HOSTOS COMMUNITY COLLEGE
DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

CMT 160	INTRODUCTION TO SURVEYING
CREDIT HOURS:	3.0
EQUATED HOURS:	3.0
CLASS HOURS:	5.0 (1 Class Hour, 4 Lab Hours)
PRE/COREQUISITE:	CMT 140 (Applied Computer Aided Design (Autocad II))

REQUIRED TEXT(S): *Elementary Surveying: An Introduction to Geomatics*, Charles D. Ghilani, 15th edition, Pearson 2018. (Print ISBN: 9780134604657 or 0134604652; eText ISBN: 9780134645964 or 0134645960)

TECHNOLOGY: Students are required to submit all assignments using excel and AutoCAD when applicable. Preparation of raw point executed via AutoCAD for use in topographic surveys.

DESCRIPTION: This course examines the fundamental theory of plane surveying, including surveying procedures, measuring distances, elevations, and direction. Students become proficient in using steel tapes, automatic levels, theodolites, and total stations. Proficiency in the use of these surveying instruments ensures that students are adequately prepared with the skills needed to execute field measurements. Students perform topographic surveys, construction surveys and data reduction procedures.

GRADING CRITERIA:

Assignments/Projects (5 x 10%)	50%
Practice Problems (5 x 2%)	10%
Midterm Exam	20%
Final Exam	20%
	100%

GRADES: A, A^-, B^+, B, B^-, C^+, C, D, I, F.

Program Criteria

ABET, Inc. is the nationally recognized accrediting body for engineering technology programs. The Department has adopted the most current ABET Program Criteria. Graduates of a construction degree programs typically specify project methods and materials, perform cost estimates and analyses, and manage construction activities. The curriculum provides instruction in the following areas:

- utilization of techniques that are appropriate to administer and evaluate construction contracts, documents, and codes;
- estimation of costs, estimation of quantities, and evaluation of materials for construction projects;
- utilization of measuring methods, hardware, and software that are appropriate for field, laboratory, and office processes related to construction; and

- application of fundamental computational methods and elementary analytical techniques in sub-disciplines related to construction engineering.

Student Learning Outcomes

The Department has adopted the most current ABET student outcomes criteria. Student performance in this course will be assessed based on the following learned capabilities:

- an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve well-defined engineering problems appropriate to the discipline; (Criterion 3.A.1.)
- an ability to design solutions for well-defined technical problems and assist with the engineering design of systems, components, or processes appropriate to the discipline (Criterion 3.A.2.);
- an ability to apply written, oral, and graphical communication in well-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature (Criterion 3.A.3.);
- an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results (Criterion 3.A.4.); and
- an ability to function effectively as a member of a technical team (Criterion 3.A.5.).

COURSE OUTLINE

Week	Topic	Assignment
1	a. **Introduction – History and Types of Surveys; Safety; Protection and Cleaning of Instruments** (Chapter 1) b. **Units, Significant Figures, and Field Notes** (Chapter 2)	Practice Problems Set 1
2	**Theory of Errors in Observations – direct and indirect observations; Errors and Mistakes; Data Reduction** (Chapter 3)	Practice Problems Set 2
3	a. **Distance Measurement – Introductions to Methods; Taping; Electronic Distance Measurement** (Chapter 6) b. **Field Lab: Taping**	Lab 1
4	a. **Leveling – Theory, Methods, and Equipment** (Chapter 4) b. **Leveling – Field Procedures and Computations** (Chapter 5)	
5	**Field Lab: Setting Up; Peg Test; Level Run** (Chapter 8)	Lab 2
6	**Measuring and Reading Angles; Computing Azimuths and Bearings** (Chapter 7)	Practice Problems Set 3
7	**Midterm Exam**	
8	**Field Operations: Taking inverts; Cross Section Survey; Traverse; Topographic survey; GPS equipment** (Chapter 9-10, 13)	Practice Problems Set 4
9	**Field Lab: Taking Inverts**	Lab 3
10	**Field Lab: Transverse**	Lab 4
11	**Field Lab: Topographic Survey**	Lab 5
12	**Data Reduction; Keeping a record; Traverse balancing & check shots; Importing data & CAD; Structure Sheets**	Practice Problems Set 5
13	a. **Mapping Surveys; Mapping** (Chapter 17-18) b. **Construction Surveys and Layouts** (Chapter 23)	
14	**Work Session & Review**	
15	**Final Exam**	

Note that this syllabus is a suggested timeline only. Instructors are responsible for covering all of the material in the syllabus, but they may do so at their own pace.