related, but independent law library. Additional library resources are available in two specialized libraries, the UF Digital Collections and the Special & Area Studies Collection. Books and periodicals, related to plant breeding are located primarily in the Marston Science Library.

Electronic books, journals and many key databases, such as Web of Science, BIOSIS Citation Index, CAB Abstracts, Proquest SciTech Collection and others, are available via the internet to UF students, faculty and staff. Many relevant databases are multidisciplinary and are funded centrally. The UF Libraries expend over $10.6 million annually on electronic resources. Listed below is a selection of the important journals available through UF Libraries for use by students pursuing a doctorate degree in plant breeding:

- American Journal of Botany
- Annual Review of Plant Biology
- Crop Science
- Current Opinion in Plant Biology
- Euphytica
- Journal of Experimental Botany
- Plant Breeding
- Plant Cell
- Plant Cell and Environment
- Plant Molecular Biology
- Plant Physiology
- Plant Science
- Proceedings of the National Academy of Sciences of the USA
- Scientia Horticulturae
- Theoretical and Applied Genetics: International Journal of Plant Breeding Research
- Trends in Plant Science

In addition, there are a growing number of open access journals in the field; the content of these journals is freely available to readers. Important titles of open access journals related to plant breeding include:

- Frontiers in Plant Science
- HortScience*
- Journal of American Society of Horticultural Science*
- Molecular Plant Breeding
- New Phytologist
- Plant Biotechnology Journal
- Plant Genome
- Plant Journal

*These journals will become freely available without a subscription as of January 1, 2020.

The Libraries hold memberships in a number of consortia, and in institutions such as the Center for Research Libraries, ensuring access to materials not held locally. "UBorrow" service allows UF patrons to easily borrow materials from any other Florida state university or college library. Materials not held in UF collections and unavailable via UBorrow are procured through
Interlibrary Loan requests are fulfilled at no cost to the library patron; participation in this library collection exchange program is paid for by the UF Libraries. All students, faculty, and staff may use interlibrary loan services.

With monies allocated through the Provost and the UF budgeting process, the library materials budget is determined by the Dean of Libraries in consultation with the Senior Associate Dean for Scholarly Resources & Research Services and subject specialist librarians. The librarian subject specialists for the agricultural sciences and biological/life sciences, with input from the Plant Molecular & Cell Biology Program, Department of Biology, Department of Horticultural Sciences and the Department of Environmental Horticulture faculty, determine acquisition priorities for the year. Standing subscriptions to journal literature and databases make up the majority of purchasing. Online research guides for all UF disciplines and many specific topics are available from the library website http://library.ufl.edu. Many online tutorials for specific databases are also available. Additionally, the UF Libraries offer consultations, workshops, and events throughout the year.

B. Describe additional library resources that are needed to implement and/or sustain the program through Year 5. Include projected costs of additional library resources in Table 2 in Appendix A. Please include the signature of the Library Director in Appendix B.

No additional library resources beyond the current allocation and normal growth in holdings already in place to support current programs are necessary to implement or sustain the graduate program in Plant Breeding.

C. Describe classroom, teaching laboratory, research laboratory, office, and other types of space that are necessary and currently available to implement the proposed program through Year 5.

Facilities available to students in the Plant Breeding graduate program will be derived from the multiple academic units and Research and Education Centers participating, including the four IFAS departments of Agronomy, Horticulture Sciences, Environmental Horticulture and School of Forest Resources and Conservation and the six REC units in Wimauma, Lake Alfred, Apopka, Homestead, Belle Glade and Marianna. Overall, these infrastructures include all the laboratory, greenhouse and field facilities of the Plant Breeding faculty, classrooms, computer facilities, and core laboratories of the Interdisciplinary Center for Biotechnology Research (ICBR), and Genetics Institute. It is important to mention that the proposed courses for this degree, including the new course, will utilize classrooms, teaching and research laboratories and other types of space that currently exist and are utilized by the above departments and research and education centers (RECs).

