(WIMUL) (3 credits)

Normally Offered: Fall semester, yearly

Instructor: Albert Ayeni (Foran Hall Room 268; 2-6289; ayeni@aesop.rutgers.edu);
Lab Assistant: Patricio Rojas (Foran Hall, Room 228; patricio@Eden.Rutgers.edu)

Office Hours: Patricio Rojas - Tuesday and Wednesday 11.00-12.00 Foran Hall, Room 228
(please e-mail me before coming).

Pre-requisites and other registration restrictions: A minimum of one 200-400 level course in
Biology, Plant Science, Biochemistry or related courses is required to register for WIMUL. When
in doubt, student must seek Instructor’s permission to register for the course.

Format: One 80-minute lecture/week and one 3-hr Lab/week: Tuesday 2.15-3.35 pm (Lecture);
Friday 9.15 am -12.15 pm (Lab)

Lecture/Lab Venues: Lecture - Foran Hall Room 191B; Lab - Foran Hall Room 194 and field
trips (TBA)

Course Website: Materials distributed via eCompanion

Description: This is a senior level course which, in three modules, examines the impact of
weeds in urban landscapes and the management options. Urban landscape is broadly defined
as the area of greenery integrated into human population centers including home/community
lawns; home/community gardens, small farms and orchards; nurseries (field & container);
recreation areas including agro-tourism centers and parks; sporting grounds (e.g. baseball,
football and lawn tennis pitches, golf courses, polo grounds, etc.); industrial sites; rights of way
(rails & roads); etc. Module 1 of WIMUL covers the basic principles of weed ecology and
management, Module 2 focuses on the description of major landscape settings where weeds
are encountered and their significance (ecological & economic), while Module 3 discusses
weed management options for selected major weed situations in urban landscapes, highlighting
advantages and disadvantages. By the end of this course, the student should be able to:

a) identify a minimum of 15 weed species of Mid-Atlantic USA by their common and
scientific names, associate each of the weed species with an urban landscape setting
where it is mostly encountered, and describe the significance,

b) name a minimum of three management options that may be used to control weeds in
a given urban landscape setting; and,

c) analyze the strengths and weaknesses of any of the weed management options one
may apply to a given weed situation in an urban landscape setting.

Module 1: Weed ecology and management

09/04/12: Course introduction, weed definition, and significance

09/11/12: Weeds: Identification and classification

09/18/12: Weed ecology: Nature and Examples
09/25/12: Weed management methods Part 1: Non-chemical methods
10/02/12: Weed management methods Part 2: Chemical and Integrated methods

**10/09/12: Exam 1.**

**Module 2: Weeds in Urban Landscape Settings and Significance**

10/16/12. Home/community lawns and sport grounds
10/23/12: Nurseries (field & container), ornamentals and landscapes
10/30/12: Home/community gardens, small farms, and orchards
11/06/12. Recreation areas including agro-tourism centers and parks

**11/13/12: Exam 2.**

**Module 3: Weed Management Options in Urban Landscape Settings**

11/20/12. Home/community lawns and sport grounds
11/27/12. Nurseries (field & container), ornamentals and landscapes
12/04/12. Home/community gardens, small farms, and orchards
12/11/12: Recreation areas including agro-tourism centers and parks

**12/18/12: Deadline for Term Paper written on a topic approved by the Instructor**


**Grading:** This is based on (i) two Exams (50%), a class presentation (20%), semester-long lab reports (20%), and class participation (10%). Exam 1 takes place at the end of Module 1; Exam 2 at the end of Module 2. Each exam carries 25% of total course grade. Class exams are generally a mixture of multiple choice and short answer questions. The class presentation takes place towards the end of the semester. Topic of presentation will be selected from several options to be given to the class at the beginning of the semester. Lab reports are based on lab activities carried out during the semester. Lab grades will be based on lab reports and accounts for 20% of the total course grade. Class participation is based on a combination of class attendance and contributions to class discussions and accounts for 10% of total score. Grades will be classified based on Rutgers approved system: A, B, B+, C, C+, D, F etc.

**Teaching methods:** This is a lecture and lab course. Lecture topics will be covered using a traditional lecture format based on chapters that may (or may not) be found in the recommended textbook. Guest lecturers may be invited to give lectures. Often, power point presentations will accompany lectures to facilitate learning and understanding. Class exams will be based on what has been treated in the class. Class is highly interactive and critical thinking is expected. Lab sessions will be tied as much as possible to the lecture topics, with students required to submit lab reports at the end of each lab session.

