

## **SOLID WASTE MANAGEMENT & TREATMENT**

**11:375:307**

**Fall 2024, 3 Credits**

Tuesday/Thursday 5:40-7:00 pm.

Foran Hall, Room 138B (Cook-Douglass Campus)

### **CONTACT INFORMATION:**

Instructor(s): Dr. Ching Ling Tsai

Email: [ching.tsai@rutgers.edu](mailto:ching.tsai@rutgers.edu)

Office Hours: By appointment via Zoom (See zoom link on Canvas)

### **COURSE WEBSITE, RESOURCES AND MATERIALS:**

1. Environmental Research & Education Foundation. 2020. Solid Waste Management. e-Textbook. Cost \$50. <https://etextbook.erefdn.org/classes/>
2. Christensen, T.H. (ed.). 2010. Solid Waste Technology & Management. John Wiley & Sons, Ltd., Chichester, UK. (Available online at the Rutgers University library)

### **OTHER REFERENCES:**

1. Electronic waste management <https://www.epa.gov/international-cooperation/cleaning-electronic-waste-e-waste>
2. Solid Waste Legislation and Regulations <https://www.epa.gov/sites/default/files/2015-07/documents/rom.pdf>
3. OECD Extended Producer Responsibility <https://www.oecd.org/environment/extended-producer-responsibility.htm>

### **COURSE DESCRIPTION:**

Understand integrated solid waste management (ISWM) systems, including waste generation and characterization, life cycle analysis of waste management, waste prevention and minimization, material recovery, composting and anaerobic digestion, incineration, and landfilling.

The specific course objectives are for students to be able to:

1. comprehend the theories and principles of solid waste generation, characterization, collection, recycling, and final disposal.
2. identify contemporary issues related to solid waste management in current societal practices
3. familiarize with key concepts of waste minimization, waste hierarchy, and life cycle management of solid waste.

### **LEARNING GOALS:**

#### ***Environmental Science Majors:***

This class will contribute toward students' ability to:

1. apply knowledge, skills and techniques from the sciences and mathematics to identify, characterize and provide solutions to environmental problems
2. function effectively on teams to accomplish collaborative tasks
3. Recognize and discuss the ethical and professional responsibilities of environmental scientists in addressing contemporary environmental science issues and the impact of environmental science in a global and societal context

**ASSIGNMENTS & ASSESSMENT:**

Homework assignment & class participation	20%
Quizzes	20%
Group project	15%
Midterm	20%
Final exam	25%

Letter grades will be assigned based on the Rutgers grade scale: A  $\geq 90\%$ ; B+ = 85.0 – 89.9%; B = 80.0 – 84.9%; C+ = 75.0 – 79.9%; C = 70.0 – 74.9%; D = 60.0 – 69.9%; F < 60%

**Notes:**

1. Midterm in late October (class time). Final exam in mid December.
2. One group project will be presented in early December.
3. Three homework assignments are due one week from the date assigned. Late homework assignment will not be accepted.
4. Four quizzes will be given in the beginning of the class on specified dates.
5. Field trips are optional to MRF and landfill (date TBD) but extra credits are given for attendance.

**QUIZZES:**

There will be 4 quizzes throughout the semester, paper based. All quizzes will take place in the beginning of the class on dates specified. Each quiz will be composed of multiple-choice and/or short answer/fill-in-the blank. Each student will have 20 minutes to complete the quiz. Make-up quizzes will be allowed for 50% credit without a university approved excuse. You must complete any make-up quiz before the next class (by appointment) to receive 50% credit.

**HOMEWORK ASSIGNMENTS:**

There will be 3 homework assignments throughout the semester, and these **must be completed on time (one week after the HW assignments were assigned)**. The instructions and Due Dates for each Problem Set are clearly indicated on Canvas. Late Problem Sets will **not** be accommodated without a university-approved excuse.

**DISCUSSION AND ACTIVITIES:**

A variety of in-class and outside class activities will be incorporated throughout the semester. These will include 2 field trips, quizzes, discussion questions, and a variety of problem-solving and critical-thinking activities. Reference readings are assigned to help you understand the class material. Other assignments and discussion questions will be assigned occasionally to promote class engagement and promote learning.

**FINAL EXAM:**

The final exam will have a similar format as the quizzes. Students should prepare for the final exam by reviewing quizzes, homework assignments, discussion questions, and course material.

**LATE ASSIGNMENTS AND MAKE-UPS:**

Meeting deadlines and completing assignments on time are important parts of this class. The Due Dates for all assignments are posted on Canvas. Late Problem Sets will **not** be accepted. Late Quizzes will be accepted, but quizzes will incur a -50% penalty if completed before the next class by appointment. After that, students will earn 0 points for any missing quiz. Additional time will not be accommodated. Exceptions to this policy will be made only for students with a University-approved excuse or prior approval by the instructor. Students must give instructor **one-month** advanced notice for any expected absences from exam/quiz days – contact professor immediately to reschedule the quiz or exam. **Contact Dean of Students if you have missed course assignments due to illness or other University approved reason.**

#### **ABSENCE POLICY:**

Attendance will be collected at the beginning of each class. Students are expected to attend all classes on-time. Tardiness will be considered as absent, although students are encouraged to attend class even if late. **Students may not “sign-in” other classmates on the attendance sheet.**

If you miss a class, you are responsible for all materials, including announcements. I recommend exchanging email addresses with at least 2-3 other students to ensure that you can acquire any missed information. If you expect to miss more than two classes, please use the University absence reporting website <https://sims.rutgers.edu/ssra/> to indicate the date and reason for your absence. An email is automatically sent to me.

