# University of Puerto Rico
# Mayagüez Campus
# College of Engineering

## Syllabus & Instructor Information Sheet Form

## A. COURSE SYLLABUS
### 1. General Information:
Course Number :  INCI 4002
Course Tittle:  Surveying II
Credit Hours:  3

### 2. Course Description:
Land measurement; topographic surveys (transit); elements of error analysis; elementary triangulation; precise leveling; determination of true meridian; state coordinate systems; computation with electronic computers.

### 3. Pre-requisites:  INCI 4001

### 4. Textbook, Supplies and Other Resources:
V. Anderson & E. Mikhail; Surveying:  Theory & Practice; 7th Edition, McGraw-Hill

### 5. Purpose :
This is an advanced course required in the completion of the bachelor's degree in Civil Engineering and a basic course required in the completion of the bachelor's degree in Surveying and Topography.

### 6. Course Goals: Upon completion of this course the student is expected to be able to:
a)  have a basic understanding of random errors in measurements;
b)  understand and be able to read a topographic map plus be able to prepare such a map;
c)  have a basic knowledge of areas such as : true meridian and azimuth determination, precise horizontal and vertical control, and state plane coordinate systems;
d)  make use of available software to accomplish most of these tasks.

### 7. Requirements : All students are expected to :
a)  complete all lessons;
b)  do all of the assigned reading and homework;
c)  come to class all the time and on time;
d)  do all of the assigned field and office work;
e)  pass all tests to receive credit for the course.

### 8. Laboratory/Field Work (If applicable) :
Field work exercises are a required aspect of this course.

### 9. Department/Campus Policies:
**9a.  Class attendance:**  Class attendance is compulsory.  The University of Puerto Rico, Mayagüez Campus, reserves the right to deal at any time with individual cases of

non-attendance. Professors are expected to record the absences of their students. Frequent absences affect the final grade, and may even result in total loss of credits. Arranging to make up work missed because of legitimate class absence is the responsibility of the student. (Bulletin of Information Undergraduate Studies, pp 39, 1995-96)

**9b. Absence from examinations:** Students are required to attend all examinations. If a student is absent from an examination for a justifiable reason acceptable to the professor, he or she will be given a special examination. Otherwise, he or she will receive a grade of zero of "F" in the examination missed. (Bulletin of Information Undergraduate Studies, pp 39, 1995-96)

**9c. Final examinations:** Final written examinations must be given in all courses unless, in the judgment of the Dean, the nature of the subject makes it impracticable. Final examiantions scheduled by arrangements must be given during the examination period prescribed in the Academic Calendar, including Saturdays. (See Bulleting of Information Undergraduate Studies, pp39, 1995-96)

**9d. Partial withdrawals:** A student may withdraw from individual courses at any time during the term, but before the deadline established in the university Academic Calendar. (See Bulletin of Information Undergraduate Studies, pp 37, 1995-96)

**9e. Complete withdrawals:** A student may completely withdraw from the University of Puerto Rico, Mayagüez Campus, at any time up to the last day of classes. (See Bulletin of Information Undergraduate Studies, pp 37, 1995-96)

**9f. Disabilities:** All the reasonable accommodations acording to the Americans with Disability Act (ADA) Law will be coordinated with the Dean of Students and in accordance with the particular needs of the student.

**9g. Ethics:** Any academic fraud is subject to the disciplinary sanctions described in article 14 and 16 of the revised General Student Bylaws of the University of Puerto Rico contained in Certification 018-1997-98 of the Board of Trustees. The professor will follow the norms established in articles 1-5 of the Bylaws.

## 10. General Topics:

| Lecture | Topic | Arts., Problems, Homeworks |
|---|---|---|
| 1 | Introduction | Ch. 14 (14.1-14.3) |
| 2 | Topographic Surveys | Ch. 14 (14.4 -14.13) |
| 3 | Contour Lines | Ch. 14 (14.4 -14.13) |
| 4 | Field Methods | Ch. 14 (14.4 -14.13) Ch. 15 (15.9 -15.10) |
| 5 | Plotting, Interpolation | Ch. 14 (14.22-14.25) |
| 6 | Field Practice (Topo) | |
| 7 | Cross Sections, Profiles | Ch. 16 (16.24-16.30) |
| 8 | Polar Planimeter, Areas | Ch. 16 (16.30-16.35) |

