# Cover Sheet: Request 11663

## HOS 4XXX Genetics and Breeding of Vegetable Crops

**Info**

<table>
<thead>
<tr>
<th>Process</th>
<th>Status</th>
<th>Submitter</th>
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</thead>
<tbody>
<tr>
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<td>Ugrad/Pro</td>
<td>Gerardo Nunez Villegas <a href="mailto:g.nunez@ufl.edu">g.nunez@ufl.edu</a></td>
<td>5/1/2017 6:28:49 PM</td>
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**Description of request**

We request to create a new undergraduate course titled "Genetics and Breeding of Vegetable Crops"

## Actions

<table>
<thead>
<tr>
<th>Step</th>
<th>Status</th>
<th>Group</th>
<th>User</th>
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<td>Approved</td>
<td>CALS - Horticultural Sciences 514923000</td>
<td>Kevin Folta</td>
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<td>9/21/2018</td>
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<td>CALS - College of Agricultural and Life Sciences</td>
<td>Joel H Brendemuhl</td>
<td>Edits requested by the CALS CC meeting on 4/13/18 have been addressed.</td>
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<td>Syllabus HOS 4XXX Genetics Breeding Vegetable- Revised.pdf</td>
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Course|New for request 11663

Info

Request: HOS 4XXX Genetics and Breeding of Vegetable Crops
Description of request: We request to create a new undergraduate course titled "Genetics and Breeding of Vegetable Crops"
Submitter: Joel H Brendemuhl brendj@ufl.edu
Created: 9/21/2018 5:12:39 PM
Form version: 4

Responses

Recommended Prefix
Enter the three letter code indicating placement of course within the discipline (e.g., POS, ATR, ENC). Note that for new course proposals, the State Common Numbering System (SCNS) may assign a different prefix.

Response:
HOS

Course Level
Select the one digit code preceding the course number that indicates the course level at which the course is taught (e.g., 1=freshman, 2=sophomore, etc.).

Response:
4

Number
Enter the three digit code indicating the specific content of the course based on the SCNS taxonomy and course equivalency profiles. For new course requests, this may be XXX until SCNS assigns an appropriate number.

Response:
XXX

Category of Instruction
Indicate whether the course is introductory, intermediate or advanced. Introductory courses are those that require no prerequisites and are general in nature. Intermediate courses require some prior preparation in a related area. Advanced courses require specific competencies or knowledge relevant to the topic prior to enrollment.

Response:
Joint (Ugrad/Grad)

• 1000 and 2000 level = Introductory undergraduate
• 3000 level = Intermediate undergraduate
• 4000 level = Advanced undergraduate
• 5000 level = Introductory graduate
• 6000 level = Intermediate graduate
• 7000 level = Advanced graduate

4000/5000 and 4000/6000 levels = Joint undergraduate/graduate (these must be approved by the UCC and the Graduate Council)
**Lab Code**  
Enter the lab code to indicate whether the course is lecture only (None), lab only (L), or a combined lecture and lab (C).

Response: C

**Course Title**  
Enter the title of the course as it should appear in the Academic Catalog.

Response: Genetics & Breeding of Vegetable Crops

**Transcript Title**  
Enter the title that will appear in the transcript and the schedule of courses. Note that this must be limited to 21 characters (including spaces and punctuation).

Response: Genetics Breeding Veg

**Degree Type**  
Select the type of degree program for which this course is intended.

Response: Baccalaureate

**Delivery Method(s)**  
Indicate all platforms through which the course is currently planned to be delivered.

Response: On-Campus

**Co-Listing**  
Will this course be jointly taught to undergraduate, graduate, and/or professional students?

Response: Yes

**Co-Listing Explanation**  
Please detail how coursework differs for undergraduate, graduate, and/or professional students.

Response:  
- Activities assigned to undergraduate students will have only one objective while activities assigned to graduate students will contain multiple objectives (usually 2 to 3).  
- Graduate students are required to interpret their observations in the light of previous research work in
that domain based on a literature search, while undergraduate students are expected to write simpler interpretations of their observations and data.
- Problems using bioinformatics tools (for mapping quantitative trait loci) are assigned only for graduate students while undergraduate students will be taught the concepts but not have to do hands-on exercises.
- Both graduate and undergraduate students have to make one presentation about their semester-long project and the goals set in these projects will vary between undergraduate and graduate students.

For more information, see attached letter.

