Cover Sheet: Request 11663

HOS 4XXX Genetics and Breeding of Vegetable Crops

Info

Process	Course|New|Ugrad/Pro
Status	Pending at PV - University Curriculum Committee (UCC)
Submitter	Gerardo Nunez Villegas g.nunez@ufl.edu
Created	5/1/2017 6:28:49 PM
Updated	9/21/2018 5:13:38 PM
Description of request	We request to create a new undergraduate course titled "Genetics and Breeding of Vegetable Crops"

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	CALS - Horticultural Sciences 514923000	Kevin Folta		4/3/2018
UG versus Graduate sections BR.pdf Veg Breeding support letter BR.doc.pdf					5/1/2017 5/1/2017
College	Approved	CALS - College of Agricultural and Life Sciences	Joel H Brendemuhl	Edits requested by the CALS CC meeting on 4/13/18 have been addressed.	9/21/2018
Syllabus HOS 4XXX Genetics Breeding Vegetable- Revised.pdf Revised Syllabus submission Letter .pdf Syllabus - HOS 5242 - Genetics & Breed Veg.pdf					8/3/2018 8/3/2018 9/21/2018
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			9/21/2018
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 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:

3

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.

Response:
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. MAC2311 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:

"An Introduction to Plant Breeding" by Jack Brown and Peter Caligari, Blackwell Publishing, 2008. ISBN 978-1-4051-3344-9.

"Molecular Plant Breeding" by Yunbi Xu, CABI publishing, Oxfordshire, England, 2010. ISBN 13:978-1-84593-982-3 (PB).

"Breed your own vegetable varieties: The Gardener's and farmer's guide to plant breeding and seed saving" by Carol Deppe, 2nd Edition. Green Books Ltd., Totnes. ISBN 1-890132-72-1.

Assigned Reading List:

Asins, M.J. (2002) Present and future of quantitative trait locus analysis in plant breeding. Plant Breeding, 121:281-291.

Bai Y, Lindhout P. (2007) Domestication and breeding of tomatoes: What we have gained and what can we gain in the future? Ann Bot 100: 1085-1094.

Kihara, H. (1951) Triploid watermelons. Proc of the American Soc Hort Sci. 58: 217-230.

Olsson G. (1960) Species crosses within the genus Brassica. 2. Artificial Brassica napus L. Hereditas 46: 351-386.

Liu et al (2014) The Brassica oleracea genome reveals the asymmetrical evolution of polyploidy genomes. Nature Communications 5: Article number 3930.

Gray AR, Crisp P. (1977). Breeding system, taxonomy, and breeding strategy in cauliflower, Brassica oleraceae var. botrytis L. Euphytica 26: 369-375.

Hale AL, Farnham MW, Nzaramba M, Kimbeng CA. (2007) Heterosis for horticultural traits in Broccoli. Theo Appl Gen 115: 351-360.

Farinho, P. Coelho, J. Carlier, D. Svetleva, A. Monteiro and J. Leitao. (2004) Mapping a locus for adult plant resistance to downy mildew in broccoli (Brassica oleracea convar. italica). Theor. Appl. Genet. 109:1392-1398.

Martin, G.B., Brommonschenekel, S.H., Chunwongse, J., Frary, A., Ganal, M.W., Spivey, R., Earle, E.D., Tanksley, S.D. (1993) Map-based cloning of a protein-kinase gene conferring disease resistance in tomato. Science 262: 1432-1436.

Tricoli DM, Carney KJ, Russell PF, McMaster JR., Groff DW, Hadden KC, Himmel PT, Hubbard JP, Boeshore ML, Quemada HD. (1995) Field evaluation of transgenic squash containing single or multiple virus coat protein gene constructs for resistance to cucumber mosaic-virus. Bio-Technology 13: 1458-1465.

Gaskell, G., N. Allum, M. Bauer and W. Wagner. (2008) Biotechnology and the European Public. Nature Biotechnology, 18:935-938. http://biotech.nature.com.

Holland, J.B. (2004) Implementation of molecular markers for quantitative traits in breeding programs - challenges and opportunities. Proceedings of the 4th International Crop Science Congress, 1-13. www.cropscience.org.au.

Jeuken, M.J.W and P. Lindhout. (2004) The development of lettuce backcross inbred lines (BILs) for exploitation of the Lactuca saligna (wild lettuce) germplasm. Theor. Appl. Genet. 109:394-401.

