MINISTRY OF EDUCATION AND TRAINING

LAC HONG UNIVERSITY

PROGRAMME SPECIFICATION

Undergraduate

Construction Engineering Technology Programme

PROGRAM CODE: 7510102

TYPE OF STUDY: FULL-TIME

FACULTY: FACULTY OF CIVIL ENGINEERING

Dong Nai, 2024

1. General Information

- **Programme title:** Construction Engineering Technology
- **Degree awarded:** Engineer
- **Major:** Civil and Industrial Construction
- **Mode of study:** Full-time
- **Duration:** 4 years (8 semesters)
- **Total credits:** 150 credits
- **Admission criteria:**

Option 1: Basing on the National High School Exam scores

Students who:

- ✓ graduated from high school
- ✓ achieved the cut-off score set by MOET

Option 2: Basing on the school report of Grade 12

Students who:

- ✓ graduated from high school
- ✓ achieved the GPA for the whole year of grade 12 >= 6 (or GPA for 3 years of grades 10, 11 and 12 >= 6)

Option 3: Basing on Competency Exam scores

- ✓ the National Competency Exam scores
- ✓ LHU Competency Exam scores

Option 4: Direct admission to students

- ✓ winning the first, second and third prize in science and technology contests or in excellent student contests from provincial level
- ✓ achieving good performance in three years of grades 10, 11 and 12
- ✓ attending gifted high schools
- ✓ achieving international English certificates
- ✓ attending one of the top 200 high schools in Vietnam
- ✓ attending high schools signing up to educational cooperation with LHU

- **Graduation requirements:**

Students must meet the following conditions in order to graduate

- ✓ Not being prosecuted for criminal liabilities, not in the period of being disciplined as suspension;
- ✓ Accumulating sufficient number of credits and volumes of the curriculum
- ✓ The cumulative GPA is at least 5.00/10.0 or higher;
- ✓ Having a certificate of national defense education and physical education;
- ✓ Meeting the standards of the foreign language according to the LHU regulations;
- ✓ Having the certificate of basic information technology according to the LHU regulations;
- ✓ Having the certificate of soft skills according to the LHU regulations.

- **Job positions:**

Students who graduate with the Engineer degree in CET can find their jobs in the following positions:

- ✓ Governmental organizations: including research centers; Institutes, Ministry of construction or Department of construction of local authorities.
- ✓ Private companies and corporations, foreign companies: there are a lot of private companies working in the Civil engineering field. Their main purposes include Consulting, Site construction manager, Designing, and Maintaining infrastructures. Other opportunities: students who graduate from the Civil Engineering field can work in the companies in related fields such as civil materials, building for construction, maintaining buildings, real estate business etc.

- **Ability to develop higher level of education:**

Graduates from this course can enroll in the master degree programme in the same or relevant fields.

2. Programme Overview

The Construction Engineering Technology programme is designed to train engineers with solid fundamental knowledge, practical skills, and professional competencies to meet the demands of the construction industry in the context of digital transformation.

The programme aligns with the mission of Lac Hong University in providing high-quality human resources and emphasizes outcome-based education (OBE), CDIO approach, and industry relevance.

The 2024 revised curriculum reflects stakeholder feedback by strengthening digital competencies (BIM, construction informatics), increasing practical training, and enhancing employability.

3. Programme Educational Objectives (PEOs)

Code	Programme Educational Objectives
PEO1	Graduates become civil engineers with professional ethics, dynamism, and creativity, capable of working effectively to meet socio-economic demands in the construction industry.
PEO2	Graduates are able to develop into managers or technical leaders in construction and related fields through continuous learning and professional development.

