Phụ lục 4
ĐỀ CƯƠNG MÔN HỌC

SYLLABUS

I.   General Information

1.   Course tittle in Vietnamese: Sức bền vật liệu 2 (CENG5201)

2.   Course tittle: Mechanics of Materials

3.   Knowledge/Skill block :

☐   General Knowledge   ☐   Specialized Knowledge

☒   Fundamental knowledge   ☐   Supplementary Knowledge

☐   Course project / Graduation project

4.   Number of Credits

Total	Theory	Practice	Self-study
2 (2,0,4)	2	0	4

5.   Responsible for the course

a.   Faculty: Faculty of Civil Engineering
b.   Lecturer: A/Prof. Nguyen Trong Phuoc
c.   Email: phuoc.nguyen@ou.edu.vn
d.   Work place: Room.705, Faculty of Civil Engineering, Ho Chi Minh City Open University; Address: 35-37 Ho Hao Hon St, Co Giang Ward, District 1, Ho Chi Minh City

II.   Course Information

1.   Course Description and Course Outline

The subject aims to equip the student with essential knowledge about external and internal forces occurring in simple structural elements under the action of various types of loadings. The objective of the analysis is the determination of the stresses, strains and displacements produced by the loads. In addition, this subject will also furnish an understanding of the mechanical behavior of materials, which is essential for the safe design of all structures in civil engineering.

Chapter 1 provides the shear stress in torsionally loaded members. The analysis of simple structures submitted to compound loadings by the application of the principle of superposition for such cases as: unsymmetric bending, combined bending and tension or compression, combined bending and torsion, general compound loading is presented in Chapter 2. The concepts of buckling of columns and critical loads for studying the phenomenon of stability of bars under compression with various types of supports by analytical method and practical one are given in Chapter 3. Next, Chapter 4 discusses the nonlinear problem of compression-bending of columns due to eccentric loading. Finally, the dynamic behaviour of simple structures submitted to dynamic loadings is presented in the last chapter.

2.   Course Conditions

No.	Course Conditions	Course Code
1.	Pre-requisites subject	
	None	
2.	Prior-subject	
	Mechanics of Materials 1	CENG6302
3.	Parallel subject	
	None	

3. Course objectives

At the conclusion of the couse, students should be able to:

Course Objectives	Description	Programme learning Outcomes (PLOs) compactible to the course
CO1	*Knowledge:* To analyse the stresses, strains and displacements of simple structures due to torsional and conbined loads To identify and analyse buckling of columns and critical loads for studying the phenomenon of stability of bars under compression with various types of supports. To analyse the behaviour of the simple structures due to dynamic loads.	PLO3
CO2	*Skill:* Using the mathematical to describe: geometrics, vectors, diffentials and integrals.	PLO10, PLO11
CO3	*Attitude:* Exact, serious and careful in mechanics of materials and various codes	PLO15, PLO16

4. Course Learning Outcomes (CLOs)

Course Objectives	Course learning Outcome	Discription of CLO
CO	CLO1.1	To choose the analytical model from the real structures and modelling the loads in 3D structures
	CLO1.2	To analyse the internal forces, stresses, displacements and strength condition of simple structures due to torsional and conbined loads
	CLO1.3	To analyse the critical loads of bar to compression and behaviour of simple structures to dynamic loads
CO	CLO2.1	Know to solve technical problems and give these the suitable solution and correctly assesment
CO	CLO3.1	Exact, serious and careful in mechanics of materials and various codes

Integrated matrix between Course learning Outcomes (CLOs) and Programme Learning Outcomes (PLOs)

CLOs	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PLO 13	PLO 14	PLO 15	PLO 16
1.1			4													
1.2			5								5					
1.3			3													
2.1										3	3					
3.1															3	3

5. Learning Materials

a. Textbook

[1] Đỗ Kiến Quốc và các tác giả, (2007). ***Giáo trình Sức bền vật liệu***, Nhà xuất bản ĐHQG TPHCM hoặc các bản tái bản.

[2] Bùi Trọng Lựu, và các tác giả (2004). ***Bài tập Sức bền vật liệu***, Nhà xuất bản ĐH&THCN.

b. Additional readings

[3] Hibbeler R.C., (2017). Mechanics of Materials. 10th edition, Prentice Hall. Hoặc các phiên bản trước của tài liệu này.