Mohan, M., S. Nair, A. Bhagwat, T.G. Kirshna, M. Yano, C.R. Bhatia and T. Sasaki. (1997)

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

Rao, G.U., A.B. Chaim, Y. Borovsky and I. Paran. (2003) Mapping of yield-related QTLs in pepper in an interspecific cross of Capsicum annuum and C. frutescens. Theor. Appl. Genet. 106:1457-1466.

Vilarinho, L.B.O., Silva, D.J.H., Greene, A., Salazar, K.D., Alves, C., Eveleth, M., Nichols, B., Tehseen, S., Khoury Jr., J.K., Johnson, J.V., Sargent, S.A., Rathinasabapathi, B. (2015) Inheritance of fruit traits in Capsicum annuum: Heirloom cultivars as sources of quality parameters relating to pericarp shape, color, thickness and total soluble solids. Journal of the American Society for Horticultural Science 140: 597-604.

Sakata, Y., N. Kubo, M. Morishita, E. Kitadani, M. Sugiyama and M. Hirai. (2006) QTL analysis of powdery mildew resistance in cucumber (Cucumis sativus L.). Theor. Appl. Genet, 112:243-250.

Elshire RJ, Glaubitz JC, Sun Q, Poland JA, Kawamoto K, Buckler ES, Mitchell SE. (2011) A robust, simple genotyping-by-sequencing (GBS) approach for high diversity species. PLoS ONE 6: e19379.

Shi, M.M. (2001) Enabling large-scale pharmacogenetic studies by high-throughput mutation detection and genotyping technologies. Clinical Chemistry 47:164-172.

Tiwari, K.R., G.A. Penner and T.D. Warkentin. Identification of coupling and repulsion phase RAPD markers for powdery mildew resistance gene er-1 in pea. Genome, 41:440-444.

Zhang, R, X. Yong, K. Yi, H. Zhang, L. Liu and G. Gong. (2004). A genetic linkage map for watermelon derived from recombinant inbred lines. J. Amer. Soc. Hort. Sci. 129:237-243.

Rommens, C.M. (2004) All-native DNA transformation: a new approach to plant genetic engineering. Trends in Plant Science, 9:1360-1385.

Hall BG (2013) Building phylogenetic trees from molecular data with MEGA. Mol. Biol. Evol. 30: 1229-1235.

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/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.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
<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

UNIVERSITY OF FLORIDA

Institute of Food and Agricultural Sciences
Horticultural Sciences Department

2247 Fifield Hall
PO Box 110690
Gainesville, FL 32611-0690
(352) 273-4847
Fax (352) 392-5653

8/2/2018

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

UNIVERSITY OF FLORIDA

Horticultural Sciences Department

Genetics & Breeding of Vegetable Crops
HOS 5242, Section 04EE
Spring 2018

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, Fifield 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:

"An Introduction to Plant Breeding" by Jack Brown and Peter Caligari, Blackwell Publishing, 2008. ISBN 978-1-4051-3344-9.

"Molecular Plant Breeding" by Yunbi Xu, CABI publishing, Oxfordshire, England, 2010. ISBN 13:978-1-84593-982-3 (PB).

"Breed your own vegetable varieties: The Gardener's and farmer's guide to plant breeding and seed saving" by Carol Deppe, 2nd Edition. Green Books Ltd., Totnes. ISBN 1-890132-72-1.

Assigned Reading List:

Asins, M.J. (2002) Present and future of quantitative trait locus analysis in plant breeding. Plant Breeding, 121:281-291.

Bai Y, Lindhout P. (2007) Domestication and breeding of tomatoes: What we have gained and what can we gain in the future? Ann Bot 100: 1085-1094.

Kihara, H. (1951) Triploid watermelons. Proc of the American Soc Hort Sci. 58: 217-230.

Olsson G. (1960) Species crosses within the genus Brassica. 2. Artificial *Brassica napus* L. Hereditas 46: 351-386.

Liu et al (2014) The *Brassica oleracea* genome reveals the asymmetrical evolution of polyploidy genomes. Nature Communications 5: Article number 3930.

Gray AR, Crisp P. (1977). Breeding system, taxonomy, and breeding strategy in cauliflower, *Brassica oleraceae* var. *botrytis* L. Euphytica 26: 369-375.

