

Sediment Transport and Dredging

ENCE 6334

Meeting times: Tuesday, 17:00 to 19:45

Prerequisite: ENCE 3318 or consent of the Department of Civil and Environmental Engineering.

Instructor: Dr. Robert Mahon,
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Office Location: EN822 during office hours, GP1062 other times

Office Hours: Thursday 16:00-18:00

Course Description: Particle size analysis, fluid-particle systems, incipient motion; bedload, suspended load, and total load; bedforms; sediment measurement; physical and numerical modeling of sediment transport; river modeling, transport of liquid-solid mixtures in pipes; dredging equipment; hydraulic and mechanical dredging; geotechnical properties of dredged sediments; environmental impacts of dredging.

Student Learning Objectives:

At the completion of this course:

- Students should be able to apply basic principles of fluid mechanics to problems associated with sediment transport in open channel flows and conduits
- Students should be able to understand the methods of sediment characterization and transport rate measurement in rivers
- Students should be able to use models and indirect methods to evaluate transport of sediment in rivers.
- Students should be able to evaluate and compare different dredging and conveyance methods for a project
- Students should be able to evaluate site-specific subsurface soil conditions as dredging source material
- Students should be able to evaluate the environmental impacts of dredging for a project
- Students should be able to evaluate transport of dredged materials for coastal restoration projects

Course Management

Communication, delivery of lecture materials, and distribution of assignments will all be conducted through Moodle. Students should familiarize themselves with the course layout and resources in <https://uno.mrooms3.net>. In addition, there is a Q&A forum in the Moodle site for students to communicate and ask/answer each other's questions. This forum will be monitored by the instructor and I will chime in with answers where needed.

Course Evaluation

Grading: Total class grade: 90% or above = A, 80-89.9% = B, 70-79.9% = C, and 60-69.9% = D.

Midterm Exam – 30%

Quizzes/Homeworks – 40%

Final Exam – 30%

Extra Credit: No extra credit will be offered under any circumstances.

Textbook and Notes: No textbook will be assigned for this course. All course lectures and notes will be posted on the course Moodle site. Portions of text including necessary equations and background material will be posted on the course Moodle site where necessary.

Homework Assignments: Assigned homework will be due at the beginning of class on the due date. A significant part of engineering professionalism is written communication. Therefore, all assignments should be neat, legible, and orderly. Use engineering paper for all your quizzes / homework. Write your name on each sheet of your answer paper. Solve each problem on separate page. Write the problem number, given data and what is required to compute. Show the computations clearly with the formula or equations that you use and also the substituted values. Multiple page assignments should be stapled prior to being turned in.

Quizzes: Quizzes will be given in class similar to or involving the concepts learned in practice problems. They may last from 10 to 20 minutes depending on the problem. All quizzes are closed book and closed notes with relevant tables/charts being supplied with a few selected formulas. Use engineering paper in all your work.

Exams: One take-home Mid semester examination will be distributed February 26 and due March 12th. The Mid semester examination will cover topics up to one week before the day of the exam distribution. The Final Exam will cover topics not covered by the Mid semester examination and will be given on Tuesday May 14th, 2019 (5:30 PM – 7:30 PM), according to the University Schedule. The final examination will be open-book; calculators and laptops can be used.

Late Assignment Policy: Any assignment turned in after the specified due date (at the beginning of class) will be considered late and will result in deducted points. An assignment not handed in by the end of the day it is due will not be accepted without a valid University excuse. Make-ups will only be given for verifiable written excuses specifically recognized by the University (illness of the student, or of an immediate family member, death of an immediate family member, participation on trips related to certain University functions, major religious holidays). Make-ups after one week has passed will be permitted only under extenuating circumstances.

Attendance Policy: Class attendance is in accordance with the published university policy. Regular attendance is required in this course. You must sign in on a sign-on sheet passed around during the class. You are responsible for material identified in the Reading/Lecture schedule listed in the syllabus and covered in class, even if absent from class for authorized activities.

Academic Honesty: Academic integrity is fundamental to the process of learning and evaluating academic performance. Academic dishonesty will not be tolerated. Academic dishonesty includes, but is not limited to, the following: cheating, plagiarism, tampering with academic records and examinations, falsifying identity, and being an accessory to acts of academic dishonesty. Refer to the Academic Dishonesty Policy (<http://www.uno.edu/student-affairs/documents/academic-dishonesty-policy-rev2014.pdf>) for further information. The University policies and procedures regarding academic dishonesty are clearly defined in the University Code of Conduct: <http://www.uno.edu/student-affairs/documents/Student-Code-of-Conduct-rev-7-16.pdf>

Students with disability: It is University policy to provide, on a flexible and individual basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or to meet course requirement. Students with disabilities should contact the Office of Disability Services (LIB 120) as well as their instructors to discuss their individual needs for accommodations. See the UNO Policy for Students with Disabilities at <http://www.ods.uno.edu/>

Spring 2019 Course Schedule

Lecture	Date	Material Covered
1	1/22/2019	Intro and river mechanics review
2	1/29/2019	Erosion and upland transport
3	2/5/2019	Bed forms
4	2/12/2019	Shear stress and stress partitioning
5	2/19/2019	Bedload
	2/26/2019	Review and distribution of take-home mid-semester examination
	3/5/2019	Mardi Gras Holiday
6	3/12/2019	Midterm Due.; Suspended load
7	3/19/2019	Field measurements
8	3/24/2019	Transport formulae
9	4/2/2019	River modeling
10	4/9/2019	Methods of sediment conveyance
11	4/16/2019	Geotechnical properties of dredged sediment
12	4/23/2019	Dredge pumps and equipment
13	4/30/2019	Dredging and coastal restoration; Review
	5/14/2019 5:30-7:30pm	FINAL EXAM