| Lecture | Topic | Arts., Problems, Homeworks |
|---|---|---|
| 9 | Field Practice (Topo) | |
| 10 | Volume Computations | Ch. 16 (16.36-16.37) |
| 11 | Road Earthworks | Ch. 16 (16.39-16.45) |
| 12 | Field Practice (Topo) | |
| 13 | **FIRST EXAMINATION** | |
| 14 | Systematic and Random Errors | Ch. 2 (2.1-2.7,2.12) |
| 15 | Special Error Proagation Law | Ch. 2 (2.13-2.17) |
| 16 | Weights and Corrections | Ch. 2 (2.18-2.23) |
| 17 | Rejection of Observations | Ch. 2(2.30) |
| 18 | Horizontal Control Surveying | Ch. 15 (15.1-15.6)<br>Ch. 12 (12.1-12.7) |
| 19 | Horizontal Control Surveys | Ch. 15 (15.1-15.6)<br>Ch. 12 (12.1-12.7) |
| 20 | Triangulation | Ch. 9 (9.1-9.10) |
| 21 | Base Line Measurement | Ch. 9 (9.9-9.10) |
| 22 | Angular Measurements, Directional Theodolites | Ch. 6 (6.48-6.50) |
| 23 | Adjustment of a Quadrilateral | Ch. 9 (9.12) |
| 24 | Trilateration | Ch. 9 (9.13-9.15) |
| 25 | Global Positioning System | Ch. 12 (12.1-12.4) |
| 26 | Global Positioning System | Ch. 12 (12.5-12.7) |
| 27 | Global Positioning System | Ch. 12 (12.8-12.15) |
| 28 | **SECOND EXAMINATION** | |
| 29 | True Meridian Determination | Ch. 10 (10.1) |
| 30 | The Celestial Sphere, Definitions | Ch. 10 (10.2-10.3) |

| Lecture | Topic | Arts., Problems, Homeworks |
|---------|-------|----------------------------|
| 31 | Horizon, Equator, Hour Angle Systems | Ch. 10 (10.4-10.11) |
| 32 | Time – Civil, Apparent, Sidereal, Standard | Ch. 10 (10.15-10.21) |
| 33 | The Ephemeris – The Sun and Polaris | Ch. 10 (10.7, 10.24-10.29, 10.35-10.36) |
| 34 | Azimuth – Sun Observation | Ch. 10 (10.12-10.13) |
| 35 | Azimuth – Sun Observation | Ch. 10 (10.12-10.13) |
| 36 | Azimuth – Polaris Observation | Ch. 10 (10.38-10.40) |
| 37 | Azimuth – Polaris Observation | Ch. 10 (10.38-10.40) |
| 38 | Latitude Determination | Ch. 10 (10.33-10.34,10.37) |
| 39 | Third Examination | |
| 40 | State Plane Coordinate Systems, Theory | Ch. 11 (11.10-11.14) |
| 41 | State Plane Coordinate Systems, Theory | Ch. 11 (11.10-11.14) |
| 42 | Lambert Conformal Conic and Transverse Mercator Projections | Ch. 11 (11.16-11.17) |
| 43 | Lambert Conformal Conic, Computation of Coordinates | Ch. 11 (11.17, 11.24-11.25) |
| 44 | Lambert Conformal Conic, Computation of Length, Azimuth and Area | Ch. 11 (11.18-11.21) |
| 45 | Lambert Conformal Conic, Computation of Length, Azimuth and Area | Ch. 11 (11.18-11.21) |

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## B.    INSTRUCTOR INFORMATION SHEET

### 1.   General Information:
Instructor :  Linda L. Vélez Rodríguez
Title:  Professor
Office:  CI-011B
Phone:  832-4040 Ext. 5405
Office Hours:
E-mail:  LindaL@ce.uprm.edu

### 2.   Course Description:
Course Number:  INCI 4002
Course Title:  Surveying II
   See element number 2 (Course Description) of Course Syllabus Section.

### 3.   Purpose:
See element number 5 (Course Description) of Course Syllabus Section.

### 4.   Course Goals:
See element number 6 (Course Description) of Course Syllabus Section.

### 5.   Instructional Strategy:
The course will have lectures and field instrument laboratory.  Cooperative learning will be emphasized with teamwork in lab assignments and projects.

### 6.   Evaluation/Grade Reporting:
Three Partial Examinations        60%
One Final Examination             20%
Project and Lab Assignment        20%

### 7.   Course Outline and Schedule:
### 8.   Deadlines for Assignments (Optional):
### 9.   Student Assistance (If applicable):
### 10.  Attendance and Behavior:
### 11.  Instructor Responsibilities (If applicable):
### 12.  Additional References:

> ➢ Charles B. Breed and George L. Hosmer, <u>Elementary Surveying</u>, 11th Edition, John Wiley & Sons, Inc., 1977.

> ➢ Francis H. Moffitt and Harry Bouchard, <u>Surveying</u>, 8th Edition, Harper & Row Publisers, 1986.

- Charles B. Breed, George L. Hosmer and Alexander T. Bone, <u>Higher Surveying</u>, Principles and Practice of Surveying Volume II.

- Phillip Kissam, <u>Surveying for Civil Engineers</u>, McGraw-Hill Book Co.

- Rayner William H. And Milton O. Schmidt, <u>Surveying</u>, D. Van Nostrand.

- Nassau, <u>Practical Astronomy</u>, McGraw Hill Book Co.