Course Syllabus

1. **Course Title:** STeel STructures
2. **Course Code:** STST240917
3. **Credit Units:** 4 credits (4/0/8) (4 units of theory/ 0 unit of practice/ 8 units of self-study)
   Duration: 15 weeks (4 hours of theory+0 hours of practice, and 8 hours of self-study per week)
4. **Course Instructors**
   1/ Assoc. Prof. Dr. Nguyễn Trung Kiên
   2/ Dr. Lê Trung Kiên
   3/ Dr. Phan Đức Hùng
5. **Course Requirements**
   Prerequisite courses: Structural Mechanics (STME240517)
   Previous courses: None
   Parallel courses: None
6. **Course Description**

   The course provides basic knowledge and skills in the field of steel structure design including detailed design of steel and steel-concrete composite members (trusses, beams, columns, and slabs) and steel connections (welded, bolted, and riveted ones). The course helps students to enhance their ability and self-confidence to analyze steel and composite structures.

7. **Course Goals**

Goals	***Goal description***	**Programme ELOs**
G1	Core knowlegement in the field of designing steel and steel-concrete composite structures.	1.2
G2	Analysis and giving possible solutions for design problems of steel and composite structures.	2.1, 2.4
G3	Ability to read and understand basic English vocabularies in the area of steel structure design.	3.3

8. **Course Learning Outcomes (CLOs)**

CLOs		**CLO Description**	**Programme ELOs**
G1	**G1.1**	Demonstrate the basic properties and application field of steel and composite structures.	1.2
	G1.2	Demonstrate basic concept, use design principles for the design of steel/composite structural elements.	1.2
G2	**G2.1**	Calculate and design steel/composite connections as well as steel/composite structural members.	2.1
	G2.2	Seclect reasonable solutions for design problems of steel and	2.1

		composite members.	
	G2.3	Self study and engage in long-life learning	2.4
G3	**G3.1**	Demonstrate the ability of use English in the area of steel/composite structure design.	3.3

9. Learning resourses

All following learning resources will be sent to student throughout learning management system (LMS) of the University.

- Textbooks:

1. Phạm Văn Hội, Nguyễn Quang Viên, Phạm Văn Tư, Lưu Văn Tường, *Steel Structures,* Science and Technics Publisher, 2009.
2. Phạm Văn Hội, Steel-concrete composite structures, NXB KH&KT, 2010.
3. K.K. Mukhanov, *Design of metal structures*, Science and Technics Publisher, 2003

- References:

1. Trần Thị Thôn, *Design problems for steel structures*, Vietnam National University-HCMC, 2013.
2. TCVN 5575:2012 (Design standard for steel structures)
3. TCVN 5574:2012 (Design standard for reinforced concrete structures)
4. Eurocode 3: Design of steel structures
5. Eurocode 4: Design of composite steel and concrete structures

10. Student assessment

- Grading point: **10**
- Assessment plan

Type	Content	Timeline	Assessment method	CLOs	Rate (%)
Exams					**50**
Exam 01	The exam relates to design a steel connection (using welds or bolts) including: • Determine internal forces, stresses in connection members. • Check strength criteria • Present arrangement of the connection in a drawing.	Week 4	+ Individual paper assessment + Open book exam + Duration: 30 minutes + Feedback after one week.	G1.2, G2.1, G2.2, G2.3, G3.1	10
Exam 02	Design a steel beam or column including: • Determine internal forces • Calculate the member for requirements about strength, stiffness and stability.	Week 10	+ Individual paper assessment + Open book exam + Duration: 60 minutes + Feedback after one week.	G1.2, G2.1, G2.2, G2.3, G3.1	30
Exam 03	Calculate the loaded carrying capacity of a comosite slab or a	Week 14	+ Individual paper	G1.2,	10

	composite beam section including: • Idealize the considered section • Determine the position of the plastic neutral axis of the section. • Calculate the plastic moment strength of the section.		assessment + Open book exam + Duration: 30 minutes + Feedback after one week.	G2.1, G2.2, G2.3, G3.1	
Final exam					**50**
	The final exam covers some contents delivered in the course and CLOs	Univ. timeline	+ Paper assessment + Open book exam + Duration: 90 minutes + Feedback after one week.	G1.2, G2.1, G2.2, G2.3, G3.1	

