**New course” BPSC 235 “Plant Cell and Developmental Biology”**

Instructors: Venu Reddy, Carolyn Rasmussen

Level: Graduate

Short title (30 characters max): “Plant Cell & Develop Biology”

4 units: 3 hours lecture, 1 hour discussion

Effective term: Fall 23

Prerequisites: BCH 100 or BCH 110B; BCH 110C or BCH 110HC or BIOL 107A; BIOL 102; BIOL 104/BPSC 104; BPSC 143 or CBNS 101; or their equivalents,

Or consent of instructor

Grading: Letter grade only,

Satisfactory (S) or No Credit (NC) grading is not available.

**Catalog description:**

Studies the structure, function, and dynamics of plant cell division, expansion, and specialization as well as molecular and genetic mechanisms in patterning plant forms during development. Emphasis on aspects unique to plants including cytoskeletal and cell plate dynamics; intracellular trafficking and wall-dynamics; as well as targeting to chloroplasts and vacuoles.

**Justification:**

Graduate students of the Plant Biology program are required to take three major 4-unit courses that match their areas of focus. Graduate students with a focus on cellular, molecular and developmental aspects of plant biology have been traditionally taking BPSC 231 (The Plant Genome; 4 units), BPSC 232 (Plant Development, 4 units) and BPSC 237 (Plant Cell Biology, 4 units) to fulfill these requirements. As the scope of contemporary plant biology has very much widened in the recent past, many students have the desire to get exposed to additional rapidly developing topics, such as bioinformatics or epigenetics. Consolidating our existing separate 4-unit courses on Plant Development (BPSC 232) and Plant Cell Biology (BPSC 237) into one new 4-unit course on combined Plant Cell and Developmental Biology will allow students more flexibility in taking additional courses, while still receiving sufficient fundamental training in cellular, and developmental aspects of plant biology.

**Sample Syllabus for BPSC 235**

**“Plant Cell and Developmental Biology”**

3 hours of lecture and 1 hour of discussion per week; Lectures will be given in two 80 min sessions per week. Instructors; Dr. Venu Reddy Gonehal; Dr. Carolyn Rasmussen

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| **Lecture #** | **Topic** |
| 1 | Plants are Different: An overview of unique plant structures (Carolyn Rasmussen) |
| 2 | Principles of Microscopy and Imaging (Carolyn Rasmussen) |
| 3 | Cytoskeleton (Carolyn Rasmussen) |
| 4 | Endomembrane trafficking (Carolyn Rasmussen) |
| 5 | Cell wall (Carolyn Rasmussen) |
| 6 | Cytokinesis and cell plate formation (Carolyn Rasmussen) |
| 7 | Cell-cell communication (Carolyn Rasmussen) |
| 8 | Cellular signaling (Carolyn Rasmussen) |
| 9 | Cell polarity and morphogenesis (Carolyn Rasmussen) |
|  | Midterm |
| 10 | Techniques in Developmental Biology (Venu Reddy) |
| 11 | Plant embryo development (Venu Reddy) |
| 12 | Stem cells - Shoot (Venu Reddy) |
| 13 | Differentiation of shoot stem cells-a model for pattern formation (Venu Reddy |
| 14 | Polarity establishment – Leaf as a model (Venu Reddy) |
| 15 | Stem cell-root (Venu Reddy) |
| 16 | Phase change: Flowering (Venu Reddy) |
| 17 | Pattern formation: Flower development I (Venu Reddy) |
| 18 | Pattern formation: Flower development II (Venu Reddy) |
| 19 | Final exam |

REQUIREMENTS

There will be assigned readings for each week. These will be available as PDF files on the course web site. If PDF files aren’t available, We will have hard copies available that you may check out for photocopying.

**Midterm and Final Exam:** In class, closed book.

**Discussion**

Each week, 1-2 primary research papers will be assigned where all students will participate in an in-depth discussion (on concepts, questions, methods, data analysis and interpretations). Each student will once lead the discussion. Therefore, a thorough reading of the assigned paper/s is a MUST for all participants to effectively participate and contribute to discussion. You will be graded on your participation in the paper discussion.

**Grading**

Percent of Final Grade:

Midterm exam 35

Final exam 35

Leading discussion 15

Discussion participation 15

Total 100

**Votes needed:**

1) gEAC recommended to establish this course as specified above.

BPSC faculty: ?

2) We will need to replace the requirement of BPSC 232 and/or BPSC 237 by BPSC 235 in section III of the MS program and the PhD concentration in Plant cell, Molecular and Developmental Biology.

BPSC faculty: ?