**Effective Term**
Select the requested term that the course will first be offered. Selecting “Earliest” will allow the course to be active in the earliest term after SCNS approval. If a specific term and year are selected, this should reflect the department's best projection. Courses cannot be implemented retroactively, and therefore the actual effective term cannot be prior to SCNS approval, which must be obtained prior to the first day of classes for the effective term. SCNS approval typically requires 2 to 6 weeks after approval of the course at UF.

Response:
Earliest Available

**Effective Year**
Select the requested year that the course will first be offered. See preceding item for further information.

Response:
Earliest Available

**Rotating Topic?**
Select “Yes” if the course can have rotating (varying) topics. These course titles can vary by topic in the Schedule of Courses.

Response:
No

**Repeatable Credit?**
Select “Yes” if the course may be repeated for credit. If the course will also have rotating topics, be sure to indicate this in the question above.

Response:
No

**Amount of Credit**
Select the number of credits awarded to the student upon successful completion, or select “Variable” if the course will be offered with variable credit and then indicate the minimum and maximum credits per section. Note that credit hours are regulated by Rule 6A-10.033, FAC. If you select “Variable” for the amount of credit, additional fields will appear in which to indicate the minimum and maximum number of total credits.

Response:
S/U Only?
Select “Yes” if all students should be graded as S/U in the course. Note that each course must be entered into the UF curriculum inventory as either letter-graded or S/U. A course may not have both options. However, letter-graded courses allow students to take the course S/U with instructor permission.

Response:
No

Contact Type
Select the best option to describe course contact type. This selection determines whether base hours or headcount hours will be used to determine the total contact hours per credit hour. Note that the headcount hour options are for courses that involve contact between the student and the professor on an individual basis.

Response:
Regularly Scheduled

- Regularly Scheduled [base hr]
- Thesis/Dissertation Supervision [1.0 headcount hr]
- Directed Individual Studies [0.5 headcount hr]
- Supervision of Student Interns [0.8 headcount hr]
- Supervision of Teaching/Research [0.5 headcount hr]
- Supervision of Cooperative Education [0.8 headcount hr]

Contact the Office of Institutional Planning and Research (352-392-0456) with questions regarding contact type.

Weekly Contact Hours
Indicate the number of hours instructors will have contact with students each week on average throughout the duration of the course.

Response:
3

Course Description
Provide a brief narrative description of the course content. This description will be published in the Academic Catalog and is limited to 50 words or fewer. See course description guidelines.

Response:
Traditional and molecular breeding methods for vegetable crops and the influence of scientific research, government policies, industry needs and consumer preferences on vegetable crop improvement.

Prerequisites
Indicate all requirements that must be satisfied prior to enrollment in the course. Prerequisites will be automatically checked for each student attempting to register for the course. The prerequisite will be published in the Academic Catalog and must be formulated so that it can be enforced in the registration system. Please note that upper division courses (i.e., intermediate or advanced level of instruction) must have proper prerequisites to target the appropriate audience for the course.
AGR 3303

Completing Prerequisites on UCC forms:

- Use "&" and "or" to conjoin multiple requirements; do not used commas, semicolons, etc.
- Use parentheses to specify groupings in multiple requirements.
- Specifying a course prerequisite (without specifying a grade) assumes the required passing grade is D-.
  In order to specify a different grade, include the grade in parentheses immediately after the course number.
  For example, "MAC 2311(B)" indicates that students are required to obtain a grade of B in Calculus I.
  MAC 2311 by itself would only require a grade of D-.
- Specify all majors or minors included (if all majors in a college are acceptable the college code is sufficient).
- "Permission of department" is always an option so it should not be included in any prerequisite or co-requisite.

Example: A grade of C in HSC 3502, passing grades in HSC 3057 or HSC 4558, and major/minor in PHHP should be written as follows:
HSC 3502(C) & (HSC 3057 or HSC 4558) & (HP college or (HS or CMS or DSC or HP or RS minor))

Co-requisites
Indicate all requirements that must be taken concurrently with the course. Co-requisites are not checked by the registration system.

Response:
None

Rationale and Placement in Curriculum
Explain the rationale for offering the course and its place in the curriculum.

Response:
For the past three years, we have taught a graduate 3-credit course HOS 5242 (Section 04EE) titled "Genetics & Breeding of Vegetable Crops". Because of interest from undergraduate students, we have offered a section for undergraduate students under HOS4932. We request the committee to consider giving a permanent course number for the undergraduate section of this course, so that it can formally be included in our undergraduate curriculum.