11. Course contents

Week	Content	CLOs
1	***Chapter 1*** **Overview of Steel Structures** *(4h,0,8h)*	
	A/ **Content and pedagogical methods in class** *(4h)* **Content** 1.1 Merits and drawback of steel members 1.2 Field of application 1.3 Requirement for steel structures 1.4 Steel materials for building structures 1.5 Behavior of steel material 1.6 Classification of rolled steels 1.7 Design methods of steel structures **Pedagogical method** Use powerpoint to show the content. A series of diagnostic questions will be also used to estimate students‘ knowledge and skills.	G1.1, G1.2, G3.1
	B/ **Self-study content** *(8h)* Find and read standards TCVN2737-95 and TCVN 5575:2012	G2.3
2	***Chapter 2*** **Steel Connections**	
	A/ **Content and pedagogical methods in class** *(4h)* **Content** 2.1 Welded connections + Welding processes + Types of welds and theirs design strengths + Types of welded connections and design approaches **Pedagogical method** Use powerpoint to disseminate the content. Worked examples are presented in detail to help students reinforce their knowledge and skills.	G1.2, G2.1, G3.1

	***B/* Self-study content** *(8h)* + Studying the weld deffects + Do homeworks about design of welded connections in the reference book.	G2.1, G2.2, G2.3, G3.1
3	***Chapter 2* Steel Connections (continue)**	
	***A/* Content and pedagogical methods in class** *(4h)* **Content** 2.2 *Bolted connections* + Types of bolts + Behavior of bolted connections and design strengths of a bolt + Arrangement of bolts in a connection + Design bolted connections **Pedagogical method** Use powerpoint to disseminate the content. Worked examples are presented in detail to help students reinforce their knowledge and skills.	G1.2, G2.1, G3.1
	***B/* Self-study content** *(8h)* + Do homeworks about design of bolted connections in the reference book.	G2.1, G2.2, G2.3, G3.1
4	***Chapter 2* Steel Connections (continue)**	
	***A/* Content and pedagogical methods in class** *(4h)* **Content** *2.3 Reveted connections* *2.4 Response questions about homeworks* **Take the exam 01** **Pedagogical method** Opinions from students are disscussed and responsed in detail.	G1.2, G2.1, G3.1
	***B/* Self-study content** *(8h)* + Do homeworks about design of bolted connections in the reference book (continue)	G2.1, G2.2, G2.3, G3.1
5	**Chapter 3 Steel Beams**	
	***A/* Content and pedagogical methods in class** *(4h)* **Content** 3.1 Introduction 3.2 Main dimensions of a steel beam 3.3 Design of rolled steel beams **Pedagogical method** Use powerpoint to disseminate the content. Worked examples are presented in detail to help students reinforce their knowledge and skills.	G1.2, G2.1, G3.1
	***B/* Self-study content** *(8h)* + Design method of steel slabs + Do homeworks about design of rolled steel beams in the reference book.	G2.1, G2.2, G2.3, G3.1

6	**Chapter 3 Steel Beams (continue)**	
	***A/* Content and pedagogical methods in class** *(4h)* **Content** 3.4 Design of built-up steel beams 3.5 Global stability of steel beams 3.6 Local stability of steel beams **Pedagogical method** Use powerpoint to disseminate the content. Worked examples are presented in detail to help students reinforce their knowledge and skills.	G1.2, G2.1, G3.1
	***B/* Self-study content** *(8h)* 3.7 Changing beam sections 3.8 Design of beam details Do homeworks about design of built-up steel beams in the reference book.	G2.1, G2.2, G2.3, G3.1
7	**Chapter 3 Steel Beams (continue)**	
	***A/* Content and pedagogical methods in class** *(4h)* **Content** + Discuss about homeworks **Pedagogical method** Open disscussing about the given homeworks to enhance design skills for students.	G1.2, G2.1, G3.1
	***B/* Self-study content** *(8h)* Do homeworks about design of built-up steel beams in the reference book.	G2.1, G2.2, G2.3, G3.1
8	**Chapter 4 Steel Columns**	
	***A/* Content and pedagogical methods in class** *(4h)* **Content** 4.1 Introduction 4.2 Axially loaded solid columns **Pedagogical method** Use powerpoint to disseminate the content. Worked examples are presented in detail to help students reinforce their knowledge and skills.	G1.2, G2.1, G3.1
	***B/* Self-study content** *(8h)* Do homeworks about design of axially loaded solid columns in the reference book.	G2.1, G2.2, G2.3, G3.1
9	**Chapter 4 Steel Columns (continue)**	
	***A/* Content and pedagogical methods in class** *(4h)* **Content** 4.3 Axially loaded open-web columns 4.4 Eccentrically loaded columns **Pedagogical method** Use powerpoint to disseminate the content. Worked examples are	G1.2, G2.1, G3.1

