Oregon State University
Professional and
Continuing Education

Department of Horticulture
Oregon State University
4017 Agricultural and
Life Sciences Building
Corvallis, Oregon, 97331
P 541-737-3695 | **F** 541-737-3479
horticulture.oregonstate.edu

Course Name: Permaculture Water Management
Instructor name: Neil Bertrando(he/him)
Instructor email: bertrnei@oregonstate.edu
Office Hours: By appointment, please email to set up a Zoom
Link to OSU Permaculture Program Website: https://permaculturedesign.oregonstate.edu/
Link to OSU Permaculture Team Website: https://workspace.oregonstate.edu/osu-permaculture-design-team

Course Description

Teaches assessment, mapping, and site designs for installing water retention landscapes using integrated water management strategies. Introduces assessment and analysis of rainwater runoff patterns and calculation of runoff quantities and water usage amounts. Teaches principles of water harvesting used to create functional site designs. Examines rainwater harvesting systems case study designs and teaches to identify both water and solar site resources. Creates an integrated permaculture site design based on design principles, water flow and quantity analysis, and overall site condition assessment. Covers rainwater harvesting cisterns, water harvesting earthworks, their integration with greywater treatment, passive solar design, and planning for vegetation.

Communication

Please check the Start Here area and the course syllabus before you ask general course "housekeeping" questions (i.e. who do I contact if I have a problem?). If you don't see your answer there, then please contact the teaching assistant.

Post all course-related questions in the 'Help! Discussion Board' found in the 'Discussions' section of the course. so the whole class may benefit from our conversation. Please contact the teaching assistant privately for matters of a personal nature. A reply to course related questions will be sent within 1-2 weeks unless the teaching assistant is on vacation or leave.

Instructor Feedback

All feedback is provided by the teaching assistant. Feedback is provided primarily as a discussion reply to your submission on discussion boards. When it relates to deductions of rubric points, feedback is provided in the "rubric comments" box on your assignments submissions page. It is an expectation that you will review these comments and respond if necessary. **Please check your Canvas settings to ensure you receive a message when an Announcement is made, and when a grade or comment is submitted on your assignment.** To do this go to your Canvas "Account" tab on the Left Sidebar, click on "notifications" and set 'Announcements', 'Grading' and 'New Mention' are set to 'Notify Immediately'. You can have these notifications delivered to your email, sent as a text, etc. Please review the feedback provided in the assignment discussion board and respond and reply to any comments in the assignment discussion board. These are our primary forum for communication.

Technical Assistance

If you experience any errors or problems while in your online course, contact 24-7 Canvas Support through the Help link within Canvas. If you experience computer difficulties, need help downloading a browser or plug-in, or need assistance logging into a course, contact the IS Service Desk for assistance. You can call (541) 737-8787 or visit the IS Service Desk online.

Required Readings

A. Doherty, Darren. "Regrarians Handbook Chapter 2: Geography" Regrarians Limited. 2019
   a. Students can purchase the book directly from Darren Doherty here: http://www.regrarians.org/regrarians-ehandbook-2-geography/
B. Doherty, Darren. "Regrarians Handbook Chapter 3: Water" Regrarians Limited. 2019
   a. Students can purchase the book directly from Darren Doherty here: http://www.regrarians.org/regrarians-ehanbook-3-water/
C. From Self-Paced course required readings
   a. Lancaster, Brad. "Rainwater Harvesting for Drylands and Beyond, Volume 1, 3rd edition" Rainsource Press. 2019
   b. Lancaster, Brad. "Rainwater Harvesting for Drylands and Beyond, Volume 2, 2nd edition" Rainsource Press. 2019
      i. Students can purchase the books (print or digital) directly from Brad Lancaster here: https://www.harvestingrainwater.com/shop/

Measurable Student Learning Outcomes

A "learning outcome" highlights the specific and measurable skills, attributes, and knowledge that I expect you as a learner to achieve and demonstrate through this course.

