THUY LOI UNIVERSITY
FACULTY OF WATER RESOURCES ENGINEERING
DIVISION OF SURVEYING

SYLLABUS
Educated grade:
Undergraduate

SURVEYING SYSTEMS
Code: CVEG3015

1. **Number of credits**: 3 [3.0.0]
2. **Class hours**: 45; in which Theory: 45; Assignments: 0; Field trip: 0
3. **Education program for:**

- Compulsory: Civil Engineering specialized in Structural Engineering, Transportation Engineering, Geotechnical Engineering, Hydraulic Engineering, Construction Management, Environmental Engineering, Water Resources Engineering

4. **Assessment method**:

Form	No. of times	Description	Time	Weighted
Homework	1 time	Every chapter	Last week of the course	10%
Quiz	5 times	- 10÷15 mins - Multiple choice/ written	Every 2 weeks	10%
Examination	4 times	- 30÷45 mins - Written	- Week 3 - Week 7 - Week 10 - Week 13	40%
Attendance	All times	Call name in lists	All time	10%
Summation progressive assessment				70%

Final examination	1	- 90 mins - Multiple choice /written	1-2 weeks after courses finished	30%

5. Prerequisite conditions:

- *Prerequisite class*: Math 2554

- *Prior class*: None

- *Parallel class:* None

- *Others:* None

6. Brief content:

The aim of this course is:

- Understand and apply the knowledge of some subjects such as: Math, Physical, etc. in calculating, analyzing, synthetizing the special technical problems.

- This course and associated lab is designed to introduce undergraduate civil engineering students to surveying calculations, procedures and equipment. The objective of the course is to provide the students with a basic understanding of surveying systems and their use in civil engineering and surveying application.

7. Teaching Staff:

No	Name	Academic degree	Phone	Email	Job title
1	Lã Phú Hiến	Dr.	0965138589	laphuhien@tlu.edu.vn	Lecturer, Head of division
2	Đặng Tuyết Minh	Dr..	0983180297	dtminh@tlu.edu.vn	Main lecturer
3	Nguyễn Cẩm Vân	MSc.	0982427986	nguyencamvan@tlu.edu.vn	Lecturer

8. Text books & Reference books

Text books:

[1] Wolf and Ghilani, Elementary Surveying, An Introduction to Geomatics, Eleventh Edition, Prentice Hall

Reference books:

[1] Trắc địa cơ sở : Lưu hành nội bộ //Paul R. Wolf, Charles D. Ghilani; Hoàng Xuân Thành,.. [và những người khác] dịch. - Hà Nội ::Khoa học tự nhiên và Công nghệ,,2010. (#000004346)

[2] Trắc địa đại cương //Hoàng Xuân Thành chủ biên, Đào Duy Liêm, Trần Lê Đang. Tài nguyên điện tử - Hà Nội ::Xây dựng ,,2005. (#000001010)

9. Detailed content:

Chapter	Content (1)	Teaching & learning activities (2)	Hours		
			Theory	Exercise	Field trip
1	**Introduction** - Definition - Brief History - Classification - Importance of Surveying	* Lecturer: - Self introduction for further communication - Introduction of syllabus, assessment method, course content. - Conveying experiences and study methodology. - Introducting surveying and its applications * Student: - Answer queries - Problem solving - Question the course (if necessary)	1	0	0
2	**Units, significant figures** 2.1 Units of measurement 2.2 Significant figures 2.3 Rounding off numbers	* Lecturer: - Lecturing - Query - Use practical images and problems - Explaining units used in surveying and significant figures * Student: - Answer queries	1	0	0

		- Problem solving - Question the course (if necessary)			
3	**Theory of errors in observations** 3.1. Classification 3.2. Sources of errors in making observation 3.3. Type of errors 3.4. Precision and accuracy 3.5. Probability 3.6. Most probable value 3.7. Residuals 3.8. Measures of precision 3.9. Occurrence of Random Errors 3.10. General Laws of Probability 3.11. Error propagation 5.1. Correct exercises + Quiz	* Lecturer: - Lecturing - Query - Use practical images and problems - Work assignment. * Student: - Answer queries - Problem solving - Question the course (if necessary) - Implement of the work	3	0	0
4	**Leveling- Theory, Methods and Equipment** 4.1. Introductions 4.2. Definitions 4.3. Curvature and refraction	* Lecturer: - Lecturing - Query - Use practical images and problems - Work assignment. * Student: - Answer queries - Problem solving	1	0	0

	4.4. Methods for determining differences in elevation 4.5. Categories of level 4.6. Parts of automatic level	- Question the course (if necessary) - Implement of the work			
5	**Leveling – Field procedures and Computations** 5.2. Operations using the level 5.3. Differential leveling 5.4. Precision 5.5. Adjustments of simple level circuits 5.6. Correct exercises + Quiz 5.7. Examination #1	* Lecturer: - Lecturing - Query - Use practical images and problems - Work assignment. * Student: - Answer queries - Problem solving - Question the course (if necessary) - Implement of the work	4	0	0
6	**Distance measurement** 6.1. Introduction 6.2. Distance measurement by stadia	* Lecturer: - Lecturing - Query - Use practical images and problems - Work assignment. * Student: - Answer queries - Problem solving - Question the course (if necessary) - Implement of the work	1	0	0
7	**Angles, Azimuths, and Bearings**	* Lecturer: - Lecturing	3	0	0