Among the proposed core courses is STA6093 Introduction to Applied Statistics for Agriculture & Life Sciences, which is 100% online, and therefore, does not require any physical space. Similarly, AGR5321C Genetic Improvement of Plants offered by Agronomy, is 80-99% online with some in-person exams or projects. AGR5266C Field Plot Techniques also offered by Agronomy courses are primarily classroom delivered in the Plant Science Facility (PSF) 0005, HOS6932 Journal Colloquium and HOS6932 Survey of Breeding Tools and Methods will both be offered by Horticultural Sciences in either one of the Fifield classrooms (2316 and 2318 Fifield, each with a room capacity of 48 students).
The four departments involved currently provide workspaces for each graduate student enrolled under the supervision of a faculty member in such department.

There are no specific needs for specially equipped classrooms for instruction in this program, except those that are required for students with disabilities. Non-special-use classroom space is centrally managed at the University of Florida. Our requirements for classroom space are currently met and we do not anticipate additional needs.

D. Describe additional classroom, teaching laboratory, research laboratory, office, and other space needed to implement and/or maintain the proposed program through Year 5. Include any projected Instruction and Research (I&R) costs of additional space in Table 2 in Appendix A. Do not include costs for new construction because that information should be provided in response to X (E) below.

Two spaces are needed. First, an office for the program administrator large enough to conduct meetings with up to two students and/or faculty members. Second, a common office area for graduate students as they move between Research and Education Centers and the Main Campus, and/or for students housed in Main Campus programs, which have insufficient space to accommodate them.

E. If a new capital expenditure for instructional or research space is required, indicate where this item appears on the university's fixed capital outlay priority list. Table 2 in Appendix A includes only Instruction and Research (I&R) costs. If non-I&R costs, such as indirect costs affecting libraries and student services, are expected to increase as a result of the program, describe and estimate those expenses in narrative form below. It is expected that high enrollment programs in particular would necessitate increased costs in non-I&R activities.

At this point no additional research or instructional spaces are required to successfully implement and grow this proposed program.

F. Describe specialized equipment that is currently available to implement the proposed program through Year 5. Focus primarily on instructional and research requirements.

For instructional purposes our proposed program requires classrooms equipped with online delivery equipment. All classrooms being utilized for this degree are either already well-equipped for online delivery or are being promptly updated by the four departments involved. For research, all plant breeding faculty laboratories are well-equipped to train and instruct graduate students on techniques and methods used in plant breeding.

G. Describe additional specialized equipment that will be needed to implement and/or sustain the proposed program through Year 5. Include projected costs of additional equipment in Table 2 in Appendix A.

No additional specialized equipment will be needed to implement the program.

H. Describe any additional special categories of resources needed to implement the

38
program through Year 5 (access to proprietary research facilities, specialized services, extended travel, etc.). Include projected costs of special resources in Table 2 in Appendix A.

None.

I. Describe fellowships, scholarships, and graduate assistantships to be allocated to the proposed program through Year 5. Include the projected costs in Table 2 in Appendix A.

It is anticipated that all doctoral students in this program will receive graduate assistantship or fellowship support since financial support is a critical element in recruitment of top applicants and maintenance of a Ph.D. program. The plant breeders are envisioning a unique program that has continuous support from licensing royalties. Since 2010 the UF/IFAS Plant Breeders Workgroup (PBWG) and IFAS-Research have funded 23 graduate students through the Plant Breeding Graduate Initiative (PBGI) scholarship initiatives. The proposed program is expected to recruit top students with interest in plant breeding (maximum of 5-6 students per year in the first cycle). With continuing support of the Plant Breeders Workgroup (PBWG) and IFAS-Research, the PBGI will ensure assistantships for 3-4 students annually and thus 60-80% of the recruitment goal will be achieved with internal funding.

We also project an increase in the philanthropy endowments represented by the Plant Breeding Graduate Initiative (PBGI). This initiative represents an annual funding opportunity provided by UF/IFAS Research and Florida Foundation Seed Producers, a Direct Support Organization (DSO) that supports the plant breeding program. IFAS Research currently funds $60,000 per cohort per year, while the plant breeders provide $60,000. We are predicting that with the success of the program the plant breeders will expand their support by Year 5 for a total of $90,000 per year. Furthermore, we are estimating that the program will obtain support for either one Graduate School Preeminence Award (GSPA) or Graduate School Funding Award (GSFA) by Year 5, in addition to the $30,000 provided by IFAS for the PBGI program (total of $61,000 by Year 5).