Hale AL, Farnham MW, Nzaramba M, Kimbeng CA. (2007) Heterosis for horticultural traits in Broccoli. Theo Appl Gen 115: 351-360.

Farinho, P. Coelho, J. Carlier, D. Svetleva, A. Monteiro and J. Leitao. (2004) Mapping a locus for adult plant resistance to downy mildew in broccoli (*Brassica oleracea* convar. *italica*). Theor. Appl. Genet. 109:1392-1398.

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Tricoli DM, Carney KJ, Russell PF, McMaster JR., Groff DW, Hadden KC, Himmel PT, Hubbard JP, Boeshore ML, Quemada HD. (1995) Field evaluation of transgenic squash containing single or multiple virus coat protein gene constructs for resistance to cucumber mosaic-virus. Bio-Technology 13: 1458-1465.

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Jeuken, M.J.W and P. Lindhout. (2004) The development of lettuce backcross inbred lines (BILs) for exploitation of the *Lactuca saligna* (wild lettuce) germplasm. Theor. Appl. Genet. 109:394-401.

Mohan, M., S. Nair, A. Bhagwat, T.G. Kirshna, M. Yano, C.R. Bhatia and T. Sasaki. (1997) Genome mapping, molecular markers and marker-assisted selection in crop plants. Molecular Breeding. 3:87-103.

Rao, G.U., A.B. Chaim, Y. Borovsky and I. Paran. (2003) Mapping of yield-related QTLs in pepper in an interspecific cross of *Capsicum annuum* and *C. frutescens*. Theor. Appl. Genet. 106:1457-1466.

Vilarinho, L.B.O., Silva, D.J.H., Greene, A., Salazar, K.D., Alves, C., Eveleth, M., Nichols, B., Tehseen, S., Khoury Jr., J.K., Johnson, J.V., Sargent, S.A., Rathinasabapathi, B. (2015) Inheritance of fruit traits in *Capsicum annuum*: Heirloom cultivars as sources of quality parameters relating to pericarp shape, color, thickness and total soluble solids. Journal of the American Society for Horticultural Science 140: 597-604.

Sakata, Y., N. Kubo, M. Morishita, E. Kitadani, M. Sugiyama and M. Hirai. (2006) QTL analysis of powdery mildew resistance in cucumber (*Cucumis sativus* L.). Theor. Appl. Genet, 112:243-250.

Elshire RJ, Glaubitz JC, Sun Q, Poland JA, Kawamoto K, Buckler ES, Mitchell SE. (2011) A robust, simple genotyping-by-sequencing (GBS) approach for high diversity species. PLoS ONE 6: e19379.

Shi, M.M. (2001) Enabling large-scale pharmacogenetic studies by high-throughput mutation detection and genotyping technologies. Clinical Chemistry 47:164-172.

Tiwari, K.R., G.A. Penner and T.D. Warkentin. Identification of coupling and repulsion phase RAPD markers for powdery mildew resistance gene er-1 in pea. Genome, 41:440-444.

Zhang, R, X. Yong, K. Yi, H. Zhang, L. Liu and G. Gong. (2004). A genetic linkage map for watermelon derived from recombinant inbred lines. J. Amer. Soc. Hort. Sci. 129:237-243.

Rommens, C.M. (2004) All-native DNA transformation: a new approach to plant genetic engineering. Trends in Plant Science, 9:1360-1385.

Hall BG (2013) Building phylogenetic trees from molecular data with MEGA. Mol. Biol. Evol. 30: 1229-1235.

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:

Date	Topics	Instructor(s)
1/9/2018, Tue	Introduction, Review of syllabus and discussion topics	BR, KF, JS
1/11/2018, Thu	Activity 1. Introduction to pepper breeding program	BR
1/16/2018, Tue	The domestication of plants and genetic diversity in vegetable crops	KF
1/18/2018, Thu	Qualitative traits and review of Mendelian genetics	BR
1/23/2018, Tue	Modes of reproduction in vegetable crops	BR
1/25/2018, Thu	Activity 2. Making a genetic cross	BR
1/30/2018, Tue	Breeding schemes & Induced mutagenesis	BR
2/1/2018, Thu	Activity 3. Planting a mapping population	BR
2/6/2018, Tue	Basics of Quantitative genetics	BR
2/8/2018, Thu	Activity 4. Nuclear DNA isolation and marker technologies	JS, BR
2/13/2018, Tue	Heritability	JS
2/15/2018, Thu	Activity 5. Analysis of quantitative data	JS
2/20/2018, Tue	QTL mapping	JS
2/22/2018, Thu	Activity 6. Linkage analysis	JS
2/27/2018, Tue	Heterosis and sweet corn breeding	JS
3/1/2018, Thu	Genome wide association mapping	JS