#### **COURSE SCHEDULE:**

Tentative course schedule, dates of all assignments and quizzes are provided on Canvas.

#### **DISCUSSION AND COMMUNICATION GUIDELINES:**

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- **Writing style:** While there is no need to participate in class discussions as if you were writing a research paper, you should remember to write using standard grammar, spelling, and punctuation. Informality (including an occasional emoticon) is fine for non-academic topics. Please also refrain from using all CAPITAL LETTERS, as this is often interpreted as shouting.
- **Tone and civility:** Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm can easily be misinterpreted. Always treat your instructor and fellow students with respect whether in-class, online, or through email.
- **Citing your sources:** When having academic discussions, please cite your sources to back up what you say.
- **Backing up your work:** Consider composing any long-form discussion or homework posts in a word processing program (e.g. Word, Pages, Open Office), where you can save your work, and then copying and pasting into the online discussion or just upload your Word document in the Assignment on Canvas.

#### **ACCOMODATIONS FOR STUDENTS WITH DISABILITIES:**

Please follow the procedures outlined at <https://ods.rutgers.edu/students/getting-registered>. Full policies and procedures are at <https://ods.rutgers.edu/>

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## ACADEMIC INTEGRITY

The university's policy on Academic Integrity is available at <http://academicintegrity.rutgers.edu/academic-integrity-policy>. The principles of academic integrity require that a student:

- properly acknowledge and cite all use of the ideas, results, or words of others.
- properly acknowledge all contributors to a given piece of work.
- make sure that all work submitted as his or her own in a course or other academic activity is produced without the aid of impermissible materials or impermissible collaboration.
- obtain all data or results by ethical means and report them accurately without suppressing any results inconsistent with his or her interpretation or conclusions.
- treat all other students in an ethical manner, respecting their integrity and right to pursue their educational goals without interference. This requires that a student neither facilitate academic dishonesty by others nor obstruct their academic progress.
- uphold the canons of the ethical or professional code of the profession for which he or she is preparing.

Adherence to these principles is necessary in order to ensure that

- everyone is given proper credit for his or her ideas, words, results, and other scholarly accomplishments.
- all student work is fairly evaluated and no student has an inappropriate advantage over others.
- the academic and ethical development of all students is fostered.
- the reputation of the University for integrity in its teaching, research, and scholarship is maintained and enhanced.

Failure to uphold these principles of academic integrity threatens both the reputation of the University and the value of the degrees awarded to its students. Every member of the University community therefore bears a responsibility for ensuring that the highest standards of academic integrity are upheld.

## STUDENT WELLNESS SERVICES

### Counseling, ADAP & Psychiatric Services (CAPS)

(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901/ [www.rhscaps.rutgers.edu/](http://www.rhscaps.rutgers.edu/)

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

### Violence Prevention & Victim Assistance (VPVA)

(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / [www.vpva.rutgers.edu/](http://www.vpva.rutgers.edu/)

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

### **Disability Services**

(848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / <https://ods.rutgers.edu/>

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. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.

**DoSomething** button through Rutgers Dean of Students office:

<http://health.rutgers.edu/do-something-to-help/>

**Wellness Coaching** through Rutgers HOPE:

<http://health.rutgers.edu/education/hope/wellness-coaching/>

**Self-Help Apps** found on the Rutgers Student Health website:

<http://health.rutgers.edu/education/self-help/self-help-apps/>

**NJ Hopeline-** (1-855-654-6735)|**National Suicide Hotline** - (1-800-273-8255)

### **BASIC NEEDS RESOURCES**

Any student who has difficulty affording groceries or accessing sufficient food, or who lacks a safe and stable place to live, is urged to contact the Rutgers Student Food Pantry and/or the Dean of Students (details below). Furthermore, please notify the professor if you are comfortable doing so, as they may be able to provide additional support.

#### **Rutgers Student Food Pantry**

848-932-5500 / College Ave Student Center, Room 115 (126 College Ave) /

<http://ruoffcampus.rutgers.edu/food/>

Check their website for hours and additional locations. The Rutgers Student Food Pantry is dedicated to helping all Rutgers students in need of food, no questions asked. Students will be provided with groceries that typically last about one week.

#### **Dean of Students Office**

848-932-2300 / 88 College Avenue, New Brunswick, NJ 08901 / <http://deanofstudents.rutgers.edu/>

Mon-Fri, 8:30am-5:00pm

The Dean of Students Office at Rutgers University-New Brunswick provides solutions, services, and support to help students navigate Rutgers University. The Office serves as a student support network by providing advocacy, problem resolution, and critical incident intervention for those times when additional assistance is needed. Please call to schedule an appointment to meet with a representative from the Dean's office.