The visibility provided by this new graduate program will increase UF/IFAS opportunities to obtain industry support targeting training of new plant breeders. Moreover, the plant breeding faculty have an excellent track record of obtaining extramural support and the number of grant-supported assistantships has grown steadily. The increased visibility of this new interdisciplinary program would enhance PIs' changes of more successfully compete for extramural research project funding.

Additionally, the addition of this doctoral program would make us competitive for university-wide fellowships that are limited to doctoral students and we plan to take advantage of those opportunities.

J. Describe currently available sites for internship and practicum experiences, if appropriate to the program. Describe plans to seek additional sites in Years 1 through 5.

The UF/IFAS Plant Breeding Graduate Program is a field-based applied breeding program which provides students with hands-on experience and exposure to 50 crops that our faculty research
and investigate. As part of their plant breeding training, both our on-campus or off-campus students are required to carry out extensive field work research. UF/IFAS provides research support for faculty members including facilities on the University of Florida campus plus off-campus facilities including 12 Research and Education Centers, five Research and Demonstration Sites (that include two biological stations) and a research forest. We therefore feel that we will be able to provide adequate sites for student research.

Even though we do not require an internship or practicum for doctoral students in the proposed degree program, students are encouraged to pursue an outside internship with industry, governmental agencies, and non-governmental organizations with the duration of at least one month. We have excellent collaborative relationships with industry and other organizations so our students will be able to gain experience in other applied breeding programs especially with potential future employers (private and public).

CITED LITERATURE


doi:10.2134/csa2018.63.0701
## Cover Sheet: Request 11708

### Approval of new course: Applications and Technologies of Synthetic Biology

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Course|New for request 11708

Info

Request: Approval of new course: Applications and Technologies of Synthetic Biology
Description of request: Approval of new course: Applications and Technologies of Synthetic Biology-MCB 4xxx
Submitter: Monika Oli moli@ufl.edu
Created: 11/8/2019 9:25:05 AM
Form version: 5

Responses

Recommended Prefix MCB
Course Level 4
Number xxx
Category of Instruction Advanced
Lab Code None
Course Title Applications and Technologies of Synthetic Biology
Transcript Title Synthetic Biology
Degree Type Baccalaureate

Delivery Method(s) Online, UF Online - Please attach a letter of support from the Director of the UF Online program
Co-Listing No

Effective Term Earliest Available
Effective Year Earliest Available
Rotating Topic? No
Repeatable Credit? No

Amount of Credit 3

S/U Only? No
Contact Type Regularly Scheduled
Weekly Contact Hours 3

Course Description Synthetic biology is the construction and reconstruction of biological systems, and its practical applications in research and industry. Advanced molecular biology tools for DNA assembly, the construction of biological pathways and circuits, genome editing, and strategies for transcriptional control will be examined in the course.

Prerequisites MCB 3020 or MCB 3023
Co-requisites N/A

Rationale and Placement in Curriculum This course is an important addition to our curriculum, explaining the most current technologies to our students. None of the other course cover the topics discussed in this class.

Course Objectives 1. Define synthetic biology and understand its importance in the 21st century.
2. Classify and analyze biological parts and their function on the systems level.
3. Describe and discuss advanced molecular biology techniques that facilitate the building of biological parts and systems.
4. Argue both sides of ethical decisions and containment strategies in synthetic biology

Course Textbook(s) and/or Other Assigned Reading N/A

Primary papers and literature are listed week by week

Weekly Schedule of Topics Date (week) Topic Readings


5 Recombinant DNA technologies, Cloning techniques and strategies Polymerase Chain Reaction
https://en.wikipedia.org/wiki/Polymerase.chain.reaction
The SLIC, Gibson, CPEC and SLICE assembly methods (and GeneArt® Seamless, In-Fusion® Cloning)
https://j5.jbei.org/j5manual/pages/22.html

