Welcome to the world of plants. Without plants you would be dead. And some plants can kill you. So, it is best to know which one is which and how to figure it out.

Instructor
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Teaching assistant
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Credits: 3. An optional 1-credit companion lab is available for students that want to dig deeper into the incredible world of botanical biodiversity, see 11:216:412/16:215:508. If you are an EENR major and want Biodiversity credit for this course, then you have to take both lab and lecture.

Class meeting time
Mondays and Thursdays 9.15-10.35, 138A Foran Hall (Cook Campus).

INTRODUCTION
The evolution and diversification of land plants have shaped life on Earth both in past times and today and are crucial for the survival of terrestrial ecosystems and the human species. Plants provide most of humanity's food, nutrients, and many medicines. Plant diversity is also crucial for well-functioning natural ecosystems, for improving public health, and long-term sustainability of both natural and urban systems. This class is about how our plant diversity of over a quarter million species has evolved over the last 500 million years, including various crop species since the origin of agriculture, and how the evolution of plant properties have provided crops, spices, horticultural plants, bioenergy, medicines and other chemicals, timber, etc. The class includes developing skills in plant identification (including toxic and edible plants, DNA barcoding of medicinal plants), phylogenetics, and morphological, anatomical and phytochemical evolution. Digital and online tools and resources will be strongly emphasized in working on real world problems such as estimates of biodiversity, taxonomic databases an accuracy in botanical names, and identification of unknown plants (edible, toxic, wild, invasive),
Short course description
This class explores the origin and diversification of land plants, especially flowering plants with ethnobotanical uses. Topics include plant identification and nomenclature, botanical accuracy of medicinal plants, edible and toxic plants, evolutionary biosprospecting, reproductive biology of plants, and phylogenetics. Class includes fieldtrips, hands-on and independent projects, use of online tools, and class discussions.

General information about class format:
This class will likely be unlike most other classes you have taken. This is not your usual "lecture, study, exam" class. After ten years of teaching this class like that, I am changing this class drastically to increase students' learning, skill and knowledge building (most important), and build excitement and understanding of plant diversity in today's world and your lives, and get away from boring lectures and cramming for tests. The new format will be a 'semi-flipped classroom with active learning components, inside and outside the classroom''. This will be done through 1) posting of readings and other activities that you should follow up on before class, 2) while in class, short intro presentations that goes deeper into some topics, 3) then graded short in-class or out-of-class activities (case studies, activities, etc.), and finally the addition of 4) two graded long-term class projects focused on local biodiversity. (Graduate students also have a research paper due since they have to do more.) This also means that you will probably have to…

… take more responsibility for your own learning and skill building than in most other classes:
It is up to you to plan ahead, read ahead, select readings or other learning methods (from provided choices), and keep on top of things. Use your curiosity, dig deeper, challenge yourself, have fun, and develop the learning style that fits you best. I will provide tools, resources, and advice to maximize your learning, but it is up to you to shape your knowledge and skills in a way that fits your future career choice the best. The class is not focused on memorization (except for vocabulary and a few plant families), because a lot of facts can easily be looked up. Instead we will focus on foundation knowledge, vocabulary, critical thinking and evaluation of facts and 'facts', identification skills, and developing a true understanding of botany that will be useful for the rest of your life.

LEARNING GOALS
Plant diversity and evolution focus on green plants from around the world. You will:
1. Understand how plant diversity has been discovered, described, and classified during the last 2000 years.
2. Describe the history of land plants on Earth through geologic time and the timing of macroevolutionary key innovations
3. Explain and implement the rules for botanical nomenclature and classification based on phylogenetic information
4. Recognize the major features and evolutionary diversifications of all major plant groups.
5. Learn to recognize all major plant families of New Jersey
6. Build up your vocabulary for plant morphological and evolutionary terminology to aid in species identification and description, evaluation of resources, and phylogenetic tree-thinking
7. Be able to provide species identification of common everyday plants, including food plants (see list) using a variety of available tools
8. Describe the difference in vegetative and sexual reproduction between animals and plants, and understand the implications of migration and dispersal of plants globally and locally
9. Evaluate variation and differences in morphology and genetics between species, especially when it comes to species identification, edible plants, and DNA barcoding
10. Analyze how phylogenetic information for plants can be used for bioprospecting of new crops and plant-based medicines
11. Understand the importance of botanical accuracy when it comes to sourcing, vouchersing, marketing, and content in commercial products, media, and research reports
COURSE WEBSITE  onlinelearning.rutgers.edu

Sign in using your netID at the eCollege course website (not Sakai!). The course website have syllabus, lectures, readings, self-assessment quizzes, links to on-line educational materials (movies, websites, podcasts), and dropboxes for uploading assignments. Please refer to the schedule to find each week’s topic, assignment, self-assessment, and other resources. The course website is divided up in units, following the main topics in class. The self-assessments are listed under a special heading.