Course Objectives
Describe the core knowledge and skills that student should derive from the course. The objectives should be both observable and measurable.

Response:
At the conclusion of this course, the student will be able to:
- Apply traditional and molecular breeding methods for the enhancement of vegetable crops.
- Interpret how plant breeding, scientific research, genetic diversity, germplasm resources and conservation, government policies, industry needs and consumer preferences can affect vegetable crop improvement programs.
- Design and present a vegetable breeding research project that meets specific short-term and long-term goals.

Course Textbook(s) and/or Other Assigned Reading
Enter the title, author(s) and publication date of textbooks and/or readings that will be assigned. Please provide specific examples to evaluate the course.

Response:
There is no required textbook for this course. Optional textbooks are listed below:


Assigned Reading List:


Genome mapping, molecular markers and marker-assisted selection in crop plants. Molecular Breeding. 3:87-103.


Additional or alternative readings may be selected from current literature and will be made available to the students in the form of a link or an electronic file.

Weekly Schedule of Topics
Provide a projected weekly schedule of topics. This should have sufficient detail to evaluate how the course would meet current curricular needs and the extent to which it overlaps with existing courses at UF.

Response:
Week 1. Introductions
Week 2. The domestication of plants and genetic diversity in vegetable crops
Qualitative traits and review of Mendelian genetics
Week 3. Modes of reproduction in vegetable crops
Breeding schemes
Week 4. Induced mutagenesis
Basics of quantitative genetics
Week 5. QTL mapping
Heritability
Week 6. Genome-wide association mapping
Heterosis and sweet corn breeding
Week 7. Genic and cytoplasmic male sterility
Polyploidy and breeding Brassicas
Week 8. Anther culture and doubled haploids
Seedless watermelon
Week 9. Plant tissue culture, embryo rescue, somaclonal variation
Chimeras
Genetic transformation
Week 11. Genome editing technologies
Week 12. Virus-resistant squash breeding
Vegetable variety patents
Week 13. Potential for transgenic vegetable crops
New breeding objectives in vegetable crops
Week 14. Student presentations
Week 15. Student presentations, greenhouse cleanup, and seed extractions.

Links and Policies
Consult the syllabus policy page for a list of required and recommended links to add to the syllabus. Please list the links and any additional policies that will be added to the course syllabus.
Please see: syllabus.ufl.edu for more information

Response:

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. Reports are due on the dates indicated in the instructions for each activity. Late homework will be accepted with a 20% penalty for each day after the due date. If you are having trouble with homework or class, please see me immediately.

Safety: Follow all safety regulations in and out of the classroom.

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 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/sscr/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/cwc/
Counseling services, groups and workshops, outreach and consultation, self-help library and wellbeing coaching.

U Matter We Care, www.umatter.ufl.edu/
Career Resource Center, First Floor JWRU, 392-1601, www.crc.ufl.edu/

Student Complaints:

Residential Course: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf
Online Course: http://www.distance.ufl.edu/student-complaint-process

Grading Scheme
List the types of assessments, assignments and other activities that will be used to determine the course grade, and the percentage contribution from each. This list should have sufficient detail to evaluate the course rigor and grade integrity. Include details about the grading rubric and percentage breakdowns for determining grades.

Response:
Class Assignment:
(a) Each student will do the lab exercises set for each week related to vegetable breeding, keep a journal of notes about what has been done and write reports for grade. Even if some of the exercises may be done in groups, each student should write the notebook and reports individually.
(b) Students will develop a research project in vegetable breeding in consultation with the instructors. Opportunities for the choice of the projects will be discussed in class.

Written Report: Lab reports are expected to be typed, double-spaced, and should be no more than 5 pages each. Quantitative data need to be shown in tables or figures and qualitative data using images. Tables and figures should have descriptive legends. Please include your name, date, a title for the exercise, a statement of objective of the exercise, description of what you did, the results observed and a discussion of your results. Include complete citations of any references or websites consulted.

Presentation: Each student will be required to present their class assignment as a 20-35 minute PowerPoint presentation (length of time for presentation may depend on the number of students enrolled), allowing time for questions and answers by the audience. Each student will provide fellow students and instructor handouts of their PowerPoint presentation on the day it is scheduled.

Evaluation & Grades: (Students will be evaluated based on the following)
Item , Points, Percentage of Grade
Class attendance and participation, 10, 10%
Class assignment - written reports*, 15, 15%
Tests 2 , 15, 15%
Project & presentation, 30, 30%
Final Exam 30, 30%
Total: 100 points

*The assignments, tests and the final exam will differ in their levels of difficulty between students attending the undergraduate and graduate sections of this course.