6 Artificial Gene Circuits, Noise in Gene Expression, Test 1 Construction of a genetic toggle switch in Escherichia coli

7 BioSensors – Construction and Application Synthetic biology devices for in vitro and in vivo diagnostics


Links and Policies Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

Grading Scheme Evaluation of Learning/Grades
3 Exams (100 pts each) – 300 points
Discussion, Quizzes, Homework – 200 points
Written Proposal – 100 points
Exams
There will be 3 exams administered throughout the semester at approximately 5 week intervals. All material covered during class will be subject to testing. Tests are conceptually cumulative because understanding of topics covered early in the course will be required to understand materials covered later in the course.
Discussion, Quizzes, Homework
Throughout the semester there will be quizzes, discussions, and homework assigned for grades that will total 200 points.
Proposals
Each student will be responsible for writing a research proposal that aims to investigate a novel idea in the field of synthetic biology that is of scientific or industrial interest. The proposal for students in the 4xxx level course will be 3 pages single-spaced, while the 6xxx level students are expected to write 6 pages with more detailed experimental approaches. Grading rubrics will be provided in class.
Grading Policy
Final letter grades will be assigned based on the number of points earned, as follows:
A = 564-600 points, A- = 540 – 563 points
B+ = 516 – 539 points, B = 498-515 points, B- = 480-497 points
C+ = 456-479 points, C = 438-455 points, C- = 420-437 points
D+ = 396-419 points, D = 378-395 points, E = 0-377 points
More information on grades and grading policies is here: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx
Instructor(s) Dr. Christopher Reisch - creisch@ufl.edu
Links and Policies Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

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Instructor(s) Dr. Christopher Reisch - creisch@ufl.edu
## UCC: External Consultations

### External Consultation Results (departments with potential overlap or interest in proposed course, if any)

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<td>Dorota Z. Haman - Professor and Chair</td>
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<td>(352) 392-1864 ext 120</td>
<td><a href="mailto:dhaman@ufl.edu">dhaman@ufl.edu</a></td>
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**Comments**

Please see attached email correspondence. Dr. Haman identified two courses with the potential for minor overlap, but she was happy that the course would be offered at UF.

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<td>Molecular Genetics and Microbiology</td>
<td>Henry V. Baker, Professor and Chair</td>
</tr>
<tr>
<td>Phone Number</td>
<td>E-mail</td>
</tr>
<tr>
<td>(352) 273-5935</td>
<td><a href="mailto:baker@mgm.ufl.edu">baker@mgm.ufl.edu</a></td>
</tr>
</tbody>
</table>

**Comments**

Dr. Baker saw no potential overlap and believed that the course would complement existing courses in MGM.

<table>
<thead>
<tr>
<th>Department</th>
<th>Name and Title</th>
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<tbody>
<tr>
<td>Biochemistry and Molecular Biology</td>
<td>James Flanagan, Professor and Chair</td>
</tr>
<tr>
<td>Phone Number</td>
<td>E-mail</td>
</tr>
<tr>
<td>(352) 294-8384</td>
<td><a href="mailto:flanagan@ufl.edu">flanagan@ufl.edu</a></td>
</tr>
</tbody>
</table>

**Comments**

See attached correspondence. Dr. Flanagan and Dr. Tom Yang found a "relatively small amount of overlap" with courses in BMB, though the overlap is not a concern to the department.
UCC: External Consultations

<table>
<thead>
<tr>
<th>Department</th>
<th>Name and Title</th>
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<tbody>
<tr>
<td>Biology</td>
<td>Prof. Marta Wayne</td>
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<table>
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<tr>
<th>Phone Number</th>
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<tbody>
<tr>
<td>352-392-9925</td>
<td><a href="mailto:mlwayne@ufl.edu">mlwayne@ufl.edu</a></td>
</tr>
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</table>

Comments

The Department of Biology is also offering a course on synthetic biology taught by Dr. Ed Braun. Dr. Braun and I have been in contact and aim to make the two courses complementary and not competing. See the attached correspondence for details on the specifics of each course.
Hi Chris
The Applied Microbiology and Biotechnology covers industrial fermentation and wastewater treatment applications of biotechnology. The focus is on the process engineering aspects along with mathematical modeling of processes. So I do not see any overlap with your proposed course.
I will be recommending your Synthetic Biology course to my graduate students.