4. Programme Learning Outcomes (PLOs)

4.1. Programme Learning Outcomes

PROGRAMME LEARNING OUTCOMES (PLOs)	PERFORMANCE INDICATORS (PIs)
Knowledge	**Disciplinary Knowledge**
PLO1: Demonstrate proficiency in using engineering software within the construction engineering technology context.	PI1: Use engineering software effectively for technical drawing and documentation
	PI2: Use engineering software for design calculations and construction planning
	PI3: Use engineering software for construction project management.
PLO2: Perform laboratory experiments related to construction materials in the construction engineering technology context.	PI1: Conduct experiments on solid construction materials
	PI2: Conduct experiments on granular construction materials
	PI3: Conduct experiments on granular construction materials

PLO3: Apply modern techniques and technologies in construction engineering practice	PI1: Apply Building Information Modeling (BIM) in construction projects.
	PI2: Apply modern construction methods and techniques
	PI3: Apply advanced construction materials technologies
	PI4: Apply advanced construction materials technologies
PLO4: Implement construction projects based on engineering design documentation	PI1: Explain the structural behavior of fundamental construction components
	PI2: Execute construction components based on drawings through workshop practice
	PI3: Evaluate the consistency between constructed components and design drawings on-site
	PI4: Develop construction methods and implementation plans for basic components.
PLO5: Design construction projects in the construction engineering technology context	PI1: Propose structural design solutions
	PI2: Develop construction design documentation
	PI3: Evaluate the feasibility of structural components through practical construction activities
Skills	**Generic Competencies**
PLO6: Adapt to digital working environments in engineering practice.	PI1: Present reports using multimedia technologies
	PI2: Utilize digital resources effectively
	PI3: Perform tasks using digital platforms and tools
PLO7: Communicate ideas effectively in written, oral, and visual forms in both technical and non-technical contexts	PI1: Communicate ideas effectively through oral presentation
	PI2: Communicate ideas effectively through written formats
	PI3: Communicate ideas effectively using visual representation
PLO8: Work effectively as a team member in engineering environments	PI1: Plan team activities and assign responsibilities
	PI2: Motivate team members to achieve tasks on schedule
	PI3: Complete assigned individual tasks within given timelines

Attitude	Professionalism & Lifelong Learning
PLO9: Engage in lifelong learning for continuous professional development	PI1: Use information retrieval tools effectively for learning purposes
	PI2: Develop effective self-learning strategies
	PI3: Demonstrate habits of independent learning
PLO10: Demonstrate professionalism and ethical responsibility in engineering practice	PI1: Exhibit professional behavior in academic and practical settings
	PI2: Use references appropriately with proper citation in technical and non-technical contexts
	PI3: Comply with professional ethical standards of engineers

4.2. Mapping PEOs – PLOs

PEO \ PLO	1	2	3	4	5	6	7	8	9	10
PEO1	X	X	X	X	X	X	X	X		X
PEO2			X		X	X	X	X	X	X

5. Programme Structure

5.1. Curriculum Structure

Knowledge Block		Total Credits
General Education	Political Theory	11
	Social Sciences	2
	Foreign Languages	12
	Natural Sciences, Mathematics, Informatics, Technology	6
Professional Education	Fundamental Courses	17
	Specialized Courses	78
	Projects and Internship	11
	Other Courses	3
	Graduation Thesis	10
Total minimum credits for graduation		**150**

5.1. Curriculum Mapping

5.1.1 General Education Courses

Course	PLOs									
	1	2	3	4	5	6	7	8	9	10
Marxist-Leninist Philosophy										CLO1 CLO2
Marxist-Leninist Political Economy										CLO1 CLO3
Scientific Socialism										CLO1 CLO2
Ho Chi Minh's Ideology									CLO1 CLO2	
The History of the Vietnamese Communist Party									CLO1	CLO2
Introduction to Laws										CLO1 CLO3
English 1									CLO1 CLO2	
English 2									CLO1 CLO2	
English 3									CLO1 CLO2	
English 4							CLO1		CLO2	
English 5									CLO2 CLO3	
Mathematics A1									CLO1 CLO2	
General Informatics			CLO1			CLO3		CLO2		

5.1.2 Fundamental Courses

Course	PLOs									
	1	2	3	4	5	6	7	8	9	10
Engineering Geology		CLO1 CLO2						CLO3		
Soil Mechanics		CLO1	CLO2						CLO3	
Structural Mechanics				CLO1	CLO2				CLO3	