Grades for this course will be assigned according to established university policy.
90-100 = A 85-89.9 = B+ 80-84.9 = B 75-79.9 = C+ 70-74.9 = C 65-69.9 = D+ 60-64.9 = D<br/>&lt;60 = E

Instructor(s)
Enter the name of the planned instructor or instructors, or "to be determined" if instructors are not yet identified.

Response:
Dr. Bala Rathinasabapathi
Dr. Kevin Folta
To

CALS Curriculum Committee,
College of Agriculture and Life Sciences,
University of Florida,
Gainesville, FL 32611

Dear Members of the Curriculum Committee,

Earlier I have submitted the syllabus for HOS 4xxx “Genetics and Breeding of Vegetable Crops” course for your consideration. I thank you for considering my request and approving it on April 13, 2018.

I have revised the syllabus with the following modifications suggested:

- The reading list was made up-to-date and some of the articles have been removed and some new ones added.
- Regarding the note about excessive amount of reading material, I would like to state that some guidance will be provided in students reading these materials by the instructor explaining portions of these articles. However, the number of the articles has now been reduced
- Attendance & make up policies and student resources, only reference to links have been provided and the texts have been deleted.
- Decimal points have been added to percentages in the grading scale to avoid confusion on the part of the students.
- A statement clarifying goals of graduate and undergraduate students has now been added.

If the committee needs additional input, I could be contacted at 352-273-4847 or e-mail brath@ufl.edu

Bala Rathinasabapathi, Ph.D.,
Professor, Horticultural Sciences Department
Instructors:

Dr. Bala Rathinasabapathi,  
Professor,  
Horticultural Sciences Department,  
2247, Fifield Hall  
University of Florida, Gainesville, FL 32611  
E-mail brath@ufl.edu

Dr. Kevin Folta,  
Professor& Chair,  
Horticultural Sciences Department,  
University of Florida, Gainesville, FL 32611  
E mail kfolta@ufl.edu

Dr. Jugpreet Singh,  
Post-doctoral associate,  
Horticultural Sciences Department,  
2241, Fiffield Hall,  
University of Florida, Gainesville, FL 32611  
E-mail jugpreetsingh@ufl.edu

Office hours: By appointment.

Prerequisites: AGR 3303 or equivalent

Credit hours: 3

Frequency: Offered Spring semester

Meeting Days and Times:  
Tue, 1:55 to 2:45 p.m. (period 7) and Thu 1:55 to 2:45 and 3:00 to 3:50 (periods 7 and 8).

Location: Room 5, PSF

Course format: Lectures, discussion, student research and student presentations
Course Description: Traditional and molecular breeding methods for vegetable crops and the influence of scientific research, government policies, industry needs and consumer preferences on vegetable crop improvement.

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

- Apply traditional and molecular breeding methods for the enhancement of vegetable crops.
- Interpret how plant breeding, scientific research, genetic diversity, germplasm resources and conservation, government policies, industry needs and consumer preferences can affect vegetable crop improvement programs.
- Design and present a vegetable breeding research project that meets specific short-term and long-term goals.

Textbooks: There is no required textbook for this course. Optional textbooks are listed below:


Assigned Reading List:


*Additional or alternative readings may be selected from current literature and will be made available to the students in the form of a photocopy or an electronic file.*