Best Regards
Pratap

From: Dorota Haman <dhaman@ufl.edu>
Date: Wednesday, March 1, 2017 at 12:35 PM
To: Chris Reisch <creisch@ufl.edu>
Cc: "Correll, Melanie J" <correllm@ad.ufl.edu>, Pratap Pullammanappallil <pcpratap@ufl.edu>
Subject: Re: External Consult for MCS course

Chris,
Pratap Pullammanappallil is teaching ABE4600 and as far as I know, he does not teach synthetic biology in it. I have copied him on this email. Melanie Correll is also very interested in your class – she talked about synthetic biology in her class and works with a team of students on synthetic biology competition – I also copied her on this email. These are two faculty members that you may want to talk to. I am glad to see this class being developed at UF.
Dorota

Dr. Dorota Z. Haman
Professor and Chair
Agricultural and Biological Engineering
120 Rogers Hall
PO Box 110570
University of Florida
Gainesville FL 32611-0570

Tel: (352) 392-1864 ext 120
Fax: (352) 392-4092
email: dhaman@ufl.edu
http://abe.ufl.edu/

https://mail.ufl.edu/owa/wviewmodel=ReadMessageItem&ItemID=AAAIADKZGWU140K3540 UNGMwZC04NjNjLTMyMmUwMWU2MTJjZQ8GAAAA..
From: Chris Reisch <creisch@ufl.edu>
Date: Wednesday, March 1, 2017 at 10:18 AM
To: Dorota Haman <dhaman@ufl.edu>
Subject: External Consult for MCS course

Hi Dr. Haman,

I'm developing a 4000/6000 level course in synthetic biology that will be listed in Microbiology and Cell Sciences and need to get external consultations for potential course overlap. The course will focus on techniques and microbial applications of synthetic biology, including; methods for transcriptional and translational control of gene expression, genome evolution and editing, metabolic engineering, and synthetic cell creation. I was specifically concerned about overlap with ABE4600 - Applied Microbial Biotechnology. Is the course still being taught and is there a faculty member that I should contact for consultation? I've attached a draft of the syllabus for your reference.

Best,
Chris

Christopher R. Reisch
Assistant Professor
Department of Microbiology and Cell Science
1355 Museum Road, Room 1146
University of Florida
Dear Chris,

I asked Dr. Tom Yang to look at your new course for potential overlap with courses in our department. I agree with Dr. Yang's assessment that the relatively small amount of overlap with our courses is not a concern to our department. Let me know if you have any additional questions.

Bert

James B. Flanagan, Ph.D.
Professor and Chair
Department of Biochemistry & Molecular Biology
College of Medicine
University of Florida
flanagan@ufl.edu
(352) 294-8384 (office)

From: Yang, Thomas P
Sent: Wednesday, March 22, 2017 8:55 AM
To: Flanagan, James B <flanagan@UFL.EDU>
Subject: Re: External Consult for MCS course

Bert

There appears to be a bit of overlap in course content but nothing that really concerns me. The emphasis of this new course is so different than ours that it really appears to be a different course.

Tom

On Mar 21, 2017, at 5:45 PM, "Flanagan, James B" <flanagan@UFL.EDU> wrote:

Tom,

Please look at this and let me know if you think that there is potential overlap with BCH 6415 or BCH 5413. If there is overlap, is it significant enough for us to be "concerned" about it.

Thanks,

Bert
From: Chris Reisch  
Sent: Monday, March 20, 2017 1:18 PM  
To: Flanagan, James B <flanagan@ufledu>  
Subject: External Consult for MCS course

Hi James,

I'm developing a 4000/6000 level course in synthetic biology that will be listed in Microbiology and Cell Sciences and I need to get external consultations for potential course overlap from Department Chairs. The course will focus on techniques and prokaryotic applications of synthetic biology, including; methods for transcriptional and translational control of gene expression, genome evolution and editing, metabolic engineering, and synthetic cell creation. I think there will be minor overlap with BCH 6415 - Advanced Molecular and Cell Biology. I've attached a draft of the syllabus for your reference. Please let me know if you have concern about overlap with this, or any other course offered in BCH.