1. Learn core water properties and processes that guide effective assessment, design, and management
2. Analyze site context including climate, topography, watershed, zones, sectors, and microclimates
3. Read the landscape for water flow, potential, and constraints using tools like contour mapping, soil assessment, and climate data
4. Identify and assess water sources and sinks, then calculate both available water and site-specific demands
5. Explore passive and active water harvesting systems and match solutions to your site goals
6. Design elements such as swales, keyline systems, ponds, cisterns, greywater reuse, erosion control, and irrigation
7. Use tools like Google Earth to map and measure site features and proposed designs
8. Develop a complete water management plan including timelines, material lists, and labor estimates

Evaluation of Student Performance

Students will be graded on completion of class assignments. Each assignment is worth a specified number of points according to its rubric. Letter grades are determined based on the percentage of points earned out of the total points available for all required assignments and the chosen optional assignments.

All assignments can be revised based on instructor feedback and resubmitted for re-evaluation and an updated grade. Students must complete all required assignments with a grade of a B or higher to receive a certificate.

Letter Grades

A=90-100%, B=80-89%, C=70-79%, D=60-69%, F=59% or lower

Course Schedule & Assignments

A week in this course begins on Monday and ends on the following Sunday evening. This is a 20 week course with 10 Modules and 38 possible Assignments, so each Module and its Assignments are completed over 2 weeks. Expect to spend ~15 hours per week reviewing course materials like videos and required readings and completing the assignments.

The assignment for each Module is due the Monday of the following week by 11:59pm Pacific time. For example, the Week 1 assignment is due the Monday of Week 2, and the Week 3 assignment is due the Monday of Week 4. Because many assignments build off previous work, this allows me to review your assignments before you get too far into the next one.

There is a 3 week break during the middle of the course between summer and fall terms at OSU. I encourage you to use this time to either catch up and revise your work or get ahead on the next module.

Here is an outline of each module, its description and the associated assignments.

*Note: Not all design sites will require every assignment. Assignments marked with ** can be completed at the student's discretion if they are relevant to their design context.*

Course Modules

- 1. **Introduction and Principles**
  - Overview of water management in permaculture, key principles, ethics, and foundational hydrology concepts.
  - Assignments
    1. Personal Survey
    2. Design Site
    3. One Page Assessment
    4. Remote Site Assessment
    5. Site Observations
- 2. **Site Goals, Geography, and Base Maps**
  - Defining project objectives, understanding geographic influences, and creating accurate base maps for site planning.
  - Assignments.
    1. Client Interview and Site Inventory
    2. Basemap with Topography
    3. Site Watershed Assessment and Analysis
- 3. **Site Assessment and Analysis**
  - Techniques for evaluating climate, topography, soil, vegetation, and existing water flow patterns.
  - Assignments
    1. Sector Compass
    2. Current Zones and Chart
    3. Microclimate
    4. Slope and Aspect

- 4. **Reading the Landscape - Observations and Tests**
  - Hands-on methods for assessing water movement, infiltration, erosion risks, and microclimates.
  - Assignments
    1. Soil Testing (Percolation, Texture, Biology)
    2. Site Waterflow Observations and Mapping
    3. Site Cross Section
    4. Thematic Bubble Design Brainstorm
- 5. **Water Budget and Passive Rainwater Harvesting**
  - Calculating water availability and needs, and designing passive collection systems to match your site and project context
  - Assignments
    1. Monthly Catchment Analysis
    2. Water Sources and Sinks Assessment
    3. Passive Water Harvesting Concept
- 6. **Active Rainwater Harvesting and Greywater**
  - Implementing rainwater tanks, cisterns, and greywater recycling systems for efficient water use.
  - Assignments
    1. Domestic and Graywater Analysis
    2. Graywater Design Concept**
    3. Roofwater Runoff Analysis
    4. Active Water Harvesting Concept**
- 7. **Estimating Water Usage for Existing and Proposed Site Elements**
  - Understanding water consumption patterns and forecasting future needs for buildings, plants, and animals.
  - Assignments
    1. Review and Revise of Site/Project Goals
    2. Water Use Estimate for Irrigation and Livestock**
    3. Proposed Passive and Active Water Storages
    4. Integrated Project Design Concept Map
- 8. **Designing Active and Passive Rainwater Harvesting Features**
  - Integrating both passive and active systems into a cohesive water management strategy.
  - Assignments
    1. Concept Design Critique
    2. Design Passive Water Harvesting Detail Design**
    3. Design Active Water Harvesting Detail Design**
- 9. **Designing Domestic Water and Irrigation**
  - Planning potable and non-potable water systems, irrigation techniques, and optimizing efficiency.
  - Assignments
    1. Design a Potable Supply System**
    2. Design WasteWater Management System**
    3. Design a Water Reticulation System for Irrigation and/or Stockwater**
    4. Detailed Site Design

- **10. Planning, Implementation, Integration, and Review**
  - Focuses on transforming water management designs into actionable plans by integrating phased implementation, budgeting, resource planning, system monitoring, and long-term adaptation for sustainable site management.
  - Assignments
    1. Identify High Priority Projects
    2. High Priority Projects Timeline
    3. Project Details (including Labour Requirements, Material List, Budget, Project Details, Equipment, Project Documentation, Monitoring Plan & Metrics)
    4. Final Detailed Site Design

Course Policies

Access

This course is available to you in perpetuity as long as it is available through the OSU PACE Canvas platform. After 6 months to 1 year, OSU PACE Canvas may automatically disenroll you from the course. In order to renew your access, all you need to do is send an email request to pace@oregonstate.edu

Late Work Policy

While there is great flexibility in online courses, this is not a self-paced course. In order to keep up with the subject matter, workload, and conversations in the course, it is critical that you complete the majority of your assignments on time.

Religious Holidays

Oregon State University strives to respect all religious practices. If you have religious holidays that are in conflict with any of the requirements of this class, please email me immediately so that we can make alternative arrangements.

Guidelines for a Productive and Effective Online Classroom

Active interaction with peers and your instructor is essential to success in this online course, paying particular attention to the following:

- Unless indicated otherwise, please complete the readings and view other instructional materials for each week before participating in the discussion board.
- Read your posts carefully before submitting them.
- Be respectful of others and their opinions, valuing diversity in backgrounds, abilities, and experiences.
- Challenging the ideas held by others is an integral aspect of critical thinking and the academic process. Please word your responses carefully, and recognize that others are expected to challenge your ideas. A positive atmosphere of healthy debate is encouraged.

Ground Rules for Online Communication & Participation

Students are expected to conduct themselves in the course (e.g., on discussion boards, email) in compliance with the university's regulations regarding civility. Civility is an essential ingredient for academic discourse. All communications for this course should be conducted constructively, civilly, and respectfully.

Differences in beliefs, opinions, and approaches are to be expected. In all you say and do for this course, be professional. Please bring any communications you believe to be in violation of this class policy to the attention of your instructor.

- *Online threaded discussions* are public messages, and all writings in this area will be viewable by the entire class or assigned group members. If you prefer that only the instructor sees your communication, send it to me by email, and be sure to identify yourself and the class.
- Posting of personal contact information is discouraged (e.g. telephone numbers, address, personal website address).
- *Online Instructor Response Policy:* I will check email frequently and will respond to course related questions within 36 hours Monday through Friday, unless I post to the class in advance that I will be offline for a specific period of time. I cannot guarantee a response on the weekend or on National holidays.
- *Observation of "Netiquette":* All your online communications need to be composed with fairness, honesty and tact. Spelling and grammar are very important in an online course. What you put into an online course reflects on your level of professionalism.
- Here are a couple of references that discuss
    - writing online: http://goto.intwg.com/
    - netiquette: http://www.albion.com/netiquette/corerules.html.

Expectations for Student Conduct

Student conduct is governed by the university's policies, as explained in the Student Conduct Code. Students are expected to conduct themselves in the course (e.g., on discussion boards, email postings) in compliance with the university's regulations regarding civility.

Statement Regarding Students with Disabilities

Professional and Continuing Education seeks to accommodate the diverse experiences and learning styles of the students, and is open to feedback for improving the course, during this quarter and subsequent quarters. To provide direct feedback please email, pace@oregonstate.edu.