RESOURCES, BOOKS, and OTHER MATERIALS

Reading
The required readings and any other assignments are available on the course website (unless they are provided in the classroom), and you have to read and do any assignment before each (see course website for assignments). The website will be continuously updated as we go along in the semester, so keep checking the website before and after each class. The optional text book contains many useful chapters, and you can also use the on-line Subject Guide to Botany and Plant Systematics and numerous links to videos, articles, and websites on the course website. It is your own responsibility to make sure you follow all instructions listed on handouts, in this syllabus, and on the course website.

Supplies needed
- **Hand lens** (10X; preferably with neckband so you don’t drop it and lose it – good illuminated hand lenses can be bought through Amazon or other online places (for example SE Illuminated Loupe, model B0013E3DAG, 10-20x, 21 mm), other models are fine too - no need to buy anything expensive). Barnes and Noble in New Brunswick has a hand lens available for $11, ask for it at the textbook desk under this class number.
- **Digital camera** (smartphone or tablet with camera is OK) - you will not be able to participate in class if you do not have access to a digital camera from which you can download photos
- **Computer or tablet with internet access** (recommended, but not necessary in the classroom)

Books and other documents
- **Textbook:** Simpson, M. 2011. *Plant Systematics*, edition 2. Elsevier Press. (available at the Barnes and Noble Rutgers Campus Bookstore). This is the OPTIONAL text book for this course; it is mandatory for the lab course.
- **Other course documents:** To aid in your study, we are providing a manual of how to recognize the 50 most common plant families, a list of common plant families and major plant groups you should learn to identify, a morphology vocabulary manual, and a list of plant morphology words you should know to help you identify and describe plants. All of these are available online. Download and/or print out the 50-family manual (available in color and black and white).

PLANT AND FIELD SAFETY

Many plants are poisonous and can cause severe reactions, even death. Be careful not to get anything in your eyes or your mouth, unless we specifically say it is edible. Wash your hands after working with all material.

For the flora project: Dress in suitable clothes for any outdoor fieldwork—boots/sneakers, long pants and long-sleeved shirts are recommended. Be aware of ticks and mosquitoes, poison ivy and plants with thorns. Do not go alone to remote places. Bring a cell phone in case you get lost or need help. At the same time, do not be afraid of exploring more remote or understudied areas, such as forests, ditches, back alleys behind dining halls and power plants, etc. on campus - go out in groups of students if that makes you more comfortable, and stick to day time excursions, as you know, plants do usually not glow in the dark anyway.
ASSESSMENT
How you reach the learning goals in class will be assessed through the evaluation and grading of:
1. **4 short quizzes**
2. **In-class and online assignments**
3. **iNaturalist project: Rutgers Flora project**
4. **edible plant biodiversity inventory of Rutgers’ dining halls**
5. **On-line, open-book, repeatable self-assessment quizzes**
6. **Attendance and participation**
7. (graduate students) **Research paper**

GRADING and ASSIGNMENTS

Undergraduates vs. graduate requirements
All in-class quizzes are different for undergrads and graduates to reflect different learning expectations. Graduate students are also required to provide a research paper on a project that has been investigated during the semester by the student (this is optional extra credit for undergraduates).

**Grading points**

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<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
<th>Description</th>
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<tbody>
<tr>
<td>In-class and online assignments</td>
<td>100</td>
<td>(estimated ca. 10-15 worksheets @ 5-10 points each)</td>
</tr>
<tr>
<td>Quizzes</td>
<td>60</td>
<td>(4 quizzes @ 15 points each)</td>
</tr>
<tr>
<td>On-line self-assessments</td>
<td>50</td>
<td>(5 self-assessments @ 10 points each)</td>
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<tr>
<td>Dining hall biodiversity project</td>
<td>20</td>
<td>(group project)</td>
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<tr>
<td>iNaturalist Rutgers Flora project</td>
<td>20</td>
<td>(report at least 20 plant observations)</td>
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<tr>
<td>Attendance and participation</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Research paper</td>
<td>20*</td>
<td>(graduate students only, extra credit for undergrads)</td>
</tr>
<tr>
<td>Extra credit</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><em><em>260 (280</em>)</em>*</td>
<td>points, plus extra credit</td>
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General grading policy
For projects, points will be taken off for misspellings, wrongly formatted text, sloppiness, not adhering to given formatting guidelines and similar mistakes. There will be no curving of grades. We will use the gradebook on the course website so you can check your current grade at all times. If you feel like you are falling behind, come and talk to us about ways to improve your performance. We are here to help you learn, and our goal is for all students to achieve an A if they put in the effort needed. There will be no curving of grades, however we reserve the right to upgrade the grades with one level for students that show outstanding participation and effort in the class.

