New Jersey Institute of Technology
Department of Engineering Technology
CET 313 – Principles of Heavy Highway Construction

COURSE NUMBER	CET 313
COURSE NAME	Principles of Heavy Highway Construction
COURSE STRUCTURE	2-2-0
COURSE COORDINATOR/ INSTRUCTOR	Melissa Valoura
COURSE DESCRIPTION	An introduction to heavy construction practices. Emphasis is on construction equipment, site preparation, earthmoving, compaction, dewatering, piles, drilling and blasting, and tunnelling. Case studies in heavy construction are used.
PREREQUISITE(S)	None
COREQUISITE(S)	None
REQUIRED, ELECTIVE OR SELECTED ELECTIVE	Required
REQUIRED MATERIALS	**Text:** Autodesk Civil 3D 2026 Fundamentals By ASCENT ISBN: 978-1-63057-733-9 Construction Planning, Equipment, and Methods By Robert L. Peurifoy 10th Ed
COMPUTER USAGE	Software: Microsoft Office, Autodesk Civil 3D
COURSE LEARNING OUTCOMES(CLO)	By the end of the course students should be able to: 1. Define economic principles used in construction equipment. 2. Apply economics principles to determine the costs of renting, leasing, owning and operating construction equipment. 3. Identify the operation and employment of various types of construction equipment used in construction projects. 4. Apply estimating techniques to compute the production of various types of construction equipment used in construction projects. 5. Identify the principles of rock excavation and soil mechanics 6. Apply the principles of stormwater management and utility design. 7. Classify the production of aggregate, concrete and asphalt mixes, and their applications. 8. Apply CAD technology towards heavy highway construction applications using site, utility, and highway designs. 9. Communicate construction concepts effectively through written, verbal, and visual formats.

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CLASS TOPICS

Heavy construction equipment economics, earthmoving operations, excavating and lifting, loading and hauling, compaction and finishing, rock excavation, production of aggregates, concrete and asphalt mixes, paving and surface treatments, compressed air and water systems, blueprints, computer aided design.

STUDENT OUTCOMES

The Course Learning Outcomes support the achievement of the following CET Student Outcomes and ETAC of ABET:

Student Outcome (1) - an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;
Related CLO – 1-9

Student Outcome (2) - an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;
Related CLO – 6, 8

ACADEMIC INTEGRITY

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the code of Academic Integrity policy that is found at: NJIT Academic Integrity Code.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Office of the Dean of Students. Any student found in violation of the code by cheating, plagiarizing, or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Office of the Dean of Students at dos@njit.edu.

GENERATIVE AI POLICY

Student use of artificial intelligence (AI) is permitted in this course for certain assignments and activities. It is not permitted to be used in the assignments noted by the instructor, as doing so would undermine student learning and achievement of course learning outcomes. Additionally, if and when students use AI in this course, the AI must be cited as is shown within the NJIT Library AI citation page for AI. If you have any questions or concerns about AI technology use in this class, please reach out to your instructor prior to submitting any assignments.

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MODIFICATION TO COURSE

The Course Outline may be modified at the discretion of the instructor or in the event of extenuating circumstances. Students will be notified of any changes to the Course outline.

GRADING POLICY

Note: Grading Policy may be modified by Instructor for each Section in the Course)

Midterm/Final Exam	30 %
Assignments	25 %
Lab Drawings	35 %
Attendance	10 %
Total	100 %

Homework is due one week after it is assigned. Late penalty is minus 4% per day. Homework must be submitted in the format provided by the professor.

You must to be present and participating when the lab is conducted in order to receive credit for your submitted drawings. All lab assignments are to be complete during class and due one week after they were conducted. Late penalty is minus 4% per day.

COURSE COORDINATED BY

Melissa Valoura

CLASS HOURS

Monday-Lecture	10:00 AM - 12:05 PM	PC MALL 39
Thursday -Lab	10:00 AM - 12:05 PM	

OFFICE HOURS

Monday and Thursday - 12pm-3pm
Friday 12pm-5pm
By appointment: Melissa.Valoura@njit.edu

GRADING LEGEND

GRADE	NUMERIC RANGE
A	90 to 100
B+	85 to 89
B	80 to 84
C+	75 to 79
C	70 to 74
D	60 to 69
F	0 to 59

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Course Outline CET 313-001

MODULE #	DATE	LECTURE- MONDAY 10:00 AM - 12:05 PM PC MALL 39	LAB - THURSDAY 10:00 AM - 12:05 PM PC MALL 39	DATE
		Labor Day – No Class	Course Introduction & Overview	4-Sep
1	8-Sep	Equipment Economics (Ch 2)	Download AutoCAD Civil 3D and practice files SDC Ch 1 Civil 3D Interface - Practice 1a-1b	11-Sep
2	15-Sep	Earthwork Planning (Ch 3) Soils Maps, Reports	SDC Ch 10 Plan Production - Practice 10a-10c	18-Sep
3	22-Sep	Soil and Rock (Ch 4) Aggregate (Ch 14)	SDC Ch 2 Survey, Points, and Linework Practice 2a-2d	25-Sep
4	29-Sep	Compaction and Stabilization (Ch 5)	Wellness Day - No Class	2-Oct
5	6-Oct	Power Requirements (Ch 6) Dozers and Graders (Ch 7)	SDC Ch 3 Surfaces - Practice 3a-3d	9-Oct
6	13-Oct	Scrapers (8) Excavators (9)	SDC Ch 4 Alignments - Practice 4a-4c	16-Oct
7	20-Oct	**MID-TERM EXAM**		
8	27-Oct	Trucks and Hauling (Ch 10) Trenching (Ch 11)	SDC Ch 5 Profiles - Practice 5a-5b	30-Oct
9	3-Nov	Drilling Rock and Earth (Ch 12) Blasting Rock (Ch 13)	SDC Ch 6 Corridors Part 1- Practice 6a-6c	6-Nov
10	10-Nov	Asphalt and Pavement (Ch 15)	SDC Ch 6 Corridors Part 2- Practice 6d-6e	13-Nov
11	17-Nov	Concrete (Ch 16)	SDC Ch 7 Grading - Practice 7a-7c	20-Nov
12	24-Nov	Cranes (Ch 17) Piles and Pile driving (Ch 18)	SDC Ch 8 Pipe Networks Part 1- Practice 8a-8c **Class meets Tuesday Nov. 25th** Holiday – No Class Thursday	25-Nov
13	1-Dec	Compressed Air/Water Systems (Ch 19)	SDC Ch 8 Pipe Networks Part 2- Practice 8d-8e	4-Dec
14	8-Dec	Forming Systems (Ch 21)	SDC Ch 9 Project Explorer - Practice 9a-9c Final Exam Review	11-Dec
15		**FINAL EXAM – CHECK EXAM SCHEDULES!**		