	presented in detail to help students reinforce their knowledge and skills.	
	***B/* Self-study content** *(8h)* Do homeworks about design of axially loaded open-web columns and eccentrically loaded columns in the reference book.	G2.1, G2.2, G2.3, G3.1
10	**Chapter 4 Steel Columns (continue)**	
	***A/* Content and pedagogical methods in class** *(4h)* **Content** 4.5 Design column details **Take the exam 02** **Pedagogical method** Use powerpoint to disseminate the content. Worked examples are presented in detail to help students reinforce their knowledge and skills.	G1.2, G2.1, G3.1
	***B/* Self-study content** *(8h)* Do homeworks about design of eccentrically loaded columns in the reference book.	G2.1, G2.2, G2.3, G3.1
11	***Chapter 5 Steel Trusses***	
	***A/* Content and pedagogical methods in class** *(4h)* **Content** 5.1 Introduction 5.2 Design of truss members 5.3 Design of truss details **Pedagogical method** Use powerpoint to disseminate the content. Worked examples are presented in detail to help students reinforce their knowledge and skills.	G1.2, G2.1, G3.1
	***B/* Self-study content** *(8h)* Do homeworks about design of steel trusses in the reference book.	G2.1, G2.2, G2.3, G3.1
12	**Chapter 6 Steel-Concrete Composite Structures**	
	***A/* Content and pedagogical methods in class** *(4h)* **Content** 6.1 Overview of composite structures + Introduction + Field of applications + Construction methods + Structural members 6.2 Materials used for composite structures + Steel + Concrete **Pedagogical method** Use powerpoint to disseminate the content. Worked examples are presented in detail to help students reinforce their knowledge and skills.	G1.2, G2.1, G3.1

	***B/* Self-study content** *(8h)* Seek and sumary documents relating to typical steel-concrete composite buildings.	G2.1, G2.3, G3.1
13	**Chapter 6 Steel-Concrete Composite Structures (continue)**	
	***A/* Content and pedagogical methods in class** *(4h)* **Content** 6.3 Composite slabs + Basic requirements + Behavior of composite slabs + Limit states, effects and deflections + Determine internal forces in a slab + Check design requirements for slab sections **Pedagogical method** Use powerpoint to disseminate the content. Worked examples are presented in detail to help students reinforce their knowledge and skills.	G1.2,G2.1, G3.1
	***B/* Self-study content** *(8h)* Do homeworks about design of composite slabs in the reference book.	G2.1, G2.2, G2.3, G3.1
14	**Chapter 6 Steel-Concrete Composite Structures (continue)**	
	***A/* Content and pedagogical methods in class** *(4h)* **Content** 6.4 Composite beams + Design procedure + Connections + Cross-tie reinforcements **Take the exam 03** **Pedagogical method** Use powerpoint to disseminate the content. Worked examples are presented in detail to help students reinforce their knowledge and skills.	G1.2, G2.1, G3.1
	***B/* Self-study content** *(8h)* Do homeworks about design of composite beams in the reference book.	G2.1, G2.2, G2.3, G3.1
15	**Chapter 6 Steel-Concrete Composite Structures (continue)**	
	***A/* Content and pedagogical methods in class** *(4h)* **Content** 6.5 Composite columns + Design methods + Local Stability criteria + Axially loaded composite columns + Eccentrically loaded composite columns + Connections **Pedagogical method**	G1.2, G2.1, G3.1

	Use powerpoint to disseminate the content. Worked examples are presented in detail to help students reinforce their knowledge and skills.	
	***B/* Self-study content** *(8h)* Do homeworks about design of composite columns in the reference book.	G2.1, G2.2, G2.3, G3.1

12. Learning Ethics

Home assignments must be done by the students themselves. Plagiarism found in the assessments will get zero grade point.

13. Date of first approval: August 1st, 2012

14. Approval

Dean	Head of Department	Instructor
A/Prof. Dr. Nguyễn Trung Kiên	**MSc. Nguyễn Văn Hậu**	**A/Prof. Dr. Nguyễn Trung Kiên**

15. Date and Up-to-date content

1st time: Date:	Instructor Head of Department