SCHOOL OF STEM SYLLABUS

TERM:

INSTRUCTOR:

COURSE CODE: CNM-205

OFFICE HOURS:

COURSE TITLE: Surveying and Site Planning

OFFICE LOCATION:

DAY(S) AND TIME(S):

EMAIL:

LOCATION:

PHONE:

COURSE PREREQUISITE: None

CREDITS: 4

COURSE DESCRIPTION:

Students learn site development, site selection, site analysis, site plans, designs, and approval process. Students are introduction to the principles of construction surveying, project layout, and operation of surveying equipment. Topics include: interaction of surveying with other disciplines, measurements, concepts, accuracy, precision, and levelling; methods for measuring distance, elevation angles, bearings and azimuths using level instrument and transits; traverses and computations; basic topography and mapping.

STUDENT LEARNING OUTCOMES:

Upon successful completion of this course, students will be able to:

1. Demonstrate theoretical and practical knowledge of site development, measurements and errors; vertical and horizontal control methods; topographic, public land and construction surveys; use of surveying instruments.
2. List steps involved in overall site surveying process of a construction project.
3. Apply theoretical knowledge of land surveying process.
4. Define and exhibit technical knowledge of equipment and instruments used in surveying.
5. Use modern measurement technologies to acquire spatial data
6. Utilize surveying software to solve technical problems.

TEXTBOOK AND SUPPLEMENTAL MATERIALS:

1.Proposed student texts.

- Land Surveyor Reference Manal, Andrew L. Harbin
- Construction Project Management Handbook, FTA Report No. 0015, 2012
- Land Development Handbook, The Dewberry Companies, Sidney O. Dewberry
- Class notes and handouts

2.Supplementary readings for students.

- Caterpillar Performance Handbook, 45th edition (Caterpillar Inc., 2015). Available free online
- Handbook of Civil Engineering Calculations, Tyler G. Hicks

3.Lab Equipment

- SIS DTO5 Electronic theodolite
- Leica NA524 Automatic Level
- HD Aluminum tripod
- 13’ Telescoping level rod

SOFTWARE: Civil 3D (Autodesk Educational License)

4.Audiovisual materials and computer software.

- PowerPoint presentations in the class
- AutoCAD Site Planning and Surveying
- Excel Worksheet for engineering computations

GRADING POLICY:

Attendance and Participation	5%
Assignments	20%
Project Presentation	15%
Midterm Exam	30%
Final Exam	30%

SAMPLE COURSE SCHEDULE:

Week/ Session	Lecture Topic	Student Learning Objectives (SLO)
Session 1	Orientation, description of the course intent, schedule, expectation from students, overview of construction site planning and surveying and how they interact with each other. **Site Planning:** Introduction to site planning; steps, methods, and procedures, Importance of Site Plan, Types of survey: boundary survey, construction survey, land survey, control survey, Improvement survey, documentation required for site planning, FEMA Survey, steps in site layout and construction survey, Ground Penetrating Radar.	1, 2,3
Session 2	**Site selection and analysis:** Review of a base map for site selection, identification of existing ground surface. Land use map, tax map, zoning map, site access, utility, topography, soils, wetlands, types of wetlands and delineation, floodplains, types of floodplains, difference between floodplains and wetlands, delineation of flood plains, storm water management. Difference between site survey and site plan, perform site layout and surveying, Site Survey Report, information included in the site survey report, Analysis and design of land features and proposed development on a site map **Introduction to Case Study / Class Project**	1, 2
Session 3	**Basics of Surveying:** Types and classes of surveys, classification of survey based on purpose, plane table survey, surveying instrumentation, units of measurements. Location methods, accuracy and precision, errors and types and discrepancies and correction factors, accuracy ratio, stationing, field notes, field management.	2,3

Session 4	**Measurement of Horizontal Distances:** Methods of linear measurement, types of measurements, Equipment used for horizontal measurements, Pacing, chains, tapes, standard conditions for use of steel tapes, taping method accessories and their use. Establish site control and reference points, obtain site information and data, offsetting, sketching **Leveling:** Definitions, types of leveling equipment, adjustment of leveling equipment, field notes, ~~staff~~, leveling operations, techniques of leveling, benchmark. Datum, common errors in leveling, slopes and grades,	3, 4
Session 5	**Leveling (cont'd):** Leveling (vertical control survey), profile and cross-section leveling, reciprocal leveling, stationing, staking, peg test, errors in leveling, contours and their characteristics, various methods of Contouring, application of contouring, Examples of leveling and calculations.	3,4
Session 6	**Angles and Directions:** Horizontal and vertical angles, meridians, types of horizontal angles, azimuths, bearing, relationship between bearings and azimuths Reverse directions, azimuth and bearings computations, magnetic declination, types of compasses.	3, 4
Session 7	Midterm Exam	
Session 8	**Laboratory / Field Visit**: Field exercises utilizing classical and electronic instruments for measuring distances, levels, angles, and coordinates.	4

Session 9	**Electronic Distance Measurement:** General principles of EDMI operation, EDM characteristics, EDM accuracies, geometry of EDM, electro-optical and microwave instruments, total stations Field procedures for total stations in topographic surveys, construction layout using total stations.	5
Session 10	**Laboratory / Field Visit:** Using total station, surveying prism, leveling staff.	4
Session 11	**Traverse Surveys:** Open and closed traverses, latitude and departures, computation of error of closure, and the accuracy of a traverse, traversing with total station instruments. Rules of adjustment, effects of traverse adjustments on the original data, computation of omitted measurements, area of closed traverse methods, use of computer programs.	3
Session 12	Calculations and examples for traversing, area, angles, bearing, and distances. Back sight, intermediate sight, and foresight, reduce level,	3
Session 13	**Laboratory:** Using COGO/CAD software for importing field data and adding details.	6
Session 14	Calculations and examples for traversing, area, angles, bearing, and distances. Course Review	3
Session 15	Final Exam	

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