	7.1. Introduction 7.2. Horizontal angle 7.3. Direction of the line 7.4. Azimuth 7.5. Bearing 7.6. Comparison azimuth and bearing 7.7. Computing azimuth 7.8. Magnetic declination 5.8. Correct Exercise + Quiz	- Query - Use practical images and problems - Work assignment. * Student: - Answer queries - Problem solving - Question the course (if necessary) - Implement of the work			
8	**Total station instrument-Theodolite instrument-Angle observations** 8.1. Introduction 8.2. Observation horizontal angles with theodolite 8.3. Observation vertical angles 8.4. Correct Exercise	* Lecturer: - Lecturing - Query - Use practical images and problems - Work assignment. * Student: - Answer queries - Problem solving - Question the course (if necessary) - Implement of the work	2	0	0
9	**Traversing** 9.1. Introduction 9.2. Traverse type 9.3. Observation of traverse angles or directions	* Lecturer: - Lecturing - Query - Use practical images and problems - Work assignment. * Student:	4	0	0

	9.4. Observation of traverse lengths 9.5. Angle misclosure	- Answer queries - Problem solving - Question the course (if necessary) - Implement of the work			
10	**Traverse computation** 10.1. Rectangular coordinates 10.2. Inversing 10.3. Balancing angles 10.4. Computation of preliminary azimuths or bearings 10.5. Departures and latitudes 10.6. Departure and latitude closure conditions 10.7. Traverse linear misclosure and relative precision 10.8. Traverse adjustment (compass rule) 5.9. Correct Exercise 10.9. Examination #2	* Lecturer: - Lecturing - Query - Use practical images and problems - Work assignment. * Student: - Answer queries - Problem solving - Question the course (if necessary) - Implement of the work	4	0	0
11	**Coordinate geometry in Surveying** 11.1. Introduction 11.2. Intersection of two lines , both having known directions 11.3. Intersection of a line with a circle	* Lecturer: - Lecturing - Query - Use practical images and problems - Work assignment. * Student: - Answer queries - Problem solving	4	0	0

	11.4. Intersection of two circles 5.10. Correct Exercise + Quiz	- Question the course (if necessary) - Implement of the work			
12	**Area** 12.1. Introduction 12.2. Method of measuring area 12.3. Area by division into simple figures 12.4. Area by offset from straight lines 12.5. Area by coordinates 12.6. Correct Exercise	* Lecturer: - Lecturing - Query - Use practical images and problems - Work assignment. * Student: - Answer queries - Problem solving - Question the course (if necessary) - Implement of the work	2	0	0
13	**Mapping surveys** 13.1. Introduction 13.2. Basic methods for performing mapping surveys 13.3. Map scale 13.4. Control for mapping surveys 13.5. Contours 13.6. Characteristics of contour	* Lecturer: - Lecturing - Query - Use practical images and problems - Work assignment. * Student: - Answer queries - Problem solving - Question the course (if necessary) - Implement of the work	2	0	0
14	**Mapping** 14.1. Map design 14.2. Using the map in the office	* Lecturer: - Lecturing - Query	3	0	0

	14.3. Correct Exercise 14.4. Examination #3	- Use practical images and problems - Work assignment. * Student: - Answer queries - Problem solving - Question the course (if necessary) - Implement of the work			
15	**Horizontal curves** 15.1. Introduction 15.2. Degree of circular curve 15.3. Definitions and derivation of circular curve formulas 15.4. Circular curve stationing 15.5. General procedure of circular curve layout by deflection angles 15.6. Circular curve layout by offsets 5.11. Correct Exercise + Quiz	* Lecturer: - Lecturing - Query - Use practical images and problems - Work assignment. * Student: - Answer queries - Problem solving - Question the course (if necessary) - Implement of the work	4	0	0
16	**Verical curves** 16.1. Introdution 16.2. Grade 16.3. General equation of a vertical parabolic curve	* Lecturer: - Lecturing - Query - Use practical images and problems - Work assignment. * Student: - Answer queries - Problem solving	4	0	0

	16.4. Equation of an equal tangent vertical parabolic curve 16.5. High or low point on a vertical curve 16.6. Vertical curve computations using the tangent offset equation 16.7. Correct Exercise	- Question the course (if necessary) - Implement of the work			
17	**Volumes** 17.1. Introduction 17.2. Methods of volume measurement 17.3. The cross-section method 17.4. Determining end areas 17.5. Average-end-area formula 17.6. Prismoidal formula 17.7. Examination #4	* Lecturer: - Lecturing - Query - Use practical images and problems - Work assignment. * Student: - Answer queries - Problem solving - Question the course (if necessary) - Implement of the work	2	0	0
	Total	**45**	**45**	**0**	**0**

10. Learning outcomes:

No.	Learning outcomes of the course	Learning outcomes of corresponding education program (3)
1	Knowledge: - Understanding the definition, the important role of surveying. - Master the fundamentals to calculate: angles, distances, height as well as horizontal position and elevation of a point on earth surface.	2,3,4

2	Skills: - Capability to use a map for specific purpose - Capability to allocate a desgined point, line or curve on earth surface	10,12,14
3	Independent and responsible capability (if any):	14,16
4	Individual ethics for profession, society (if any): - Be moral, be conscience, be disciplinary, be responsible for works - Having acquisitiveness, striving to study and upgrade the degree, creativeness in specialisation.	14,15,16

(3) Learning outcomes of Corresponding Education Program was proposed by Head of specialisation.

11. Contacts

A. Address: Room 317 – Building A1, Thuy loi University

B. Head of division: *(responsible for answering the queries from students and related partners)*

- Name: Dr. Lã Phú Hiến
- Phone: 0965138589
- Email: laphuhien@tlu.edu.vn

Hà Nội, Dated August, 04th 2021

DEAN **DEAN** **HEAD OF DIVISION**

(In charge of specialisation) *(In charge of course)*

Dr. Lã Phú Hiến