**Tentative List of Topics:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topics</th>
<th>Instructor(s)</th>
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</thead>
<tbody>
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<td>1/9/2018, Tue</td>
<td>Introduction, Review of syllabus and discussion topics</td>
<td>BR, KF, JS</td>
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<td>1/11/2018, Thu</td>
<td>Activity 1. Introduction to pepper breeding program</td>
<td>BR</td>
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<td>1/16/2018, Tue</td>
<td>The domestication of plants and genetic diversity in vegetable crops</td>
<td>KF</td>
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<td>1/18/2018, Thu</td>
<td>Qualitative traits and review of Mendelian genetics</td>
<td>BR</td>
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<tr>
<td>1/23/2018, Tue</td>
<td>Modes of reproduction in vegetable crops</td>
<td>BR</td>
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<tr>
<td>1/25/2018, Thu</td>
<td>Activity 2. Making a genetic cross</td>
<td>BR</td>
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<tr>
<td>1/30/2018, Tue</td>
<td>Breeding schemes &amp; Induced mutagenesis</td>
<td>BR</td>
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<td>2/1/2018, Thu</td>
<td>Activity 3. Planting a mapping population</td>
<td>BR</td>
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<tr>
<td>2/6/2018, Tue</td>
<td>Basics of Quantitative genetics</td>
<td>BR</td>
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<td>2/8/2018, Thu</td>
<td>Activity 4. Nuclear DNA isolation and marker technologies</td>
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<td>2/13/2018, Tue</td>
<td>Heritability</td>
<td>JS</td>
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<td>2/15/2018, Thu</td>
<td>Activity 5. Analysis of quantitative data</td>
<td>JS</td>
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<td>2/20/2018, Tue</td>
<td>QTL mapping</td>
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<td>2/22/2018, Thu</td>
<td>Activity 6. Linkage analysis</td>
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<td>2/27/2018, Tue</td>
<td>Heterosis and sweet corn breeding</td>
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<tr>
<td>3/1/2018, Thu</td>
<td>Genome wide association mapping</td>
<td>JS</td>
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3/6/2018  No class - Spring break
3/8/2018  No class - Spring break
3/13/2018, Tue  Genetic transformation  KF
3/15/2018, Thu  Activity 7. Bioinformatics related to QTL mapping  BR, JS
3/20/2018, Tue  Genome editing  KF
3/22/2018, Thu  Activity 8. Anther culture  BR
3/27/2018, Tue  New breeding objective and tools for vegetable breeding  KF
4/3/2018, Tue  Student presentation of their projects  BR, JS
4/5/2018, Thu  Student presentation of their projects  BR, JS
4/10/2018, Tue  Student presentation of their projects  BR, JS
4/12/2018, Thu  Student presentation of their projects  BR, JS
4/17/2018, Tue  Student presentation of their projects  BR, JS
4/19/2018, Thu  Activity 10. Greenhouse clean up and seed extraction  BR
4/24/2018, Tue  Student presentation of their projects  BR

*Instructors: BR- Bala Rathinasabapathi, JS-Jugpreet Singh and KF – Kevin Folta

**Class Assignment:**

(a) Each student will do the lab exercises set for each week related to vegetable breeding, keep a journal of notes about what has been done and write reports for grade. Even if some of the exercises may be done in groups, each student should write the notebook and reports individually.

(b) Students will develop a research project in vegetable breeding in consultation with the instructors. Opportunities for the choice of the projects will be discussed in class.

**Written Report:** Lab reports are expected to be typed, double-spaced, and should be no more than 5 pages each. Quantitative data need to be shown in tables or figures and qualitative data using images. Tables and figures should have descriptive legends. Please include your name, date, a title for the exercise, a statement of objective of the exercise, description of what you did, the results observed and a discussion of your results. Include complete citations of any references or websites consulted.

**Presentation:** Each student will be required to present their class assignment as a 20-35 minute PowerPoint presentation (length of time for presentation may depend on the number of students enrolled), allowing time for questions and answers by the audience. Each student will provide fellow students and instructor handouts of their PowerPoint presentation on the day it is scheduled.

**Evaluation & Grades:** (Students will be evaluated based on the following)
<table>
<thead>
<tr>
<th>Points</th>
<th>Percentage of Grade</th>
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<tr>
<td>Class attendance and participation</td>
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<td>Class assignment - written reports*</td>
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<td>Tests 2</td>
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<td>Project &amp; presentation</td>
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<td>Final Exam</td>
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*The assignments, tests and the final exam will differ in their levels of difficulty between students attending the undergraduate and graduate sections of this course.

Grades for this course will be assigned according to established university policy.
90-100 = A  85-89 = B+  80-84 = B  75-79 = C+  70-74 = C  65-69 = D+  60-64 = D  <60 = E

**Course policies and procedures**

**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](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](https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx). Reports are due on the dates indicated in the instructions for each activity. Late homework will be accepted with a 20% penalty for each day after the due date. If you are having trouble with homework or class, please see me immediately. Test makeups will be arranged only in the case of an emergency and not for absences for any other reasons.

**Safety:** Follow all safety regulations in and out of the classroom.

**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](https://evaluations.ufl.edu). Evaluations are typically open for students to complete during the last two 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](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”.

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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.

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/cwc/
Counseling services, groups and workshops, outreach and consultation, self-help library and wellbeing coaching.

U Matter We Care, www.ummatter.ufl.edu/
Career Resource Center, First Floor JWRU, 392-1601, www.crc.ufl.edu/

Student Complaints:

Residential Course: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf
Online Course: http://www.distance.ufl.edu/student-complaint-process
UNIVERSITY OF FLORIDA
Horticultural Sciences Department

Genetics & Breeding of Vegetable Crops
HOS _4xxx, Section ______ and HOS 5242, Section 04EE
Spring 2019

Instructors:

Dr. Bala Rathinasabapathi,
Professor,
Horticultural Sciences Department,
2247, Fifield Hall
University of Florida, Gainesville, FL 32611
E-mail brath@ufl.edu

Dr. Kevin Folta,
Professor & Chair,
Horticultural Sciences Department,
University of Florida, Gainesville, FL 32611
E-mail kfolta@ufl.edu

Office hours: By appointment.

Prerequisites: AGR 3303 or equivalent

Credit hours: 3

Frequency: Offered Spring semester

Meeting Days and Times:
Tue, 1:55 to 2:45 p.m. (period 7) and Thu 1:55 to 2:45 and 3:00 to 3:50 (periods 7 and 8).

Location: Room 4, PSF

Course format: Lectures, discussion, student research and student presentations

Course Description: Traditional and molecular breeding methods for vegetable crops and the influence of scientific research, government policies, industry needs and consumer preferences on vegetable crop improvement.

Learning Objectives:
At the conclusion of this course, the student will be able to:
• Apply traditional and molecular breeding methods for the enhancement of vegetable crops.
• Interpret how plant breeding, scientific research, genetic diversity, germplasm resources and conservation, government policies, industry needs and consumer preferences can affect vegetable crop improvement programs.
• Design and present a vegetable breeding research project that meets specific short-term and long-term goals.

Textbooks: There is no required textbook for this course. Optional textbooks are listed below:


Assigned Reading List:


Additional or alternative readings may be selected from current literature and will be made available to the students in the form of a photocopy or an electronic file.

Tentative List of Topics:

<table>
<thead>
<tr>
<th>Date</th>
<th>Topics</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1, Thu</td>
<td>Introductions, review of class syllabus and discussion topics</td>
<td>BR, KF</td>
</tr>
<tr>
<td>Week 1 Thu</td>
<td>Activity 1. Introduction to pepper breeding program</td>
<td>BR</td>
</tr>
<tr>
<td>Week 2, Tue</td>
<td>The domestication of plants and genetic diversity in vegetable crops</td>
<td>KF</td>
</tr>
<tr>
<td>Week 2, Thu</td>
<td>Qualitative traits and review of Mendelian genetics</td>
<td>BR</td>
</tr>
<tr>
<td>Week 2, Thu</td>
<td>Activity 2: Making a genetic cross</td>
<td>BR</td>
</tr>
<tr>
<td>Week 3, Tue</td>
<td>Modes of reproduction in vegetable crops</td>
<td>BR</td>
</tr>
<tr>
<td>Week 3, Thu</td>
<td>Breeding schemes</td>
<td>BR</td>
</tr>
<tr>
<td>Week 3, Thu</td>
<td>Activity 3: Planting a mapping population</td>
<td>BR</td>
</tr>
<tr>
<td>Week 4, Tue</td>
<td>Induced mutagenesis</td>
<td>BR</td>
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<tr>
<td>Week 4, Thu</td>
<td>Activity 4: Analysis of quantitative data</td>
<td>BR</td>
</tr>
<tr>
<td>Week</td>
<td>Day</td>
<td>Topic</td>
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<tr>
<td>Week 4</td>
<td>Thu</td>
<td>Basics of quantitative genetics</td>
</tr>
<tr>
<td>Week 5</td>
<td>Tue</td>
<td>QTL mapping</td>
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<tr>
<td>Week 5</td>
<td>Thu</td>
<td>Activity 5: Linkage analysis</td>
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<tr>
<td>Week 5</td>
<td>Thu</td>
<td>Heritability</td>
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<tr>
<td>Week 6</td>
<td>Tue</td>
<td>Genome-wide association mapping</td>
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<tr>
<td>Week 6</td>
<td>Thu</td>
<td>Activity 6: Collection of quantitative data from peppers</td>
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<tr>
<td>Week 6</td>
<td>Thu</td>
<td>Heterosis and sweet corn breeding</td>
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<tr>
<td>Week 7</td>
<td>Tue</td>
<td>Genic and cytoplasmic male sterility</td>
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<tr>
<td>Week 7</td>
<td>Thu</td>
<td>Activity 7: Collection of quantitative data on fruit traits II</td>
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<tr>
<td>Week 7</td>
<td>Thu</td>
<td>Polyploidy and breeding Brassicas</td>
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<tr>
<td>Week 8</td>
<td>Tue</td>
<td>Anther culture and doubled haploids</td>
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<tr>
<td>Week 8</td>
<td>Thu</td>
<td>Activity 8: Anther culture</td>
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<tr>
<td>Week 8</td>
<td>Thu</td>
<td>Seedless watermelon</td>
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<tr>
<td>Week 9</td>
<td>Tue</td>
<td>Plant tissue culture, embryo rescue, somaclonal variation</td>
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<tr>
<td>Week 9</td>
<td>Thu</td>
<td>Chimeras</td>
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<tr>
<td>Week 9</td>
<td>Thu</td>
<td>Activity 9: Attempts on inter-specific crosses</td>
</tr>
<tr>
<td>Week 10</td>
<td>Tue</td>
<td>Spring break - No class</td>
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<tr>
<td>Week 10</td>
<td>Thu</td>
<td>Spring break - No class</td>
</tr>
<tr>
<td>Week 11</td>
<td>Tue</td>
<td>Genetic transformation</td>
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<tr>
<td>Week 11</td>
<td>Thu</td>
<td>Genome editing technologies</td>
</tr>
<tr>
<td>Week 11</td>
<td>Thu</td>
<td>Activity 10: Students work on their projects</td>
</tr>
<tr>
<td>Week 12</td>
<td>Tue</td>
<td>Virus-resistant squash breeding</td>
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<tr>
<td>Week 12</td>
<td>Thu</td>
<td>Vegetable variety patents</td>
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<tr>
<td>Week 12</td>
<td>Thu</td>
<td>Activity 9: Analysis of vegetable variety patents</td>
</tr>
<tr>
<td>Week 13</td>
<td>Tu</td>
<td>Potential for transgenic vegetable crops</td>
</tr>
<tr>
<td>Week 13</td>
<td>Thu</td>
<td>New breeding objectives in vegetable crops</td>
</tr>
<tr>
<td>Week 13</td>
<td>Thu</td>
<td>Activity 11: Students work on their projects</td>
</tr>
<tr>
<td>Week 14</td>
<td>Tue</td>
<td>Student presentation</td>
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<tr>
<td>Week 14</td>
<td>Thu</td>
<td>Student presentation</td>
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<tr>
<td>Week 14</td>
<td>Thu</td>
<td>Student presentation</td>
</tr>
<tr>
<td>Week 15</td>
<td>Tu</td>
<td>Student presentation</td>
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<tr>
<td>Week 15</td>
<td>Thu</td>
<td>Student presentation</td>
</tr>
<tr>
<td>Week 15</td>
<td>Thu</td>
<td>Activity 10: Greenhouse clean up, Seed extraction</td>
</tr>
<tr>
<td>Week 16</td>
<td>Tue</td>
<td>Review for final exam, Last day of class</td>
</tr>
</tbody>
</table>

*Instructors: BR- Bala Rathinasabapathi and KF – Kevin Folta

**Class Assignment:**

(a) Each student will do the lab exercises set for each week related to vegetable breeding, keep a journal of notes about what has been done and write reports for grade. Even if some of the exercises may be done in groups, each student should write the notebook and reports individually.
(b) Students will develop a research project in vegetable breeding in consultation with the instructors. Opportunities for the choice of the projects will be discussed in class.

**Written Report:** Lab reports are expected to be typed, double-spaced, and should be no more than 5 pages each. Quantitative data need to be shown in tables or figures and qualitative data using images. Tables and figures should have descriptive legends. Please include your name, date, a title for the exercise, a statement of objective of the exercise, description of what you did, the results observed and a discussion of your results. Include complete citations of any references or websites consulted.

**Level and expectations in this course:** This course is taught combined with graduate students. Activities assigned to undergraduate students will have only one objective while activities assigned to graduate students will contain 2-3 objectives. Graduate students are required to interpret their observations in the light of previous research work in that domain based on a literature search, while undergraduate students are expected to write simpler interpretations of their observations and data. Problems using bioinformatics tools (for mapping quantitative trait loci) are assigned only for graduate students while undergraduate students will be taught the concepts but not have to do hands-on exercises regarding mapping. Both graduate and undergraduate students have to make one presentation about their semester-long project and the goals set in these projects will vary between undergraduate and graduate students in that graduate student presentations will be expected in the light of the literature and undergraduate student presentations are expected to be centered on methods used and observed results with less reference to previous research in the field.