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
3/29/2018, Thu	Activity 9. Student projects - independent research and preparation	BR
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)

	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	

*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.

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. 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. 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/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.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

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:

"An Introduction to Plant Breeding" by Jack Brown and Peter Caligari, Blackwell Publishing, 2008. ISBN 978-1-4051-3344-9.

"Molecular Plant Breeding" by Yunbi Xu, CABI publishing, Oxfordshire, England, 2010. ISBN 13:978-1-84593-982-3 (PB).

"Breed your own vegetable varieties: The Gardener's and farmer's guide to plant breeding and seed saving" by Carol Deppe, 2nd Edition. Green Books Ltd., Totnes. ISBN 1-890132-72-1.

Assigned Reading List:

Asins, M.J. (2002) Present and future of quantitative trait locus analysis in plant breeding. Plant Breeding, 121:281-291.

Bai Y, Lindhout P. (2007) Domestication and breeding of tomatoes: What we have gained and what can we gain in the future? Ann Bot 100: 1085-1094.

Collard, B.C.Y., Jahufer, M.Z.Z., Brouwer, J.B., Pang, E.C.K. (2005) An introduction to markers, quantitative trait loci (QTL) mapping and marker-assisted selection for crop improvement: The basic concepts. Euphytica 142: 169-196.

Collard, B.C., Mackill, D.J. (2008) Marker-assisted selection: an approach for precision plant breeding in the twenty-first century. Phil. Transc. R. Soc. B 363: 557-572.

Gaskell, G., N. Allum, M. Bauer and W. Wagner. (2008) Biotechnology and the European Public. Nature Biotechnology, 18:935-938. http://biotech.nature.com.

Gray AR, Crisp P. (1977). Breeding system, taxonomy, and breeding strategy in cauliflower, *Brassica oleraceae* var. *botrytis* L. Euphytica 26: 369-375.

Hale AL, Farnham MW, Nzaramba M, Kimbeng CA. (2007) Heterosis for horticultural traits in Broccoli. Theo Appl Gen 115: 351-360.

Jeuken, M.J.W and P. Lindhout. (2004) The development of lettuce backcross inbred lines (BILs) for exploitation of the *Lactuca saligna* (wild lettuce) germplasm. Theor. Appl. Genet. 109:394-401.

Hall BG (2013) Building phylogenetic trees from molecular data with MEGA. Mol. Biol. Evol. 30: 1229-1235.

Rao, G.U., A.B. Chaim, Y. Borovsky and I. Paran. (2003) Mapping of yield-related QTLs in pepper in an interspecific cross of *Capsicum annuum* and *C. frutescens*. Theor. Appl. Genet. 106:1457-1466.

Rommens, C.M. (2004) All-native DNA transformation: a new approach to plant genetic engineering. Trends in Plant Science, 9:1360-1385.

Vilarinho, L.B.O., Silva, D.J.H., Greene, A., Salazar, K.D., Alves, C., Eveleth, M., Nichols, B., Tehseen, S., Khoury Jr., J.K., Johnson, J.V., Sargent, S.A., Rathinasabapathi, B. (2015) Inheritance of fruit traits in *Capsicum annuum*: Heirloom cultivars as sources of quality parameters relating to pericarp shape, color, thickness and total soluble solids. Journal of the American Society for Horticultural Science 140: 597-604.

Tricoli DM, Carney KJ, Russell PF, McMaster JR., Groff DW, Hadden KC, Himmel PT, Hubbard JP, Boeshore ML, Quemada HD. (1995) Field evaluation of transgenic squash containing single or multiple virus coat protein gene constructs for resistance to cucumber mosaic-virus. Bio-Technology 13: 1458-1465.