**Other matters:**
i. Class attendance and participation are highly essential in this course. These components carry 10% of total class grade.

ii. Laptops may be used to take notes, **but internet surfing is not allowed. Cell phones or similar distractions are to be turned off during lecture and lab sessions.**

iii. Students who are absent for a scheduled class or lab period are responsible for materials covered during that period. A **total** of three (3) absences from lectures & lab sessions without special note expressing reason for absence are allowed. **Subsequent absences without good reason supported with written note from a recognized authority will be penalized.**

**WIMUL Lab Topics:**

**Weed Identification & Classification:** Students are expected to identify a minimum of 15 weed species using common and scientific names and also associate each weed to an Urban landscape setting where it is predominant. Field trips to various landscape types (turf, ornamentals, nurseries, vegetable gardens, orchards, field crops, etc) are recommended so students may see how the weed species they identified interact with the desirable plants in the ecosystem. It is suggested that students visit lawns within the Cook Campus, Hort Farm 2 Turfgrass research plots, the Rutgers Gardens, and the CSA in Hort Farm 3 (all on Ryders Lane) for first hand weed ID in various landscape settings. At the end of such field trip, the student is to give a report on the weed species identified and their location. The Lab Assistant will be on hand to demonstrate the techniques for weed identification, especially at seedling stage. The recommended Weed ID book for this lab is **“Weeds of the Northeast”** by R.H. Uva, J.C. Neal, J.M. Ditomaso, and A.F. Seneca, 1997, Cornell University Press, 397 pp.


**Weed album preparation:** Students will prepare a weed album showing a minimum of 30 weed species that are commonly found in urban landscapes around Central New Jersey. For each weed species, photos of (i) the foliage (ii) the reproductive parts (if available) and (iii) the root system, are to be displayed in the weed album. The legend for the weed species should include (a) the scientific name, (b) the common name, (c) site of collection (i.e. the landscape setting), (d) date of collection, (e) name of collector, (f) short remarks (such as any unique attributes of the weed and/or the surrounding microenvironment where and/or when it was collected). The weed album is due at the end of the course. Students will be shown how to prepare a weed album and have the whole semester to develop own weed album.

**Please Note:** The pictures must be original and we will not accept pictures from the internet, textbooks, etc. under any circumstance. If a case of plagiarism is detected it will be penalized following the Rutgers University Academic Integrity Policy (http://academicintegrity.rutgers.edu/)

The pictures have to be taken with high resolution, so when you print you can have a good image. Remember that the quality of the picture is based on how many pixels you have. A good image on the screen does not always mean a good resolution for printing. We suggest you use the higher resolution available in your camera.
**Weed/crop competition:** The purpose of this lab is to demonstrate the impact of weeds on desirable plants in urban landscapes. Depending on available facilities, it is desirable to demonstrate the impact of some of the following elements on the outcome of weed/crop interactions: a) soil fertility, b) water, c) light, d) weed/crop population ratio, e) relative time of weed/crop emergence, f) weed/crop type, etc. This lab may require students to work in groups with each group investigating the impact of one of the elements mentioned above. Reports are due at the end of the weed/crop interaction study (which may last for several weeks).

**Manual & Mechanical Weed Control:** Students will be shown the different types of approaches used for manual and mechanical weed control ranging from hoes, knives, to cultivators, mowers and mulches in various landscape settings. It is recommended that field trip be organized for students to visualize manual and mechanical weed control tools in action. Hort Farm 2 (turfgrass situations) and Hort Farm 3 (orchard grounds, vegetable plots) are possible locations for students to see, touch and learn about manual and mechanical weed control strategies. Students are expected to give a report of such field trips and submit in the next lab session.

**Chemical Weed Control:** Several lab sessions will be devoted to chemical weed control to be able to demonstrate the most effective way to use this weed control method in urban landscape settings. Attempts will be made to treat some of the following labs based on time and available facilities:

i) Herbicides and herbicide formulations: Identification, nomenclature and classification

ii) Herbicide application: Identification of application implements and equipment

iii) Herbicide application: Safety measures

iv) Herbicide application: Rate estimation and implement/equipment calibration

v) Herbicide application: Efficacy factors (rate, timing – PRE, POST, PPI, etc, plant growth stage, soil conditions, etc.)

vi) Herbicide selectivity: Grass vs. broadleaf herbicides

vii) Herbicide mode of action: Contact vs. systemic

viii) Herbicide symptoms compared to other plant responses

ix) Herbicide resistance demonstration

x) Herbicide fate in the soil environment

xi) Synthetic and bio-herbicides compared

**Weed Management Economics:** Class will be divided into two groups. One group will interview the Director of Rutgers Community Sustainable Agriculture (CSA) to learn about the cost of weed management in CSA operations compared to the other production items in the enterprise. They will also learn about different strategies adopted by CSA to minimize the impact of weeds in organic vegetable production. The second group will interview the Chief Field Technician for the Turfgrass Program to learn about the cost of weed management in a typical golf course compared to other turfgrass management items. They will also learn about different strategies adopted to minimize the impact of weeds.
in the golf course. At the close of the semester, the two groups will give a detailed presentation on what they learned so the class may compare the economics of weed management in organic farming and golf courses --- two distinct and important landscape settings in Central New Jersey. Are the strategies adopted in the two landscape settings sustainable? Why or why not?