**Presentation:** Each student will be required to present their class assignment as a 20-35 minute PowerPoint presentation (length of time for presentation may depend on the number of students enrolled), allowing time for questions and answers by the audience. Each student will provide fellow students and instructor handouts of their PowerPoint presentation on the day it is scheduled.

**Evaluation & Grades:** (Students will be evaluated based on the following)

<table>
<thead>
<tr>
<th>Evaluation Component</th>
<th>Points</th>
<th>Percentage of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class attendance and participation</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td>Class assignment - written reports*</td>
<td>15</td>
<td>15%</td>
</tr>
<tr>
<td>Tests 2</td>
<td>15</td>
<td>15%</td>
</tr>
<tr>
<td>Project &amp; presentation</td>
<td>30</td>
<td>30%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30</td>
<td>30%</td>
</tr>
<tr>
<td>Total:</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

*The assignments, tests and the final exam will differ in their levels of difficulty between students attending the undergraduate and graduate sections of this course.

Grades for this course will be assigned according to established university policy.  
90-100 = A  85-89.9 = B+  80-84.9 = B  75-79.9 = C+  70-74.9 = C  65-69.9 = D+  60-64.9 = D  <60 = E
Course policies and procedures

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

Attendance: Requirements for class attendance are consistent with university policies found at https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Online Course Evaluation Process: At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard evaluation tool online at https://evaluations.ufl.edu.

Academic Honesty: As a student at the University of Florida, you have committed yourself to uphold the Honor Code. For more information regarding the Student Honor Code, please see: http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code.

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5/1/2017

To

CALS Curriculum Committee,
College of Agriculture and Life Sciences,
University of Florida,
Gainesville, FL 32611

Dear Members of the Curriculum Committee,

“Genetics and Breeding of Vegetable Crops” course is taught together for undergraduate and graduate students. This a resource-efficient way to teach this course instead of offering separate courses when the student numbers are between 12 and 20. When enrollment increases, we will consider offering as separate courses.

The course is currently taught as a combined course. Both graduate and undergraduate students attend lectures together, but they are assigned in-class and out-of-classroom activities individually and graded for them. The objectives of these activities differ in their level of difficulty between the undergraduate students and the graduate students in four ways:

- Activities assigned to undergraduate students will have only one objective while activities assigned to graduate students will contain multiple objectives (usually 2 to 3).
- Graduate students are required to interpret their observations in the light of previous research work in that domain based on a literature search, while undergraduate students are expected to write simpler interpretations of their observations and data.
- Problems using bioinformatics tools (for mapping quantitative trait loci) are assigned only for graduate students while undergraduate students will be taught the concepts but not have to do hands-on exercises.
- Both graduate and undergraduate students have to make one presentation about their semester-long project and the goals set in these projects will vary between undergraduate and graduate students.

Please find enclosed the syllabus of the course. If the committee needs additional input, I could be contacted at 352-273-4847 or e-mail brath@ufl.edu

Bala Rathinasabapathi, Ph.D.,
Professor, Horticultural Sciences Department
4/23/2017

To

CALS Curriculum Committee,
College of Agriculture and Life Sciences,
University of Florida,
Gainesville, FL 32611

Dear Members of the Curriculum Committee,

For the past three years, myself and Dr. Kevin Folta jointly teach a 3-credit course HOS 5242 (Section 04EE) titled “Genetics & Breeding of Vegetable Crops”. Because of interest from undergraduate students, we have opened a section for undergraduate students under HOS4932. We request the committee to consider giving a permanent course number for the undergraduate section of this course so that it can formally be included in our undergraduate curriculum.

We have carefully compared our course content with the syllabi of other undergraduate courses in plant breeding offered on campus and found no substantial overlap. Our course presents material relevant to vegetable crop improvement with a mix of scientific milestones and technical details. This is a specialty area of high relevance in the job market for horticultural science graduates. Also, this area of science is growing at a fast pace due to technological advancements and scientific breakthroughs and is much needed in the horticulture curriculum.

Please find enclosed the syllabus of the course. If the committee needs additional input, I could be contacted at 352-273-4847 or e-mail brath@ufl.edu

Sincerely,

Bala Rathinasabapathi, Ph.D.,
Professor, Horticultural Sciences Department