Course Syllabus

1. **Course Title:** Structural Test
2. **Course Code:** STTE321517
3. **Credit Units:** 2 (0/2/4) (0 unit of theory/ 2 units of practice/ 4 units of self-study)
   Duration: 12 weeks (0 hour of theory+5 hours of practice, and 5 hours of self-study per week)
4. **Course Instructors**
   1/ Dr. Châu Đình Thành
   2/ Dr. Trần Tuấn Kiệt
   3/ Dr. Lê Trung Kiên
   4/ Dr. Phan Đức Hùng
   5/ Dr. Lê Anh Thắng
   6/ MSc. Nguyễn Thị Thúy Hằng
5. **Course Requirements**
   Prerequisite courses: None
   Previous courses: Reinforced Concrete Structures (RCST240617), Steel Structures (STST240917).
   Parallel courses: None
6. **Course Description**
   This course provides students with knowledge and skills to conduct experiments related structural engineering. Through this course, students know how to prepare specimens and use equipment to set up suitable model for investigation and verification of structural engineering. The course also makes students to strictly follow safety regulations
7. **Course Goals**

Goals	Goal Description	Programme ELOs
G1	Set up and measure necessary parameters of structural components; and then assess the experimental data	2.2
G2	Construct specimens precisely and safely	2.5
G3	Be able to organize group-working to conduct tests, present the test's results and read manuals and guidelines in English	3.1, 3.2, 3.3

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

CLOs		CLO Description	Programme ELOs
G1	**G1.1**	Use testing facilities professionally	2.2
	G1.2	Set up experimental model to measure necessary data of structurual components (loads, displacements, strains, cracks, …)	2.2
	G1.3	Interpret, compare, evaluate and conclude the experimental data	2.2

G2	**G2.1**	Strictly follow safe and environmental regulations in the lab	2.5
	G2.2	According to design, construct specimens of R.C. beams precisely	2.5
G3	**G3.1**	Organize working groups to conduct testing process effectively	3.1
	G3.2	Be able to write report and present the experimental data	3.2
	G3.3	Be able to read manuals and guidelines of testing machinces in English	3.3

9. Learning Resources

- Textbooks:

[1]. Võ Văn Thảo, Phương pháp khảo sát và nghiên cứu thực nghiệm công trình, NXB Khoa học kỹ thuật - 2001.

- References:

[2]. Tiêu chuẩn xây dựng Việt Nam, Kết cấu bê tông và bê tông cốt thép, quy phạm thi công và nghiệm thu, TCVN 4453-1995

[3]. J. H. Bungey and S. G. Millard, Testing of Concrete in Structures, Blackie Academic & Professional, Chapman & Hall – 1996, 3rd Edition.

[4]. Guidelines and manuals

10. Student Assessment

- Grading scale: **10**
- Assessment plan:

Type	Content	Timeline	Assessment method	CLOs	Rate (%)
Quick test					**10**
KT#1	+ Evaluate knowledge and attitude of students about safety and lab's regulations	At the beginning of the class	Interview	G2.1	
Thực hành					**40**
TH#1	+ Report/ Practice on load measurement	Week 6	Interview – Practice	G1.1, G3.1, G3.2, G3.3	20
TH#2	+ Report/ Practice on displacement measurement	Week 7	Interview – Practice	G1.1, G3.1, G3.2, G3.3	20
Summative presentation					**50**
	Group of students present the testing process and results Instructor interviews students		Group presentation	G1.1, G1.2, G1.3, G2.1,G3.1, G3.2	

11. Course Content

Week	Content	CLOs
1	***Chapter 1:*** **Introduction**	
	A/ Content and pedagogical methods in class*: (5h)* **Content:** 1.1. Introduction to the course 1.2. The lab's regulations on safety and enviromental hygiene 1.3. Description of experimental methods for structural tests 1.4. Application of structural tests 1.5. Testing facilities + System supporting specimens + Hydraulic system to apply loads + Data logger and strain gauges to measure strains + Linear Variable Differential Transformer (LVDT) to measure displacements **Pedagogical methods**: + Instructor introduces basic contents + Organize groups of students + Instructor introduces facilities of lab for experiments	G2.1
	B/ Self-study content: *(5h)* + Review how to design a R.C. beam, concrete aggregates and formworks	G2.2
2	***Chapter 2:*** **Preparation of specimens**	
	A/ Content and pedagogical methods in class*: (5h)* **Content:** 2.1. Design a specimen of R.C. beam in details + Design cross section + Design concrete aggregates + Design formworks **Pedagogical methods**: + Instructor gives design requirements + Groups of students design the specimen satisfying the design requirements	G2.2, G3.1, G3.2
	B/ Self-study content: *(5h)* + Requirements for concrete aggregates	G2.2
3	***Chapter 2:*** Preparation **of specimens** *(cont.)*	

