Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional
• Submit original form and attachments •

1. This request is submitted by the Department of ____________________________

2. Course prefix, number and complete title of course: ________________
   Attach a brief supporting statement for changes made to Items 3a thru 3d. and 5 below.
   FRSC 650, Plant Cell Culture for Crop Improvement

3. Change requested
   a. Prerequisite(s): From: ____________________________ To: ____________________________
   b. Withdrawal (reason): ____________________________
   c. Cross-list with: ____________________________

Cross-listed courses require the signature of both department heads.

4. Change in course title and description. Enter complete current course title and current course description in item 4; enter proposed course title and proposed course description in item 5.
   Complete current course title and current course description: Plant Cell Culture in Crop & Tree Improvement.
   Focus on techniques in plant cell culture which can be applied to all crop plants, including agronomic crops, horticulture and forestry crops for germplasm improvement.

5. Complete proposed course title and proposed course description (not to exceed 50 words): Plant Cell Culture in Genetic Improvement & Conservation
   Focus on techniques in plant cell culture, which can be applied to all plants, including agronomic, horticultural and forestry crops for genetic improvement; and for the conservation of genetic diversity and endangered species.

6. a. As currently in course inventory:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Course #</th>
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<tbody>
<tr>
<td>FRSC</td>
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<th>CIP and Fund Code</th>
<th>Admin. Unit</th>
<th>FICE Code</th>
<th>Level</th>
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b. Change to:

<table>
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<th>Title (excluding punctuation)</th>
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<tbody>
<tr>
<td>ESM</td>
<td>644</td>
<td>PLNT CLL CLT IMP MNT CON SV</td>
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<th>Lab</th>
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Approval recommended by: ____________________________
Date: ____________________________

Head of Department

Chair, College Review Committee
Date: ____________________________

Head of Department (if cross-listed) Date: ____________________________

Dean of College

Dean of College

Submitted to Coordinating Board by: ____________________________
Date: ____________________________

Associate Director, Curricular Services

Effective Date: ____________________________

Questions regarding this form should be directed to Sandra Williams at 845.8201.
Curricular Services – 11/07
Previously this course was focused on place cell culture techniques that could be applied to primarily crop, agronomic, horticultural and forestry species. However following the merger of Forest Science and Rangeland Ecology and Management, it is necessary to expand the scope of this class to include cell culture techniques that can be applied to all plant species in order to promote the conservation of genetic diversity and protect endangered plant species.

Jean Gould
ESSM 644
Plant Cell Culture in Genetic Improvement & Conservation
Fall 2009

Course Information: (3-1) Credit 3. Focus of the course is on techniques in plant cell culture which can be applied to all plants, including agronomic, horticultural and forestry crops for genetic improvement; and to the conservation of genetic diversity and endangered species. Prerequisites: MEPS 313; CHEM 101; graduate classification. Cross listed with MEPS 650.

Text: Plant Tissue Culture Concepts and Laboratory Exercises, 2nd Edition
R. Trigiano & D. Gray, CRC Press

Meetings: Lecture: To Be Announced, Room 312 HFSB
Lab: To Be Announced, Room 107, Greenhouse Complex, Norman Center

Instructor: Jean Gould, Department of Ecosystem Science & Management
Office, 318 HFSB
Phone 845-5078
gould@tamu.edu

Lecture Topics
I. Introduction & Historical Background
   Lecture and Laboratory Organization. The role of plant tissue culture in the study of plant biology and its applications to germplasm improvement & conservation.
   Ch 2. History of plant tissue & cell culture. Plant Biology & plant cell culture - theoretical & practical, culture media, tissue explants, virus eradication & germplasm clean-up, clonal propagation.
   Ch 3. How to get started with plant tissue culture: Preparation & composition of culture media; aseptic technique, getting clean cultures, how to design a culture medium for a particular plant species/variety.
   Ch 4. Culture media: Discovery of the plant hormones & Development of MS media.