Engineering Drawing	CLO1					CLO2				
Strength of Materials				CLO1				CLO2		

5.1.3 Specialized Courses

Course	PLOs									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Geodetics			CLO1 CLO2							
Construction Materials		CLO1	CLO2						CLO3	
Construction Materials Testing		CLO1 CLO2 CLO3								
Soil Mechanics Testing		CLO1 CLO2	CLO3							
Strength of Materials Lab		CLO1 CLO2	CLO3							CLO3
Reinforced Concrete Structures 1		CLO3		CLO1 CLO2						
Reinforced Concrete Structures 2				CLO1	CLO2 CLO3					
Reinforced Concrete Structures 3				CLO1 CLO2 CLO3						
Project of RC Structures					CLO1		CLO2 CLO3			
Foundation Engineering - Basic				CLO1	CLO2					
Foundation Engineering - Advanced					CLO1		CLO2			
Foundation Engineering Solutions					CLO1		CLO2			
Project of Foundation Engineering	CLO1						CLO2			
Steel Structures 1					CLO1 CLO2					
Steel Structures 2					CLO2 CLO2 CLO4					CLO3 CLO5
Project of Steel Structures					CLO1		CLO2			

Architectural Design	CLO1					CLO2			CLO3	
Project of Architectural Design	CLO1					CLO2				
Construction Informatics - Basic 1	CLO1		CLO2						CLO3	
Construction Informatics - Basic 2	CLO1					CLO2			CLO3	
Construction Informatics - Advanced 1	CLO1			CLO2					CLO3	
Construction Informatics - Advanced 2	CLO1 CLO2									
Construction Techniques			CLO1 CLO2							
Construction Machinery			CLO1 CLO2							
BIM in Civil Engineering - Basic			CLO1							CLO2
BIM in Civil Engineering - Advanced						CLO1 CLO2 CLO3				
Technical Drawing Implementation	CLO1					CLO2				
Electrical and Plumbing Installations								CLO1 CLO2		
Construction Law										CLO1 CLO2
Construction Economics								CLO1 CLO2		
Construction Project Management										
Mass Dissection	CLO1									CLO2
Estimation Tools and Techniques	CLO1					CLO2				
Project of Building Construction	CLO1		CLO2	CLO3						
Occupational Health & Safety										CLO1 CLO2 CLO3

Construction Corporate Management								CLO1 CLO2		
Construction Operations Management								CLO1 CLO2		

5.1.4 Other Courses

Course	PLOs									
	1	2	3	4	5	6	7	8	9	10
Field Trips			CLO1					CLO2		CLO3
Technical Practice 1			CLO1					CLO2		CLO3
Technical Practice 2				CLO4						CLO1 CLO2
English for Civil Engineering							CLO1 CLO2		CLO3	
Graduation	CLO1		CLO2 CLO9		CLO3		CLO5 CLO6 CLO7		CLO8	CLO4

6. Course Description

124007 Practice of Engineering Geology

Field internships aim to assess engineering geological conditions of an area by different engineering geological survey methods: visualization, drilling, penetration, compression, experimental water extraction.

124015 Technical Practice 1

Site preparation, masonry work (construction, painting, paving, paving, rolling base, ...), finishing work.

124016 Field Trips

Cognitive internship to create conditions for students: Integrate into the real environment of corporate agencies; Apply the knowledge learned to understand the actual work; Know how to behave in corporate relationships.

124017 Soil Mechanics Testing

The soil mechanics testing course aims to consolidate the knowledge learned in the soil mechanics course through experiments to determine the physical and mechanical properties of the soil.

124018 Strength of Materials Lab

Consolidate students' theoretical knowledge of strength of materials, improve practical

skills, perform experiments on physical and mechanical properties of some solid objects and evaluate strength, hardness and stability.

