Goals
The goal of this course is to increase your familiarity with plant anatomy and your understanding of the molecular mechanisms that produce it. Upon completing the course, you should be able to: 1) diagram a root, shoot, and leaf and understand the different cell types and their roles; 2) explain several biophysical constraints affecting plant function and how variation in plant form is related to these; 3) understand some of the molecular genetic mechanisms that pattern a plant, including meristem function.

Readings
Many required readings are drawn from Chapters 4 (Metabolism) and 5 (Development) of Plant Biology, Smith et al., Garland Science. These single chapters are available for purchase as e-chapters/e-book from: http://store.vitalsource.com/show/978-1-1369-7745-9; the cost is about $9 per chapter. Other readings, drawn from a diverse set of sources, are available via Blackboard.

Office hours
Please do visit and ask questions as they arise! I have drop-in office hours Wednesday 10:00-11:00 and Thursday 11-12. If those times don’t work for you, drop me an email with a couple of suggestions of times that would—or catch me before or after class—so we can set up an appointment.

Grading policy
Exams: There will be 3 quizzes (7 % each), a midterm exam (20%) and one final exam (29 %). The final will include a significant comprehensive portion, as well as material that came after the prior exam.
Homework and assignments: Homework is worth 20 % of the grade and will be graded on a check plus (A) /check (B) /check minus (C) basis. Previous experience has shown that students who do not keep up with course material on a daily basis suffer significantly in the long run. Hence, homework will be downgraded by half a unit for each day that it is late.
Participation: Participation is worth 10 % of the grade. This includes participation in lecture/discussion classes. You will not receive credit for a discussion if you are absent.
Incompletes: In my experience, students who fall behind during the semester are rarely able to overcome the deficit in the week or so after a semester ends. Thus, the option of taking an academic incomplete is seldom in the best interest of a student. Please do not assume that I will sign a request for an academic incomplete. (Medical/emergency incompletes are another matter; of course I will sign those!)

Honor Code
Traditional honor code guidelines apply to this course. You are encouraged to talk with others and make use of materials that may be helpful in completing homework assignments, but the work that you hand in must be your own (i.e. you must write out the answers in your own words and include references wherever appropriate). In contrast to homework, exams must be completed entirely on your own.

Special Accommodations
If you require special accommodations, please let me know as soon as possible so that we can make appropriate arrangements.
Tentative schedule

Unit 1: Introduction to Plant Development/ Standing tall

Aug. 31  Introduction/Overview of plant development  see Bb for readings
Sept. 2  Lab day (stem anatomy)  Worksheet in class
Sept. 4  Vascular cambium  Bb
Sept. 7  Labor day- no class
Sept. 9  What shall I be? How is cell fate determined?
Thurs. Sept. 10  Towards an Atomic Level Description of a Whole Living Cell - The Photosynthetic Chromatophore of Purple Bacteria, a Key Milestone. Klaus Schulten 7:30 PM
Sept. 11  Creating transgenic plants
Sept. 14  Quiz 1/ Ancestral tales

Unit 2: Physiology of the leaf

Sept. 16  Life in a biochemical world: photosynthesis  PB Chapter 4, pg. 174-190
Sept. 18  Variations on the theme: photosynthetic types  PB Chapter 4, pg. 197-209
Sept. 21  Yom Kippur- no classes
Sept. 23  Lab day: leaf anatomy  Worksheet in class
Sept. 25  Discussion: Integrating water need with water transport
Sept. 28  Quiz 2/ Fun with cacti

Unit 3: Inner workings of the shoot apical meristem

Oct. 2  Molecular mechanisms of meristem function
Oct. 5  No class (comp time for evening lab)
Oct. 7  Lab day: locate and dissect meristems  Worksheet in class
PLUS  7-9 PM Evening lab session - viewing meristems
Oct. 9  No class (comp time for 2nd hour of evening lab)
Oct 14  Modern explanations for phyllotactic patterning
Oct. 16  Midterm exam (take home; due by the end of this class period)

Unit 4: How did plant organs evolve?

Oct. 26  Evolution of leaves
Oct. 28  Formation of the leaf blade - dorsiventrality  PB5: p. 335-342
Oct 30  Discussion: Compound leaf formation
Nov 2  How does pattern arise? trichome formation  PB5: p. 323-325; 342-343 + Bb
Nov 4  Computer modeling exercise
Nov 6  Meeting physical constraints: mechanosensing

Unit 5: The root system

Nov. 9  Setting up the root-shoot axis  PB5: p. 306-312 (not 311)
Nov 11  Lab day: root anatomy
Nov 13  The root apical meristem  PB5: p. 313-315 + Bb
Nov 16  Discussion: root growth
Nov 18  Gene expression profiling (and modeling)
Nov. 20  Lateral root formation  PB5: p.325
Nov 23  Discussion: root cap and rhizosphere
Nov 25  Quiz 3/ Hemiparasites!

Unit 6: Flowering

Nov. 30  Induction of flowering
Dec. 2  Making a flower  PB: 350-360 +Bb
Dec. 4  Floral behavior
Dec. 7  How did flowers evolve?
Dec. 9  Lab day: dissecting floral function  Worksheet in class
Dec. 11  Presentation by BIOL 305 class

Final exam: Dec. 18th 2-4 PM as per the Registrar’s schedule.