



THUY LOI UNIVERSITY
CIVIL ENGINEERING FACULTY
DEPARTMENT OF STRENGTH OF
MATERIALS & STRUCTURAL MECHANICS

SYLLABUS
Educated grade:
Undergraduate

MECHANICS OF MATERIALS

Code: CVE3015

1. **Number of credits:** 3
2. **Class hours:** 45; in which Theory: 33; Assignments: 12.
3. **Education program for:**

Water Resources Engineering and Civil Engineering.

4. **Assessment method**

Form	No. of times	Description	Time	Weighted
Assignment	2 times	According to schedule of the teacher in charge of the course	During the course	20%
Quiz	2 times	- 10÷15 mins - Written	During the course	
Attendance	All times	Call name in lists	All time	
1 st exam	1	- 90 mins - Written	After Chapter 4	80% (40% each, drop the lowest score)
2 nd exam	1	- 90 mins - Written	After Chapter 8	
3 rd exam	1	- 90 mins - Written	1-2 weeks after courses finished	

5. **Prerequisite conditions:**

- *Prerequisite class:* Statics.

6. **Brief content:**

Strength of Materials, a subset of deformed solid mechanics, is the computation of durability, stiffness, and stability of the structures.

Objectives:

- The student should be able to utilize and integrate material characteristics within a design in engineering mechanics;
- The student should be able to understand and utilize the concepts of stress and strain;
- The student should be able to correctly solve analysis and design problems involving torsion, flexure, stress transformations, beam deflections, and column behavior.

7. Teaching Staff:

No	Name	Academic degree	Phone	Email	Job title
1	Nguyễn Công Thắng	Dr.		thangnc@tlu.edu.vn	Main Lecturer, Head of division
2	Nguyễn Ngọc Thắng	Assoc. Prof. Dr.		nnthang@tlu.edu.vn	Senior Lecturer, Vice head of CE Faculty
3	Đinh Nhật Quang	Dr.		quang.dinh@tlu.edu.vn	Lecturer
4	Lý Minh Dương	MSc.		duonglm@tlu.edu.vn	Lecturer
5	Lê Thu Mai	MSc.		lemai@tlu.edu.vn	Lecturer
6	Nguyễn Viết Chuyên	Dr.		chuyennv@tlu.edu.vn	Lecturer
7	Nguyễn Trịnh Chung	Dr.		nguyentrinhchung@tlu.edu.vn	Lecturer

8. Text books & Reference books

Text books:

[1] F. P. Beer, E. R. J. Jr, J. T. DeWolf, and D. F. Mazurek, *Mechanics of Materials*, 7th Edition. New York, NY: McGraw-Hill Education, 2014.

Reference books:

[2] W. A. Nash and M. C. Potter, *Schaum's Outline of Strength of Materials*, Fifth Edition, 5th edition. New York: McGraw-Hill, 2010.

[3] J. M. Gere and B. J. Goodno, *Mechanics of Materials*, 8th edition. Stamford, CT: Cengage Learning, 2012.

[4] Phạm Ngọc Khánh, Nguyễn Ngọc Oanh, Đoàn Văn Đào, Đỗ Khắc Phương và Nguyễn Công Thắng, *Sức bền Vật liệu*. Nhà xuất bản Từ điển Bách khoa, 2006.

9. Detailed content

Chap .	Content	Teaching & learning activities	Hours	
			Theory	Exer.
1	Introduction – Concept of Stress 1.1 Introduction 1.2 A short Review of the Methods of statics 1.3 Stresses in the members of a Structure 1.4 Analysis and Design 1.5 Axial loading; Normal stress 1.6 Shearing stress 1.7 Bearing stress in Connections 1.8 Application to the Analysis and Design of simple structures	* <u>Lecturer</u> : - Lecturing - Query - Use practical images and problems - Self introduction for further communication - Introduction of syllabus, assessment method, course content - Conveying experiences and study methodology - Work assignment * <u>Student</u> : - Answer queries - Problem solving - Question the course (if necessary) Implement of the work	3	1
2	Stress and Strain - Axial loading 2.1 Introduction 2.2 Normal Strain under Axial Loading 2.3 Stress-Strain diagram 2.4 Hooke's Law; Modulus of Elasticity 2.5 Elastic versus Plastic Behavior of a Material 2.6 Repeated Loadings; Fatigue	* <u>Lecturer</u> : - Lecturing - Query - Use practical images and problems - Conveying experiences and study methodology. - Work assignment * <u>Student</u> : - Answer queries - Problem solving	4	1