124029 Technical Practice 2

Technical Practice 2 aims to help students grasp the reality of civil & industrial construction; apply learned theory into practice and learn and learn new techniques in construction technology. In addition, this module also helps students to be better prepared for the graduate labor period.

124057 Masonry Techniques

Provide students with economic - technical norms showing the cost of materials, labor and construction machines to complete a unit of construction work volume such as 1m3 brick wall, 1m3 concrete, 1m2 tiled, 1 ton of reinforcement, 100m of pile length, etc. from preparation to finishing work.

124058 Geodesics

The main content of the module includes basic geodetic issues but necessary for construction such as: Positioning points, orienting straight lines, using maps, measuring angles, measuring length, measuring height, measuring and drawing. maps, topographic cross-sectional measurements, types of work layout, as-built measurements, construction deformation monitoring.

124059 Engineering Geology

Basic knowledge of construction soil, underground water. Phenomena, dynamic geological processes, engineering geological survey methods.

124060 Theoretical Mechanics

Statics: Basic concepts and axioms of statics, reduction of force systems, equilibrium conditions of force systems, balance problems of solids - solid body systems, friction, center of gravity.

Kinematics: point kinematics, two fundamental motions of a solid, complex point motion, parallel plane motion of a solid, rotation around a fixed point, general motion of a solid. Modeling the kinematics.

Kinetics: particle dynamics, geometrical characteristics of the mass of the system, general theorems of system dynamics, D'Alambert 's principle, principle of possible movement, Lagrange equation 2.

Mechanical majors: Civil Engineering, Mechanical Engineering, Traffic Engineering, Geotechnical and Petroleum Engineering.

124061 Soil Mechanics

Including: Soil formation, soil composition phases, soil physical characteristics; mechanical and related properties. Stress distribution in the soil, problems with

deformation, bearing capacity of the ground, stability of soil mass and earth pressure on solid bodies.

124062 Geodetics Practice

Use theodolites and nitrous to measure the fundamentals; measure equal angle, measure vertical angle, measure length by distance and vertical mix, trigonometric altimeter, geometric altimeter.

124063 Engineering Drawing

This subject equips students with spatial thinking ability; skills in using common drawing tools as well as software and automatic drawing equipment, in order to represent and read technical ideas on drawings, in accordance with International (ISO) and Vietnamese standards (TCVN).

124064 Strength of Materials 1

- Basic concepts of stress and stress in payment problems.
- Single and complex stress states in bars.
- Durability theories.
- features required when calculating payments.
- Problems of bars subjected to torsion and planar bending
- Stabilize the compression bar.

124065 Construction Materials

The main mechanical and mechanical properties of building materials used for construction works.

Main technical features of common building materials used for construction works such as natural stone materials, construction ceramic materials, inorganic binders (construction plaster, Portland cement), cement concrete, construction mortar ...

124066 AutoCAD

Equip with basic knowledge on how to present drawings and present design drawings in the most correct and fastest way. Main content of the course: Basic drawing commands, model editing, showing dimensions on drawings, printing drawings, ...

124067 Construction Materials Testing

Consolidate theoretical knowledge of building materials, improve practical skills, perform experiments on physical and mechanical properties of some basic building materials such as: fired clay bricks, sand stone, cement, concrete.

124068 Reinforced Concrete Structures 1

This course aims to analyze the main physical and mechanical properties of concrete,

calculate the structural cross section and the required amount of reinforcement; rationally arrange reinforcement in sections when subjected to simple stress states; bending, pulling, compressing, eccentric pulling, eccentric compression. The calculation follows two limit states and is a mandatory basis for studying the calculation of house structures later.

124069 Strength of Materials 2

- Complex bearing bars.
- Stabilize the straight bar under centered compression.
- Calculating the displacement of the bar system
- Calculate the planar super static system by force method.
- Load.

124070 Foundation Engineering 1

Principles, foundation design process and rules and design order of shallow foundations: single foundation, tape foundation, raft foundation.