[4] Ugural A.C., Fenster S.K., (2011). Advanced Mechanics of Materials and Applied Elasticity, 5th Edition, Prentice Hall.

6. Course Assessment

Assessment Components	Assessment Contents	Time	CLO	Weight (%)
(1)	(2)	(3)	(4)	
A1.Formative assessment	2 Problems of chapters 1,2	End of Chapter 2	CLO1.1 CLO 1.2 CLO2.1 CLO3.1	50%
A2. Final assessment	Problems	End of Course	CLO1.1 - CLO1.3 CLO2.1 CLO3.1	50%
Total				100%

7. The detail content Schedule

Week/Session	Contents	CLOs	Activities of teaching and learning	Evaluation categories	Learning Materials
1 /1	***Introduction*** - Lecturer informations -Related issues		Lecturer: Teach in classroom Student: + Class: listen and do the		[1], [2], [3]

			Lecturer / Student	Pro.	Ref.
	-Course outline -References -Learning and assessment methods			examples. + Home: review knowledge and read books	
	Chapter 1. Torsion ● The circular bars under pure torsion: stress, deformation, shear stress and angal of twist assessments, three fundamental problems ● Potential energy, compute internal force, stress, strain of springs	CLO1.1 CLO1.2. CLO2.1	**Lecturer:** Teach in classroom **Student:** + Class: listen and do the examples. + Home: review knowledge and read books and problems (9 hours)	Pro. #1: Plot torsional moment diagrams In midterm and final test	[1], [2], [3]
2/ 1	***Chapter 1. Torsion*** ***(2.5 units)*** ● Stactically indeterminate problems	CLO1.1 CLO1.2. CLO2.1 CLO3.1	**Lecturer:** Teach in classroom **Student:** + Class: listen and do the examples. + Home: review knowledge and read books and problems (5 hours)	Pro. #2: Torsional moment diagrams, Strength condition In midterm and final test	**[1], [2], [3],**
2, 3/2	***Chương 2. Combined loadings*** ***(6.5 units)*** ● General concepts ● Unsymmetric bending: normal stress, neutral axis, displacements ● Combined bending and tension or compression ● Encentric compression (tension) loading	CLO1.2. CLO2.1. CLO3.1.	**Lecturer:** Teach in classroom **Student:** + Class: listen and do the examples. + Home: review knowledge and read books and problems (13 hours)	Pro. #3: Internal forces diagrams, Strength condition In midterm and final test	**[1], [2], [3]**
4/2 **Blended applied**	***Chương 2. Combined loadings*** ***(4.5 units)*** ● Combined bending and torsion ● General combined loadings	CLO1.2. CLO2.1 CLO3.1	**Lecturer:** Teach in classroom **Student:** + Class: listen and do the examples. + Home: review knowledge and read books and problems (9 hours)	Pro. #3: Internal forces diagrams, Strength condition In midterm and final test	**[1], [2], [3]**
5/3&4	***Chapter 3. Stability of compressed bars*** ● General concepts, stability properties in elastic range ● Critical load, ultimate stress, slenderness and the scope of Euler's equations ● Computing stability by practical method ***Chapter 4. Bending and buckling*** General concepts and computing the involved parameters of beams under bending and buckling	CLO1.3 CLO2.1 CLO3.1	**Lecturer:** Teach in classroom **Student:** + Class: listen and do the examples. + Home: review knowledge and read books and problems (9 hours)	Pro. #3: Strength and stability conditions In final test	[1], [2], [3], [4]
6/ 5 **Blended applied**	***Chapter 5. Dynamic effects*** ● General concepts ● Vibration of 1 DOF	CLO1.3 CLO2.1 CLO3.1	**Lecturer:** Teach in classroom **Student:** + Class: listen and do the	Pro. #3: Vibration Strength condition	**[1], [2]**

			examples. + Home: review knowledge and read books and problems (9 hours)	In final test	
7/ 5	***Chapter 5. Dynamic effects*** ● General concepts ● Impact loadings	CLO1.3 CLO2.1 CLO3.1	**Lecturer:** Teach in classroom **Student:** + Class: listen and do the examples. + Home: review knowledge and read books and problems (6 hours)	Pro. #3: Vibration Strength condition In final test	**[1], [2]**

8. Notes

 The materials are updated in LMS and students are responsible for downloading, printing to study in class and at home.