Zhang, R, X. Yong, K. Yi, H. Zhang, L. Liu and G. Gong. (2004). A genetic linkage map for watermelon derived from recombinant inbred lines. J. Amer. Soc. Hort. Sci. 129:237-243.

Zimmer, C (2008) What is a species? Scientific American 298: 72-79.

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:

Date	Topics	Instructor(s)
Week 1 , Thu	Introductions, review of class syllabus and discussion topics	BR, KF
Week 1 Thu	Activity 1. Introduction to pepper breeding program	BR
Week 2, Tue	The domestication of plants and genetic diversity in vegetable crops	KF
Week 2, Thu	Qualitative traits and review of Mendelian genetics	BR
Week 2, Thu	Activity 2: Making a genetic cross	BR
Week 3, Tue	Modes of reproduction in vegetable crops	BR
Week 3, Thu	Breeding schemes	BR
Week 3, Thu	Activity 3: Planting a mapping population	BR
Week 4, Tue	Induced mutagenesis	BR
Week 4, Thu	Activity 4: Analysis of quantitative data	BR

Week 4, Thu	Basics of quantitative genetics	BR
Week 5, Tue	QTL mapping	BR
Week 5, Thu	Activity 5: Linkage analysis	BR
Week 5, Thu	Heritability	BR
Week 6, Tue	Genome-wide association mapping	BR
Week 6, Thu	Activity 6: Collection of quantitative data from peppers	BR
Week 6, Thu	Heterosis and sweet corn breeding	BR
Week 7, Tue	Genic and cytoplasmic male sterility	BR
Week 7, Thu	Activity 7: Collection of quantitative data on fruit traits II	BR
Week 7, Thu	Polyploidy and breeding Brassicas	BR
Week 8, Tue	Anther culture and doubled haploids	BR
Week 8, Thu	Activity 8: Anther culture	BR
Week 8, Thu	Seedless watermelon	
Week 9, Tue	Plant tissue culture, embryo rescue, somaclonal variation	KF
Week 9, Thu	Chimeras	KF
Week 9, Thu	Activity 9: Attempts on inter-specific crosses	BR
Week 10, Tue	Spring break - No class	
Week 10, Thu	Spring break - No class	
Week 11, Tue	Genetic transformation	KF
Week 11, Thu	Genome editing technologies	KF
Week 11, Thu	Activity 10: Students work on their projects	
Week 12, Tue	Virus-resistant squash breeding	KF
Week 12, Thu	Vegetable variety patents	KF
Week 12, Thu	Activity 9: Analysis of vegetable variety patents	KF
Week 13, Tu	Potential for transgenic vegetable crops	KF
Week 13, Thu	New breeding objectives in vegetable crops	KF
Week 13, Thu	Activity 11: Students work on their projects	
Week 14, Tue	Student presentation	
Week 14, Thu	Student presentation	
Week 14, Thu	Student presentation	
Week 15, Tu	Student presentation	
Week 15, Thu	Student presentation	
Week 15, Thu	Activity 10: Greenhouse clean up, Seed extraction .	BR
Week 16, Tue	Review for final exam, Last day of class	BR, KF

*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)

	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	

*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.

Software Use: All faculty, staff and students of the University are required and expected to obey the laws and legal agreements governing software use and the policy is found here: https://hr.ufl.edu/forms-policies/policies-managers/software-copyright-policy/

Services for Students with Disabilities: The Disability Resource Center coordinates the needed accommodations of students with disabilities. 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:
University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, www.counseling.ufl.edu/cwc/
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

UNIVERSITY OF FLORIDA

Institute of Food and Agricultural Sciences
Horticultural Sciences Department

2247 Fifield Hall
PO Box 110690
Gainesville, FL 32611-0690
(352) 273-4847
Fax (352) 392-5653

5/1/2017

To

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

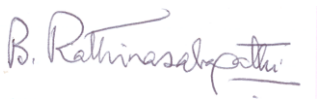
Dear Members of the Curriculum Committee,

"**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

UNIVERSITY OF FLORIDA

Institute of Food and Agricultural Sciences
Horticultural Sciences Department

2247 Fifield Hall
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(352) 273-4847
Fax (352) 392-5653

4/23/2017

To

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

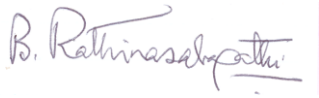
Dear Members of the Curriculum Committee,

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