124071 Reinforced Concrete Structures 2

- Reinforced concrete: Mainly calculates parts of reinforced concrete building structures including floors, frame structures, beams, foundations, roofs and 1-storey industrial buildings. At the end of this course, students can design small, medium and solid works by themselves.
- Brick and stone: This section will briefly introduce the mechanical and mechanical properties of brick and stone masonry with or without reinforcement; how to calculate those masonries with different stress states.

124072 Structural Mechanics

Static flat bar system:

- Analyze geometrical structure.
- Analysis of internal forces of mobile and stationary load-bearing systems.
- Space system concept.
- Determination of displacement in a linear convergent plane bar system.
- Concept of superstatic system, superstatic order.
- Force method and calculation of the superstatic flat bar system.
- Transposition method for flat bar system.

124073 Foundation Engineering 2

Principles, processes, design rules for special types of foundations; deep foundation: pile foundation, bored pile foundation, barrette pile foundation, pipe pillar foundation; The foundation is subjected to horizontal loads and the foundation is subjected to

dynamic loads.
Calculation of building foundations on soft soil.

124074 Foundation Engineering Solutions
Help students master theoretical and semi-experimental principles to rationally design basic foundations to apply to different conditions of the ground under constructions; Particularly about the ground, students understand how to calculate problems related to the durability, stability and deformation of the ground.

124075 Steel Structures 1
Calculation and design of simple structural steel or wood and plastics. Consists of 2 parts:

- Steel structure: can calculate the types of connections, design beams, columns, trusses in the form of shapes or combinations.
- Wood structure: calculate the connections, choose the cross section of the structure using wood or soft links and some other types of load-bearing wood structures.

124076 Reinforced Concrete Structures 3

- Calculation of special reinforced concrete structures including: earth retaining walls, liquid storage tanks of all kinds, silos, bunkers and space roofs.
- Analyze internal forces in complex structural forms and grasp calculation techniques, reinforcement structures in those structures to apply in their professional practice in the long term.

124077 Project of Foundation Engineering
Apply the knowledge learned in the modules Soil Mechanics, Foundations and Foundations to design calculations for common foundations.

124078 Architectural Design 1
Civil architecture.
Architectural design bases: implementation sequence, architectural layout, functional space; the economic - technical characteristics when designing civil works such as houses, apartments, working houses, hotels, public works, special works ... will be the basic contents of the subject. study this.

124079 Project of Reinforced Concrete Structures

- Apply the knowledge learned in the subject of reinforced concrete structures on calculation and structure of flexural members to design a specific structure.
- Perform relatively complete calculation of the working floor using BTC. Including the determination of load types, determination of internal forces, combination and selection of reinforcement; Arrange reinforcement for structural members of floor - beams in 1 of 2 options: 1-way or 2 -way working plate.

124081 Construction Computing 1

Guide students to analyze and practice using SAP - 2000 software according to the current versions widely used in the field of study today.

124082 Applied Elasticity – Finite Element Method

This course helps students learn about a modern structural calculation method in the construction industry, understand the nature of structural analysis when using structural calculation software programmed according to the method. Finite elements are widely used today.

124083 Steel Structures 2

Calculation of special steel structures including: Industrial building frames, prestressed steel structures, large span buildings, pylons and slab steel structures.

Analyzing the internal forces of complex structural forms in order to have initial skills to study in-depth and know the structures and connections of steel structures in difficult cases.

124084 Project of Architectural Design

Through civil architecture, students when implementing this project will be able to choose one of the civil or public works such as apartments, offices, hotels, exhibition halls, libraries, post offices... to design specific architecture for a first work; including the planning of the total ground, floor plans, cross-sections, cross-sections in all directions. This is one of the 3 compulsory projects for construction majors.

124085 Construction Technology - Machinery

- Construction techniques: basic knowledge about construction methods of civil and industrial works, including main contents: construction of earthworks, construction of formwork, reinforcement, concrete. Construction work of components in the project and construction and finishing work.
- Construction machines: Basic knowledge about the characteristics and general structure of construction machines; structure, technical features, exploitation and use, simple calculation ... of machines commonly used in basic construction such as lifting machines, machines
- Earthworks, foundation reinforcement equipment, construction material production machines and construction machinery mining.