**Final grades:**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90-100 %</td>
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<tr>
<td>B+</td>
<td>85-89 %</td>
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<tr>
<td>B</td>
<td>80-84 %</td>
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<tr>
<td>C+</td>
<td>75-79 %</td>
</tr>
<tr>
<td>C</td>
<td>70-74 %</td>
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<tr>
<td>D</td>
<td>60-69 %</td>
</tr>
<tr>
<td>F</td>
<td>less than 60% of total grade</td>
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**Exams and quizzes**
There is no midterm exams and no final exam. Four 30-minute quizzes on selected topics will be done in class (on nomenclature, phylogenetics, plant reproduction, and family identification). The rest of the work for this class is done as graded projects in class, online self-assessments, and as independent or group projects. Grades will be also given based on participation, effort, and attendance. (Graduate students have to write a research paper too.) **Note – cell phones and calculators are absolutely not allowed during quizzes.**
Cheat sheet
During quizzes you are allowed to have 2 pages (one sheet of paper) of original handwritten notes (in any language). No computer text is allowed, only your own handwriting and drawings (you will get a zero on your exam if you have a printed or photocopied cheat sheet). It has been shown that the preparation by hand of such notes helps you learn the material, and is also an excellent way to provide yourself with a quick review in the future. You can write small, in different colors, and any text type you want, but you are only allowed one sheet for each quiz period. No other materials and help are allowed during lab quizzes. We will do spot-checking of cheat sheets to assure they follow the guidelines.

Late hand-in
Delayed hand-in of materials will get a lowered or zero grade. In-class assignments have to be handed in during the same class or in a later class on the due date of the assignment. Long-term group projects and online assignments will have specific due dates and should be handed in by 8 PM on the due date. If not handed on time, any assignment will get an immediate 20% point reduction, and if still late after 3 days it will not be graded.

Absences, including medical
If you are sick, you have to report it on the online student absence system (https://sims.rutgers.edu/ssra/) to be able to do the assigned work at a later date. No submitted absence report online = no permission to make up the work. Two or more absences in a row require a note from a doctor or Rutgers’ health center. Any other absences have to be communicated to the instructor ahead of time, and will be handled on a case by case basis (for example, graduate students attending workshops will be excused, but attending your friend's wedding or taking an early flight will not qualify). Make-up quizzes will only be provided for unexpected medical absences.

Attendance and participation
There is an attendance and participation grade for this class, and late arrivals, non-participatory behavior, and overall effort in the class will affect this part of the grade. So be on time, participate in class, and be engaged with the class topics.

Online Self-assessments
These are graded online so that you get 10 points for each assessment performed online, as long as you have at least 80% correct answers (but you have to attempt to answer all questions, not quit prematurely). These are open-book, untimed assessments and you can work in groups if you like and you do these on your own time. The idea is that you should do the self-assessments as we go along in during the semester to improve your knowledge and understanding of the subject. Remember, you are learning for your own future, not to pass a final exam. We are filling in the grade points manually for these so the grades might not be applied until the end of class. Deadline for all self-assessments are December 1, 2015 (no exceptions).

Extra credit
There are several options for extra credit, here are some (see website for complete list):
5 points - sign the course agreement and hand it in before Sept 15.
25 points - undergraduates can write a research report like the graduate students and hand it in. This assignment is not extra credit for graduate students, for them it is mandatory.

Assignments
There are several assignments for this course. For all of these, see separate handouts with further instructions that will be provided in-class and online.
Course agreement
All students are asked to sign the course agreement as part of participating in this course. You will receive extra credit if you do.

ACADEMIC CONDUCT AND INTEGRITY
All instances of plagiarism or other unacceptable academic conduct will be reported to the Office of Student Conduct or the Graduate School and might result in warning, a mark on your permanent record, dismissal or suspension according to Rutgers official rules.

In short, to avoid plagiarism or paraphrasing in submitted reports, write everything by yourself, and never copy text from the internet or publications or other students – we are using turnitin.com to check all text handed in by students.
During quizzes, avoid looking at other students' worksheets at all costs and do not talk to each other. Any student that is not following these rules will be removed from the classroom, get a zero on the quiz, and reported for academic integrity misconduct.

You can sometimes work in groups during the class if you like, but never copy anybody else’s text for the assignments or projects. All work handed in by you should be your own work written in your own words (unless stated otherwise in assignment instructions). Any plagiarism or cheating or other misconduct will be reported.
When you hand in and report research data from our biodiversity inventory projects, you will guarantee that your data and observations are truthful and accurate when it comes to locality and date, and that they are your own photos and observations.

In reports, please remember to cite all sources of information. When you include a list of references follow the correct citation format (see instructions), Non-refereed, unscientific web sites are not acceptable as sources of information unless for images or maps. You should get all information from books, book chapters, and scientific articles (these can of course be searched for, read on, and downloaded via the web). So, do not cite websites, unless they are scientific websites, that lists references and their facts have been checked.
Please follow copyright laws and give credit to the source when using images of any kind (see course website for information), and cite all image sources properly. An url is not a source or copyright information, so don't use only urls.

NOTICE FOR STUDENTS WITH DISABILITIES
Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: https://ods.rutgers.edu/students/documentation-guidelines. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. To begin this process, please complete the Registration form on the ODS web site at: https://ods.rutgers.edu/students/registration-form.