II. Totipotency of Plant Tissues - Plant Development, Regeneration, Propagation, Germplasm & Conservation
   Ch 8. Propagation from shoots and preexisting meristems
   Ch 14. Organogenesis, Shoot Proliferation & Manipulation of Organogenesis
   Ch 19. Non-zygotic embryos, somatic embryogenesis
   Ch 40. Genetic variation in tissue culture – mutations & somaclonal variation

III. In vitro Techniques Used in Genetic Clean up & Improvement
   Ch 43 Use of virus-free shoot meristem tissue to create virus-free germplasm.
   Ch 29 Use of Haploid Plants in crop improvement; embryo rescue
   Ch 26 Plant Protoplasts

*Topics for Student Presentation are due at the time of Review for Exam 1
Review 1
**EXAM 1** - Scheduled for the end of the 5th week

**IV. Genetic Modification of Plants in the Study of Plant Biology & Crop Improvement**

- **Ch 31.** Transformation - dicots, cereals & gymnosperms
- **Ch 26.** Protoplasts, fusion & direct gene uptake
- **Ch 32. & 33.** *Agrobacterium* - mediated transformation
- **Ch 34.** The Gene Gun and other methods of direct DNA delivery transformation

*In planta* transformation, *Arabidopsis, Agrobacterium*, plant regeneration, mutations and inheritance

Cryopreservation of germplasm

**Review 2**

**EXAM 2** – Scheduled for the end of the 10th week

**V. *Suggested Topics for Student Presentations***

Examples:
- Secondary Product Synthesis *in vitro*
- Nutriceuticals
- Conservation of endangered species
- Conservation of diversity
- Genetically modified plants – basic biology & gene expression
- Genetically modified plants- crop & tree improvement
- Biotechnology & the Environment
- Sustainable Agriculture & Forestry

**Review 3**

**FINAL EXAM** - Scheduled in accordance with the academic final schedule.

**GRADING**

<table>
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<th>Component</th>
<th>Points</th>
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<tr>
<td>Exam one</td>
<td>250</td>
</tr>
<tr>
<td>Exam two</td>
<td>250</td>
</tr>
<tr>
<td>Final Exam, Cumulative</td>
<td>250</td>
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<tr>
<td>Class Participation</td>
<td>100</td>
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<tr>
<td>Oral &amp; Written Presentation</td>
<td>100</td>
</tr>
<tr>
<td>Laboratory</td>
<td>250</td>
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<tr>
<td><strong>Total Points</strong></td>
<td><strong>1200</strong></td>
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</table>

Grades will be assigned on a 10% scale.
Example: 225-250 = A; 220-224 = B; 175-199 = C; 150 -174 = D; 0-149 = F

Grades can be improved through class participation, or through an extra credit project. This option is available to all students.

**EXAMS**

Missed exams can be made up within 30 days for an excused absence.
If you know in advance that you will need to miss an exam, please let me know.
If you have missed an exam, please contact me as soon as possible following the missed exam at 979 845-5078 or gould@tamu.edu.
The **Final** is not optional. To receive a passing grade in this course, you must take the **Final Exam.**
HANDOUTS
All handouts and material sent to you electronically used in this course are copyrighted © & can only be used by you for the instructional purposes of this course. All materials generated for this class, which include but are not limited to syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy, or send out, the handouts, unless I expressly grant permission.

For any other questions or concerns, please refer to http://student-rules.tamu.edu

ACADEMIC INTEGRITY STATEMENT
"An Aggie does not lie, cheat, or steal or tolerate those who do."
All syllabi shall contain a section that states the Aggie Honor Code and refers the student to the Honor Council Rules and Procedures on the web http://www.tamu.edu/aggiehonor

"On my honor, as an Aggie, I have neither given nor received unauthorized aid on this academic work."

Signature of student


PLAGIARISM
The handouts used in this course are copyrighted. By "handouts," I mean all materials generated for this class, which include but are not limited to syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts, unless I expressly grant permission.

What is Plagiarism? Plagiarism is the use, or appropriation, of another person's ideas, processes, results, or words without giving appropriate credit. Plagiarism is thought of as theft and is one of the worst academic sins a scientist can commit.

Texas A&M University Student Rule 20.1.3 defines plagiarism as "Failing to credit sources used in a work product in an attempt to pass off the work as one's own; Attempting to receive credit for work performed by another, including papers obtained in whole or in part from individuals or other sources."

• Intentionally, knowingly, or carelessly presenting the work of another as one's own (i.e., without crediting the author or creator).
• Failing to credit sources used in a work product in an attempt to pass off the work as one's own.
• Attempting to receive credit for work performed by another, including papers obtained in whole or in part from individuals or other sources.
• Failing to cite the World Wide Web, data bases and other electronic resources if they are utilized in any way as resource material in an academic exercise.

You are responsible for the information on plagiarism available at on the web at:
http://library.tamu.edu/vgn/portal/tamulib/content/renderer/children/0,2875,1724_1001620,00.html Turnitin.com: http://itsinfo.tamu.edu/turnitin/index.html. Your assignments will be held to the standards defined on the web page (note that examples are also provided). Students turning in assignments that do not meet these standards will be given an "F" for the course."
STUDENTS WITH DISABILITIES
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Cain Hall or call 845-1637.