	2.7 Deformations of Members under Axial Loading 2.8 Poisson's Ratio	- Question the course (if necessary) - Implement of the work		
3	Torsion 3.1. Introduction 3.2. Preliminary Discussion of the Stresses in a Shaft 3.3. Deformations in a Circular Shaft 3.4. Stresses in the Elastic Range 3.5. Angle of Twist in the Elastic Range 3.6. Design of Transmission Shafts	* <u>Lecturer</u> : - Lecturing - Query - Use practical images and problems - Conveying experiences and study methodology. - Work assignment. * <u>Student</u> : - Answer queries - Problem solving - Question the course (if necessary) Implement of the work	3	1
4	Pure Bending 4.1. Introduction 4.2. Symmetric Member in Pure Bending 4.3. Deformation in a Symmetric Member in Pure Bending 4.4. Stresses and Deformations in the Elastic Range 4.5. Deformations in a Transverse Cross Section 1st exam	* <u>Lecturer</u> : - Lecturing - Query - Use practical images and problems - Conveying experiences and study methodology. - Work assignment. * <u>Student</u> : - Answer queries - Problem solving - Question the course (if necessary) Implement of the work	3	1
5	Analysis and Design of Beams for Bending 5.1. Introduction 5.2. Shear and Bending-Moment Diagrams	* <u>Lecturer</u> : - Lecturing - Query - Use practical images and problems	3	1

	5.3. Relations among Load, Shear, and Bending Moment 5.4. Design of Prismatic Beams for Bending	- Conveying experiences and study methodology. - Work assignment. * <u>Student</u>: - Answer queries - Problem solving - Question the course (if necessary) Implement of the work		
6	Shearing Stresses in Beams and Thin-Walled Members 6.1. Introduction 6.2. Shear on the Horizontal Face of a Beam Element 6.3. Determination of the Shearing Stresses in a Beam 6.4. Shearing Stresses in Common Types of Beams	* <u>Lecturer</u>: - Lecturing - Query - Use practical images and problems - Conveying experiences and study methodology. - Work assignment. * <u>Student</u>: - Answer queries - Problem solving - Question the course (if necessary) Implement of the work	2	1
7	Transformation of Stress and Strain 7.1. Introduction 7.2. Transformation of Plane Stress 7.3. Principal Stresses; Maximum Shearing Stress 7.4. Mohr's Circle for Plane Stress 7.5. General State of Stress 7.6. Stresses in Thin-Walled Pressure Vessels	* <u>Lecturer</u>: - Lecturing - Query - Use practical images and problems - Conveying experiences and study methodology. - Work assignment. * <u>Student</u>: - Answer queries - Problem solving - Question the course (if necessary)	4	1

	10.5. Design of Columns under a Centric Load	- Work assignment. * <u>Student</u>: - Answer queries - Problem solving - Question the course (if necessary) Implement of the work		
11	Energy Methods 11.1. Introduction 11.2. Strain Energy 11.3. Work and Energy under a Single Load 11.4. Deflection under a Single Load by the Work-Energy Method	* <u>Lecturer</u>: - Lecturing - Query - Use practical images and problems - Conveying experiences and study methodology. - Work assignment. * <u>Student</u>: - Answer queries - Problem solving - Question the course (if necessary) Implement of the work	3	1
	Total	45	33	12

10. Learning outcomes:

No	Learning outcomes of the course	Learning outcomes of corresponding education program
1	Knowledge: - Understand and be able to apply general knowledge (mathematics, physics, chemistry, informatics) in computing, simulating, analyzing and synthesizing a number of specialized technical problems; - Understand and utilize the basic principles of civil engineering to explain phenomena, determine factors/forces affecting buildings and analyze the behavior of structures/buildings under that forces;	1, 2, 5

	- Understand practical specialized issues relevant to the practice of engineering including ethics, professionalism, environment, social and political issues, globalization, contract documentation and other legal issues.	
2	Skills: - The ability to identify, pose and solve fundamental problems of civil engineering; - Skills in analyzing, synthesizing and processing information and data related to the Hydraulic structure engineering; - Skills in computation, design, construction, and management (at a basic level) of projects related to irrigation works, hydroelectric works, marine works, port waterway works.	6, 7, 8
3	Independent and responsible capability (if any):	
4	Individual ethics for profession, society (if any): - Be moral, be conscience, be disciplinary, be responsible for works, community and society . - High responsibility in working and group work - 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 410 – Building A1, Thuy loi University

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

- Name: Dr. Nguyễn Công Thắng

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Hanoi, Dated July, 26th 2021

DEAN

*(In charge of education
specialisation)*

DEAN

(In charge of course)

HEAD OF DIVISION

Dr. Nguyễn Công Thắng