124086 BIM in Civil Engineering

Learn about BIM (Building Information Modeling) to create and use information models in the design, construction and operation phases of a project. Some specific applications of BIM construction information model for construction companies today are:

- Architectural design: from the ideation stage, energy analysis of the building.
- Structural design: make design plans, analyze structural diagrams.
- Electromechanical design: plan design, optimize design (collision reduction, altitude assurance, performance analysis)
- Shop drawing drawings, statistics
- Simulation of construction and erection sequence
- Component fabrication service
- Managing the total premises, assessing the feasibility of the construction site, labor safety
- Virtual Reality, Augmented Reality, 3D Printing, 3D Scanning

124087 Architectural Design 2

Industrial architecture; architecture of single-storey, multi-storey industrial houses and types. Consists of 2 parts:

* Principles of industrial house design.
* Principles of industrial building components (roof, floor, positioning shaft, crane ...).

124088 Project of Steel Structures

Students will perform a relatively complete calculation of a steel structure, usually a steel single-storey industrial building with a crane, including determining load types, determining internal forces, combinations and selecting cross-sections for those structural parts.

124089 Project of Building Construction

Project of Building Construction consists of 2 parts:

Part 1: Preparation of technical measures: Students must be able to state construction techniques with a predetermined type of work (whole block or assembly). Including support measures, formwork structure and concrete pouring or assembly of a reinforced concrete or steel building for civil or industrial buildings.

Part 2: Organizing: Students must plan the total construction site plan, make construction progress (line diagram, network diagram) with calculation of technical coefficients.

124090 Construction Electric Techniques

The course equips students with the general problems of calculating and designing power supply systems for construction works. The program also introduces students to some concepts about:

- Lightning protection system
- Communication system (communication system)
- Security system (security system)
- Fire protection system

- Elevator electrical system (electrification for elevator)
- Central air conditioning system and electric water pump system.
- TV antenna system (master antenna)

124091 English for Civil Engineering

Including the vocabulary of construction industry such as jobs, subcontractors, trades, materials, equipment, warning signs, problems on site…

124092 Structural Detailing Procedure

Redraw some drawings as required from the architectural design file of a project (apartment, office building, school, hospital, ...) or a new item of the work that has been appraised.

Calculate floor structure, longitudinal beams, stairs, lake (existing or assumed), frame (flat or spatial). Calculating and designing foundation solutions (single, tape, raft; pressed piles, bored drilling …) to choose the optimal solution for implementation.

- Proficient in using software: AutoCAD, Sap-2000, Microsoft Project 2003, ... to design, draw, calculate, statistics, ... to meet industry standards on architecture, construction structure, items to be implemented through the project.
- Construction can be done as soon as the project or work item is implemented.

124093 Construction Economics

Economic management and organization of production and business in the construction industry. Dive into the management and use of investment capital, evaluate the economic efficiency of investment capital, thereby offering the best investment projects and managing project implementation. Determination of economic and technical criteria in design and construction. Proposing measures to reduce construction costs on the basis of analyzing economic activities of construction companies.

124094 Construction Project Management

Help students understand the process and implementation sequence of construction investment project management, progress management, project quality and safety, cost and material management, payment decision. project contract payment, investment capital settlement...

124095 Water Supply & Sewage

Introduction to water supply and sewage problems outside and inside the house. The water supply section will cover the types of water sources and water treatment schemes, the water supply system for the area and for the construction site as well as the indoor water supply system; in which emphasis will be placed on the calculation and design of the water supply network. The sewage section will cover the main issues of regional and indoor drainage and wastewater treatment methods.

124096 Construction Estimates

Help students get acquainted with professional work, practice students familiarize themselves with the work of building bowls and formwork at the internship workshop at the school.

- Directly involved in construction work.
- Practice the finishing work of smoothing, cladding, painting....