Best,  
Chris

Christopher R. Reisch  
Assistant Professor  
Department of Microbiology and Cell Science  
1355 Museum Road, Room 1152  
University of Florida  
<Reisch UF synbio syllabus -1.docx>
RE: External consult for MCS course

Baker, Henry V

Tue 3/28/2017 10:53 AM

To: Chris Reisch <creisch@ufl.edu>

Dear Dr. Reisch,

Thank you for giving me the opportunity to review your proposed syllabus. From the perspective of the department of molecular genetics and microbiology we do not see a potential conflict with your proposed course and the courses we offer. In fact we believe that your course is complementary to some of our offerings and we wish you luck with getting it launched.

Kindest regards,

Henry V. Baker, Ph.D.
Hazel Kitzman Professor of Genetics
Professor of Surgery
Chair, Dept. Molecular Genetics and Microbiology
University of Florida College of Medicine
Associate Director University of Florida Genetics Institute

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From: Chris Reisch
Sent: Tuesday, March 28, 2017 10:45 AM
To: Baker, Henry V <hvbaker@UFL.EDU>
Subject: External consult for MCS course

Dear Dr. Baker,

I'm developing a 4000/6000 level course in synthetic biology that will be listed in Microbiology and Cell Sciences and I need to get external consultations for potential course overlap from Department Chairs. The course will focus on techniques and prokaryotic applications of synthetic biology, including; methods for transcriptional and translational control of gene expression, genome evolution and editing, metabolic engineering, and synthetic cell creation. I have attached a draft of the syllabus for your reference. Please let me know if you have concern about overlap with any course in MBM.

Best,

Chris

Christopher R. Reisch
Assistant Professor
Department of Microbiology and Cell Science
1355 Museum Road, Room 1152
University of Florida
Re: external consult for MCB

Wayne, Marta L

Fri 8/18/2017 10:38 AM

To: Chris Reisch <creisch@ufl.edu>
Cc: Braun, Edward Louis <ebraun68@ufl.edu>

Dear Chris,

Many thanks! I am really pleased that you and Ed are working together to make complementary courses. I would like to see the two proposals go forward together so that they appear at UCC simultaneously and consults are signed off by Micro and Bio simultaneously as well, so I am cc'ing Ed here and asking him to move forward getting a proposal together. Ed, I think that Targelynn would be happy to help you if you will just provide her with a syllabus.

Cheers,
Marta

On Aug 17, 2017, at 5:09 PM, Chris Reisch <creisch@ufl.edu> wrote:

Hi Dr. Wayne,

I'm teaching a course in synthetic biology in the department of microbiology and cell science and need to get an external consult from Biology. Ed Braun and I have communicated and plan on making our two courses complimentary, not competing. Below is a brief explanation of the two courses and how they will be different. I've also attached a draft of my syllabus. Hopefully this is satisfactory, let me know what you think.

The proposed course "Microbial Applications of Synthetic Biology," currently being offered by Dr. Christopher Reisch as MCB 4934, will not overlap in any significant way with another course in the same general field that I am developing in the Department of Biology. The Microbiology and Cell Science course and the Biology course have distinct foci, formats, and target audiences. Specifically, the course proposed by Dr. Reisch is heavily focused on methods used in synthetic biology in microbiology and it is an online course. In contrast, the Biology course is focused on conceptual issues associated with the use of synthetic biology to understand minimal genomes and it will be a face-to-face course with student projects.

Dr. Reisch and I have discussed our courses and both of us feel that we will not be competing for students. Given these clear delineation between the courses students that would like to focus on the details of methodology will be best served by Dr. Reisch's course whereas those focused on
understanding issues of building minimal genomes will be best served by my course. Obviously, there may be some students that will wish to take both courses. However, the differences between our courses mean that students will have complementary experiences.

Best,
Chris

Christopher R. Reisch
Assistant Professor
Department of Microbiology and Cell Science
1355 Museum Road, Room 1152
University of Florida
<Reisch UF symbio syllabus 4.docx>
Applications and Technologies of Synthetic Biology
MCB 4934, Fall-2019

Instructor

Dr. Christopher Reisch - creisch@ufl.edu
Microbiology and Cell and Science, Office – MCS 1152
Office Hours: Monday 10am – 12 noon

Preferred methods for communication with the instructor regarding the course is through UF email (creisch@ufl.edu).

Please resolve technical issues by contacting the UF helpdesk (e.g. http://helpdesk.ufl.edu; (352) 392-HELP (4357); helpdesk@ufl.edu · HUB 132).

Delivery Method/Meeting time

Online (asynchronous)

Credits

3- Credit hours

Course Description

This course will introduce the concept of synthetic biology, which is loosely defined as the construction and reconstruction of biological systems, and its practical applications in research and industry. Advanced molecular biology tools for DNA assembly, the construction of biological pathways and circuits, genome editing, and strategies for transcriptional control will be examined in the course.

Course Objectives/Goals/Learning Outcomes

Students enrolled in this course will be able to:

1. Define synthetic biology and understand its importance in the 21st century.
2. Classify and analyze biological parts and their function on the systems level.
3. Describe and discuss advanced molecular biology techniques that facilitate the building of biological parts and systems.
4. Argue both sides of ethical decisions and containment strategies in synthetic biology.

Prerequisites

MCB 3020 or 3023 with a grade of C or better.

Course Material and Assignments

All required course materials will be available through the Canvas e-Learning site (http://elearning.ufl.edu/). Instructions for and submission of assignments will also be through Canvas.
### Required Textbooks

There is no required textbook. Required reading materials will be posted to Canvas.

### Weekly Course Schedule

<table>
<thead>
<tr>
<th>Date (week)</th>
<th>Topic</th>
<th>Readings</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Synthetic Riboswitches That Induce Gene Expression in Diverse Bacterial Species. Topp, S … J.P. Gallivan, Applied and Environmental Microbiology.</td>
</tr>
<tr>
<td>5</td>
<td>Recombinant DNA technologies, Cloning techniques and strategies</td>
<td>Polymerase Chain Reaction <a href="https://en.wikipedia.org/wiki/Polymerase_chain_reaction">https://en.wikipedia.org/wiki/Polymerase_chain_reaction</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The SLIC, Gibson, CPEC and SLiCE assembly methods (and GeneArt® Seamless, In-Fusion® Cloning) <a href="https://i5.jbei.org/i5manual/pages/22.html">https://i5.jbei.org/i5manual/pages/22.html</a></td>
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</table>
Design, synthesis, and testing toward a 57-codon genome

14 Containment strategies, Ethical considerations

Exam Dates/Calendar/Critical dates and deadlines
Week 5 - Test 1
Week 6 - Proposal Abstracts Due
Week 9 – Proposal Outline Due
Week 10 – Test 2
Week 14 - Proposal Due
Finals week – Test 3

Exam Administration - ProctorU
All exams will be administered through ProctorU using Canvas in E-learning with students using personal computers. The exam may be taken at any location approved by ProctorU during previously announced times.
For students to sign up for a ProctorU account go to:
http://www.proctoru.com/forstudents.php

Evaluation of Learning/Grades
3 Exams (100 pts each) – 300 points
Discussion, Quizzes, Homework – 200 points
  Discussion (70 points)
  Quizzes (80 points)
  Homework (50 points)
Written Proposal – 100 points

Exams
There will be 3 exams administered throughout the semester at approximately 5 week intervals. All material covered during class will be subject to testing. Tests are conceptually cumulative because understanding of topics covered early in the course will be required to understand materials covered later in the course.
Exams will be composed of multiple choice, fill in the blank, and essay questions. There will be three essay questions from each module, but you will only be required to answer one question from each module.

Discussion, Quizzes, Homework
Quizzes (70 points) – There will be a non-proctored quiz at the end of each module. The quizzes are intended to help you find out how well you know the material.

Discussion groups (80 points) – The class will be divided into discussion groups of approximately 15-20 students. The purpose of the discussion group is to encourage student-student interaction and peer learning. Students are free to ask and answer questions on the discussion group. I will moderate the responses and also pose questions to facilitate the discussion. Each student will be required to post at least once during each module, half of the discussion group will be required to post during the first week of a module and the other half during the second. Check the due dates on Canvas to know which group you are in for each module. Each module will have a separate group and each group will close after 2-3 weeks.

Homework (50 points) – There will be homework assignments that will be exercises based on material we have learned. For example, you will be asked to design a plasmid and describe its function.

Proposals
Each student will be responsible for writing a research proposal that aims to investigate a novel idea in the field of synthetic biology that is of scientific or industrial interest. The proposal should be 6-8 pages single spaced. A brief rubric of the proposal is provided below.

Introduction (1 page) – Clearly provide relevant background information in the context of research that has previously been performed in synthetic biology and fields related to your topic. At least 5 sources of primary research papers or literature reviews must be cited.

Significance and Novelty (0.5-1 page) – Identify the gap in knowledge that your proposal will address. Explain why this work is important to the field. What are the benefits to science and society that will result from successful completion of this work? Demonstrate that you understand the subject matter and its greater implications. Cite the primary literature and reviews as necessary.

Experimental Plan (1-2 pages) – Describe 1 research aim that will be used to address the gap in knowledge identified above. Provide a logical workflow that will be used to investigate the research question. The purpose of the experiments should be clear, but the exact experimental conditions do not need to be provided.

Grading Policy
Final letter grades will be assigned based on the number of points earned, as follows:

A = 564-600 points, A- = 540 – 563 points
B+ = 516 – 539 points, B = 498-515 points, B- = 480-497 points
C+ = 456-479 points, C = 438-455 points, C- = 420-437 points
D+ = 396-419 points, D = 378-395 points, E = 0-377 points

More information on grades and grading policies is here: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx
Class Attendance and Make-Up Policy
Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

Services for Students with Disabilities
The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation - 0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/

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
  Counseling Services
  Groups and Workshops
  Outreach and Consultation
  Self-Help Library
  Wellness Coaching
- U Matter We Care, www.umatter.ufl.edu/
- Career Connections Center, First Floor JWRU, 392-1601, https://career.ufl.edu/

Academic Resources
- E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lass.at.ufl.edu/help.shtml.
- Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.
- Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. http://teachingcenter.ufl.edu/
Course Evaluation
Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online at https://evaluations.ufl.edu. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results.

Netiquette guide for online courses
It is important to recognize that the online classroom is in fact a classroom, and certain behaviors are expected when you communicate with both your peers and your instructors. These guidelines for online behavior and interaction are known as netiquette.

University Honesty Policy
As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.” You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code.

Additional comments regarding academic integrity:
Students are encouraged to discuss material with each other from the course, help each other understand concepts, study together, and even discuss assessment questions with each other once the quiz window is closed. However, the following is considered academic dishonesty, and I expect that no student will ever do any of the following:
- Have another person complete a quiz in this course
- Copy another student’s quiz in this course
- Collaborate with anyone during a quiz in this course
- Discuss the questions and answers of a quiz with other students while the quiz
window is still open

- Manipulate and/or distribute any materials provided in this course for any
  purpose (including course lecture slides).
- Use any materials provided by a previous student in the course

Software Use
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.

Microsoft Office 365 Software is free for UF students
http://www.it.ufl.edu/gatorcloud/free-office-365-downloads/

Other free software is available at:
http://www.software.ufl.edu/
To check for availability of the media and technical requirements, contact the UF
Computing Help Desk at (352)392-HELP(4357).

University of Florida Complaints Policy and Student Complaint Process
The University of Florida and most instructors believe strongly in the ability of students
to express concerns regarding their experiences at the University. Most problems,
questions and concerns about courses can be resolved by professionally
communicating with the instructor. Please try to meet your instructor in person, make an
appointment to call, or try to set up a remote meeting through Skype or other media.

If this does not help the University encourages the students who wish to file a
written complaint to submit that complaint directly to the department that manages that
course. If a problem really persists and cannot be resolved by communicating with the
instructor and the department, contact... for
Residential Course: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf
Online Course: http://www.distance.ufl.edu/student-complaint-process

This said, professionalism is a two-way-street. Unprofessional behavior of students
includes, among other things: lack of communication, blaming other people or external
factors, lying, affecting others negatively in a group or in the class, not accepting
criticism and not being proactive in solving problems or seeking help. Furthermore,
faculty often have family and other obligations to tend to. Over the weekend, replies to
your inquiries or questions may be delayed.

If a student is lacking professionalism repeatedly, the instructor has the rights to
file formal complaint against the student through the Dean of Student office.