	A/ Content and pedagogical methods in class*: (5h)* **In-lab practice:** 2.2. Preparation of concrete aggregates + Screen and clean stones + Screen and clean sands + Clean the working areas **Pedagogical methods**: + Students work in group under supervision of instructor	G2.1, G2.2, G3.1
	B/ Self-study content: *(5h)* + Requirements for construction and completion of formworks and steel works	G2.2
4	***Chapter 2:*** **Preparation of specimens** *(cont.)*	
	A/ Content and pedagogical methods in class*: (5h)* **In-lab practice:** 2.3. Construction of formworks and steel works + Construction of formworks + Fabrication of reinforcements + Clean the working areas **Pedagogical methods**: + Instructor reminds safe regulations when constructing formworks and steel works + Instructor guides students how to construct formworks and steel works as specified in the design drawings + Students practice in group	G2.2, G3.1
	B/ Self-study content: *(5h)* + Safe regulations when doing concrete works + Process of concrete mixing and how to check quality of concrete during construction	G2.1, G2.2
5	***Chapter 2:*** **Preparation of specimens** *(cont.)*	
	A/ Content and pedagogical methods in class*: (5h)* **In-lab practice:** 2.4. Cast specimen of R.C beam + Mix and pour concrete + Vibration + Clean the working areas and devices **Pedagogical methods**: + Students work in group under supervision of instructor + Students practice in group	G2.1, G2.2, G3.1
	B/ Self-study content: *(5h)* + Procedure of curing R.C beam + Compute thoritical load capacity and displacements of the specimen based on design	G1.2, G2.2
6	***Chapter 3:*** **Experiment of R.C. beam under static load**	

	A/ Content and pedagogical methods in class*: (5h)* **In-lab practice:** 3.1. Guide to use hydraulic machine to apply load 3.2. Guide to use data logger to measure load, displacements and strains **Pedagogical methods**: + Instructor gives guilines and manuals in English to students + Students study and discuss how to use the machines + Instructor conducts an example of operating the machine + Students operate the machine to measure loads	G1.1, G3.1, G3.3
	B/ Self-study content: *(5h)* + Brief presentation of how to use the hydraulic machine and datalogger	G3.2
7	***Chapter 3:*** **Experiment of R.C. beam under static load** *(cont.)*	
	A/ Content and pedagogical methods in class*: (5h)* **In-lab practice:** 3.3. Guide to use magnatic bases and LVDT to measure displacements **Pedagogical methods**: + Instructor gives guilines and manuals in English to students + Students study and discuss how to use the devices + Instructor conducts an example of operating the devices + Students operate the machine to measure displacements	G1.1, G3.1, G3.3
	B/ Self-study content: *(5h)* + Brief presentation of how to use the LVDT and datalogger	G3.2
8	***Chapter 3:*** **Experiment of R.C. beam under static load** *(cont.)*	
	A/ Content and pedagogical methods in class*: (5h)* **In-lab practice:** 3.4. Guide to use strain gauges to measure strains 3.5. Guide to use portal crane **Pedagogical methods**: + Instructor gives guilines and manuals in English to students + Students study and discuss how to use the devices + Instructor conducts an example of operating the devices to measure strains + Students operate the machine to measure strains	G1.1, G2.1, G3.1, G3.3
	B/ Self-study content: *(5h)* + Brief presentation of how to use the strain gauges and datalogger to measure strains + Design arrangement of devices to prepare for R.C. beam testing	G1.2, G3.2
9	***Chapter 3:*** **Experiment of R.C. beam under static load** *(cont.)*	
	A/ Content and pedagogical methods in class*: (5h)* **In-lab practice:** 3.6. Set up experiment, conduct and measure data + Review safe regulations during testing	G1.2, G2.1, G3.1

	+ Set up measurement devices and necessary parameters + Conduct and measure data + Clean facilities and the lab **Pedagogical methods**: + Instructors and some selected students use portal crane to place the specimen on supporting system + Students set up devices, parameters for machines + Instructor checks and conduct trial test + While conducting experiment, students observe and measure crack propagation + Arrange and clean devices and machine + Instructors and some selected students use portal crane to remove the specimen from the supporting system + Clean experimental area	
	B/ Self-study content: *(5h)* + Brief report on the process of setting up the experiment and observing data + Review how to compute strength of concrete and steel from compressive and tensile tests	G1.3, G3.2
10	***Chapter 4:*** **Report and present results**	
	A/ Content and pedagogical methods in class*: (5h)* **Content:** 4.1. Analyze and comment testing results + Graph testing results + Compare testing results to theoretical results + Comment and discuss the results 4.2. Prepare final report in MS-Word **Pedagogical methods**: + Instructor guides how to demonstrate the testing results + Instructor guides how to prepare the final report according to summative assessments + Students prepare the final report in class	G1.3, G3.1, G3.2
	B/ Self-study content: *(5h)* + Complete the final report that includes the following criteria: + Objective and content of the test + Process of testing + Analyze, compare and discuss testing results	G3.1, G3.2
11	***Chapter 4:*** **Report and present results** *(cont.)*	
	A/ Content and pedagogical methods in class*: (5h)* **Content:** 4.3. Prepare final presentation in MS-Powepoint 4.4. Clean the lab **Pedagogical methods**:	G2.1, G3.1, G3.2

	+ Instructor guides how to prepare the final presentation according to summative assessments + Students prepare the final presentation in class	
	B/ Self-study content: *(5h)* + Complete the final presentation that includes the following criteria: + Objective and content of the test + Process of testing + Analyze, compare and discuss testing results	G3.1, G3.2
12	***Summative assessment:*** **Presentation in group**	
	A/ Content and assessment methods in class*: (5h)* **Assessment contents:** + Regulations on safety and lab hygiene + Use of testing machines and devices + Process of experiment and measurement of data + Analyze, compare and comment on experimental data + Skills of writing report + Skills of presentation and answers **Assessment methods**: + Assessement rubric based on report, presentation, and question and answer	G1.1, G1.2, G1.3, G2.1, G3.1, G3.2

12. Learning Ethics

- All members of groups must participate into works according to their duties
- Students must write the reports by themselves based on their own knowledge and measured data. If plagiarism is found students will get zero point

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

14. Approved by

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

15. Date and Up-to-date content

1st time: Date:	Instructor: Head of Department: