

## Civil Engineering

### Introduction

Civil Engineering is a profession in which knowledge of mathematics and physical sciences are applied, ranging from providing structures for the use of civilization to creating, improving, and protecting the environment, as well as providing facilities for transportation, infrastructures, and industries. Civil engineers are involved in the planning, design, construction and operation of complex systems such as buildings and bridges, water purification and distribution systems, flood protections, highways, rapid transit and rail systems, coastal protection and harbors, airports, tunnels and underground constructions, dams, and power generators. Civil engineers are also involved in city planning, water, energy, and land remediation, as well as hazardous waste and chemicals disposal.

Civil Engineering Study Program at BINUS UNIVERSITY offers comprehensive programs leading to a bachelor degree in Civil Engineering.

### Vision

The foremost Civil Engineering Department that is in continuous pursuit of innovation and enterprise is adaptable to global changes.

### Mission

The missions of Civil Engineering Study Program are to:

1. Educating students on sustainable infrastructure by providing knowledge in Civil Engineering and related disciplines, and to prepare them for their career advanced degrees;
2. Providing a solid learning and research experience that nurtures leaders with creative and value-adding talents for the global community;
3. Conducting professional services and improve the quality of life of Indonesians and the international community.

### Program Objective

The objectives of the Study Program are:

1. To continue updating their professional development in civil engineering related field to benefit the organization and society;
2. To utilize professional and ethical related skills to work productively within their professions and communities.

### Student Outcomes

After completing the study, graduates:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors;
3. An ability to communicate effectively with a range of audiences;
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal context;

5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions;
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

### **Prospective Career of the Graduates**

Graduates of the Civil Engineering Study Program at Bina Nusantara University will be able to apply their knowledge and interpersonal skills in careers, both in private and public sectors, to conceive, plan, design, implement, operate and maintain the systems needed to support the physical infrastructure. Bina Nusantara University is committed to provide its undergraduate program with excellent academic preparation and interpersonal skills for direct entry into the profession, or post-graduate studies.

Graduates will be able to pursue a variety of career options in worldwide locations due to demands for improvements to civil infrastructure that are ever-present, because of population growth and deterioration of existing systems over time. Several career options are including but not limited to the following:

1. Structural Engineering: Structural Engineer, Project Civil Engineer, Precast Project Engineer, Civil Designer, Offshore Structure Engineer, Airfield Civil Engineer also applied programmer for structural engineering.
2. Hydrological, Water Resources Management (WAREM) and Environmental Engineering: Flood Mapping Services Manager, Water Resources Project Manager, Storm Water Management Engineer, Senior Municipal Engineer, Drainage Engineer and Hydraulic Engineer.
3. Transportation and Traffic Engineering: Transportation Project Manager, Transportation Design Manager, Traffic Engineer and Transportation Engineer.
4. Geotechnical Engineering: Geotechnical Engineering Manager, Reclamation Engineer, Soil Improvement Engineer and Foundation Engineer.
5. Highway Engineering: Bridge Engineer, Highway Design Project Manager, Highway Project Engineer, Highway Construction Inspector.
6. Construction Management: Senior Project Manager, Lean/Process Engineer, Construction QC Manager and BIM Expert.

### **Curriculum**

Civil Engineering Study Program at BINUS UNIVERSITY utilizes information technology as an integral part of teaching and learning process, particularly through MCL (Multi Channel Learning) using two delivery methods: Face to Face (F2F) in classrooms and Guided Self Learning Class (GSLC), which allow students to further their studies independently through all sources, whether from online reading or textbook. The Civil Engineering Study Program provides an integrated educational experience that combines basic and applied science theories with practical experience in laboratory experimentations, problems solving and civil engineering designs, as well as site visits.

The curriculum in the Civil Engineering Study Program provides students with a solid foundation in science, with introductory courses in all of the Civil Engineering technical areas. During their final year, students choose one of the following Civil Engineering emphasis areas:

- Structural Engineering
- Hydrological, WAREM and Environmental Engineering
- Transportation and Traffic Engineering

- Geotechnical Engineering
- Highway Engineering
- Construction Management and BIM

As seniors, students will receive a more intense design experience, learning about alternative solution, feasibility, economics, and detailed design descriptions. Moreover, students will receive additional knowledge from our Guest Lecturer in one subject (Case Study in Civil Engineering) using English media (Lecturer Presentation, handbook, homework, and exams). Students will also receive General Lecture from national and international professionals (members of Associations, Industries, or Constructions). In addition, students are required to take courses in professionalism and engineering ethics. These courses will culminate in major engineering design experiences to bridge the gap between educational and professional practice.

### Course Structure

Sem	Code	Course Name	SCU	Total	
1	CHAR6013013	Character Building: <i>Pancasila</i>	2	20	
	MATH6014013	Calculus I	4		
	SCIE6004013	Physics I	4		
	SCIE6014013	Chemistry for Civil Engineering*	2		
	CIVL6108013	Drawing Construction*	2		
	CIVL6001013	Introduction to Civil Engineering*	2		
	LANG6027013	Indonesian	2		
	<b>English University Courses I</b>				
	ENGL6128013	English in Focus	2		
	ENGL6130013	English for Business Presentation	2		
2	CHAR6014013	Character Building: <i>Kewarganegaraan</i>	2	20	
	SCIE6028013	Physics II	4/2		
	MATH6160013	Calculus II	2		
	CIVL6085013	Statics*&***	4		
	CIVL6086013	Engineering Geology*	2		
	ENTR6509001	Entrepreneurship: Ideation	2		
	<b>English University Courses II</b>				
	ENGL6129013	English Savvy	2		
	ENGL6131013	English for Written Business Communication	2		
3	CHAR6015013	Character Building: <i>Agama</i>	2	20	
	MATH6072013	Numerical Analysis	2		
	CIVL6109013	Integrated Pre-Construction Laboratory	1		
	MATH6022013	Engineering Mathematics I	4		
	CIVL6111013	Surveying*&***	3		
	CIVL6073013	Mechanics of Materials**	2		
	CIVL6113013	Soil Mechanics*&***	4		
	STAT6147013	Statistics Method	2		
4	MATH6161013	Engineering Mathematics II	2	19	
	CIVL6053013	Structural Analysis*	4		
	CIVL6114013	Fluid Mechanics & Hydraulics*&***	4		

Sem	Code	Course Name	SCU	Total	
	CIVL6112013	Construction Material Technology*&***	3		
	CIVL6110013	Integrated Infrastructure Material Laboratory	1		
	CIVL6087013	Foundation Engineering*&***	2/1		
	<b>Free Electives</b>		2		
5	CIVL6025013	Hydrology*&***	2	21	
	CIVL6075013	Theory and Design of Concrete Structures*	2/1		
	CIVL6076013	Theory and Design of Steel Structures	2/1		
	ENTR6511001	Entrepreneurship: Market Validation	2		
	CIVL6027013	Highway Engineering*&***	2/1		
	CIVL6054013	Traffic Engineering*	2		
	CIVL6115013	Construction Project Management*&***	2		
	<b>Elective Subjects: Computer Application****</b>				
	COMP6043013	Computer Applications in Structural Engineering*	2		
	COMP6044013	Computer Applications in Geotechnical Engineering*	2		
	COMP6046013	Computer Applications in Construction Management	2		
	COMP6045013	Algorithm & Programming	2		
	<b>Elective Subjects: Infrastructure in CE****</b>				
	CIVL6080013	Construction Methods & Heavy Equipment	2		
	CIVL6007013	Harbour Engineering*	2		
	CIVL8056013	Bridge Engineering*	2		
	CIVL6035013	Airport Engineering*	2		
	CIVL6009013	Urban Drainage	2		
	CIVL6037013	Railway Engineering*	2		
	CIVL8038013	Soil Improvement Method	2		
	CIVL6015013	Geosynthetic Application in Civil Engineering	2		
CIVL6030013	Environmental Engineering	2			
CIVL6002013	Case Study in Civil Engineering	2			
6	<b>Enrichment Program I</b>		20	20	
7	<b>Enrichment Program II</b>		20	20	
8	CIVL6123013	Pre-Thesis	2	6	
	CIVL6124013	Thesis	4		
	CIVL6005013	Thesis	6		
<b>Total Credits 146 SCU</b>					

\*) This course is delivered in English

\*\*) Global Learning System Course

\*\*\*) Entrepreneurship Embedded

\*\*\*\*) Elective Subjects: Students should choose two credits from each elective courses list.

**Free Electives:**

-) For 4<sup>th</sup> Semester: Students are required to choose from the list of Free Electives in Appendix.

**English University Courses:**

-) For 1st Semester: English University Courses I, students with Binus University English Proficiency Test score less than 500 will take English in Focus, and student with test score greater than or equal to 500 will take English for Business Presentation.

-) For 2nd Semester: English University Courses II, students with Binus University English Proficiency Test score less than 500 will take English Savvy, and students with test score greater than or equal to 500 will take English for Written Business Communication.

-) Students must pass English Savvy with a minimum Grade of C.

**Pre-thesis (2 SCU) & Thesis (4 SCU)** can be taken in the 6<sup>th</sup> and/or 7<sup>th</sup> semester by the students who meet the requirements from the Study Program/Program

**Appendix: Free Electives (4<sup>th</sup> Semester)**

No	Course Owner Department	Course Code	Course Name	SCU	Semester
1	Business Creation	ENTR6580005	Digital Business Transformation	2	4
2	Business Creation	ENTR6582005	Business Strategy	2	4
3	Business Management	MGMT6399005	Fundamentals of Supply Chain Management	2	4
4	Business Management	MGMT6401005	Digital Supply Chain Management	2	4
5	International Business Management	BUSS6162005	Market Entry Strategy	2	4
6	International Business Management	BUSS6191005	Export-Import Management	2	4
7	International Business Management	MGMT6369005	Corporate Strategy in International Business	2	4
8	Management	BUSS6088005	Current Issue in Business and Technology	2	4
9	Accounting	ACCT6353020	Management Information System	2	4
10	Accounting	TAXN6050020	Sales Tax and Customs	2	4
11	Accounting Bekasi	ACCT6382020	Business Process Analysis and Solution	2	4
12	Architecture	ARCH6054014	Interior Design Principles	2	4
13	Architecture	ARCH6059014	Building Material Knowledge	2	4
14	Industrial Engineering	ISYE6041011	Engineering Economy	2	4
15	Industrial Engineering	ISYE6113011	Leadership & Organizational Behavior	2	4
16	Industrial Engineering	ISYE6181011	System Engineering & Analysis	2	4
17	Interior Design	DSGN6608008	Interior Design and culture	2	4
18	Interior Design	DSGN6611008	Business in Interior Design	2	4
19	Business Information Technology	ISYS6577003	Machine Learning & Foundations	2	4
20	Business Information Technology	ISYS6606003	Smart Application	2	4
21	Information Systems	ISYS6478003	Research Methods in Information Systems	2	4
22	Information Systems	ISYS6594003	Coding for Finance	2	4
23	International Relations	INTR6144029	Contemporary Issues in European Society	2	4
24	International Relations	INTR6145029	Contemporary Issues in American Society	2	4
25	International Relations	INTR6146029	Contemporary Issues in East Asian Society	2	4
26	International Relations	INTR6147029	Contemporary Issues in African and Middle Eastern Societies	2	4
27	Business Law	LAWS6159028	Legal Aspect in Business	2	4
28	Business Law	LAWS6170028	Investment Law	2	4
29	Business Law	LAWS6171028	Business Competition & Consumer Protection Law	2	4
30	Business Law	LAWS6181028	Industrial Relations & Alternative Dispute Resolution	2	4

**Enrichment Program I (6<sup>th</sup> Semester) & Enrichment Program II (7<sup>th</sup> Semester):**

-) Student will take one of enrichment program tracks (off campus). See enrichment appendix for the tracks detail.

**Enrichment Track Scheme**

Track	Semester 6							Semester 7							
	IN	RS	EN	CD	SA	IS	etc	IN	RS	EN	CD	SA	IS	FS	etc
1				v				v							
2					v			v							
3		v						v							
4	v							v							
5						v		v							
6	v								v						
7	v									v					
8	v										v				
9	v												v		
10	v												v		

**Note:**

IN	: Certified Internship	SA	: Certified Study Abroad
RS	: Certified Research	IS	: Certified Specific Independent Study
EN	: Certified Entrepreneurship	FS	: Further Study
CD	: Certified Community Development	etc	: Study Program Special Purposes

**Description:**

Student will take one of enrichment program tracks

**Certified Internship Track**

Code	Course Name	SCU	Total
<b>Enrichment Program I</b>			
CIVL6077013	Industrial Experience	8	20
CIVL6125013	Technical Design in Civil Engineering	8	
CIVL6116013	Professional Ethics and Communication	4	
<b>Enrichment Program II</b>			
CIVL6081013	Project Experience	8	20
CIVL6126013	Technical Project	8	
CIVL6083013	Leadership and Organization Behavior	4	

**Certified Research Track**

Code	Course Name	SCU	Total
<b>Enrichment Program I/II</b>			
RSCH6223013	Research Experience	8	20
RSCH6514013	Scientific Writing in Civil Engineering	8	
RSCH6181013	Global EES in Civil Engineering	4	

### Certified Community Development Track

Code	Course Name	SCU	Total
<b>Enrichment Program I/II</b>			20
CMDV6123013	Community Outreach Project Implementation	8	
CMDV6294013	Community Outreach Project Design in Civil Engineering	8	
CMDV6097013	Employability and Entrepreneurial Skills in Civil Engineering	4	

### Certified Study Abroad Track

Code	Course Name	SCU	Total
<b>Enrichment Program I/II</b>			20
GLOB6005013	Elective Course for Study Abroad 1	4	
GLOB6006013	Elective Course for Study Abroad 2	4	
GLOB6007013	Elective Course for Study Abroad 3	4	
GLOB6008013	Elective Course for Study Abroad 4	4	
GLOB6009013	Elective Course for Study Abroad 5	2	
GLOB6010013	Elective Course for Study Abroad 6	2	
GLOB6011013	Elective Course for Study Abroad 7	2	
GLOB6012013	Elective Course for Study Abroad 8	2	
GLOB6013013	Elective Course for Study Abroad 9	2	
GLOB6014013	Elective Course for Study Abroad 10	2	
GLOB6015013	Elective Course for Study Abroad 11	2	
GLOB6016013	Elective Course for Study Abroad 12	2	
GLOB6251013	Elective Course for Study Abroad 29	4	

\*) Transferred courses will be transferred based on credit transfer policies on study program with total of 20 credits.

### Certified Specific Independent Study

Code	Course Name	SCU	Total
<b>Elective courses list for certified specific independent study*</b>			20
<b>Enrichment Program I/II</b>			
MICR6033013	Course Certification I	3	
MICR6034013	Technical Skill Enrichment I	4	
MICR6035013	Industrial Project I	9	
MICR6036013	Soft Skill Enrichment I	4	
MICR6001013	Elective Course for Micro Credential Course 1	8	
MICR6002013	Elective Course for Micro Credential Course 2	8	
MICR6003013	Elective Course for Micro Credential Course 3	6	
MICR6004013	Elective Course for Micro Credential Course 4	6	
MICR6005013	Elective Course for Micro Credential Course 5	6	
MICR6006013	Elective Course for Micro Credential Course 6	5	
MICR6007013	Elective Course for Micro Credential Course 7	5	
MICR6008013	Elective Course for Micro Credential Course 8	5	

Code	Course Name	SCU	Total
MICR6009013	Elective Course for Micro Credential Course 9	5	
MICR6010013	Elective Course for Micro Credential Course 10	4	
MICR6011013	Elective Course for Micro Credential Course 11	4	
MICR6012013	Elective Course for Micro Credential Course 12	4	
MICR6013013	Elective Course for Micro Credential Course 13	4	
MICR6014013	Elective Course for Micro Credential Course 14	4	
MICR6015013	Elective Course for Micro Credential Course 15	3	
MICR6016013	Elective Course for Micro Credential Course 16	3	
MICR6017013	Elective Course for Micro Credential Course 17	3	
MICR6018013	Elective Course for Micro Credential Course 18	3	
MICR6019013	Elective Course for Micro Credential Course 19	3	
MICR6020013	Elective Course for Micro Credential Course 20	3	
MICR6021013	Elective Course for Micro Credential Course 21	2	
MICR6022013	Elective Course for Micro Credential Course 22	2	
MICR6023013	Elective Course for Micro Credential Course 23	2	
MICR6024013	Elective Course for Micro Credential Course 24	2	
MICR6025013	Elective Course for Micro Credential Course 25	2	
MICR6026013	Elective Course for Micro Credential Course 26	2	
MICR6027013	Elective Course for Micro Credential Course 27	2	
MICR6028013	Elective Course for Micro Credential Course 28	2	
MICR6029013	Elective Course for Micro Credential Course 29	1	
MICR6030013	Elective Course for Micro Credential Course 30	1	
MICR6031013	Elective Course for Micro Credential Course 31	1	
MICR6032013	Elective Course for Micro Credential Course 32	1	

*\*) For students who take BINUS certified specific independent study courses, they should take the first 4 courses on the list above (20 credits). Meanwhile, electives courses 1 to 32 are transferred courses for students who take certified specific independent study outside BINUS University. Transferred courses will be transferred based on credit transfer policies on study program with total of 20 credits.*

### Further Study Track

Code	Course Name	SCU	Total
<b>Enrichment Program II (Master of Management Information Systems: Information Systems Strategic Management Stream)</b>			20
ISYS6829013	Digital Technology and Transformation	4	
ISYS6830013	Data Analytics for Business	6	
ISYS6834013	Applied Technology in Civil Engineering*	4	
ISYS6849013	Strategic Planning for Information Systems	6	
<b>Enrichment Program II (Master of Management Information Systems: Digitalpreneurship Stream)</b>			
ISYS6829013	Digital Technology and Transformation	4	
ISYS6830013	Data Analytics for Business	6	
ISYS6834013	Applied Technology in Civil Engineering*	4	



Code	Course Name	SCU	Total
ISYS6848013	New Media Ventures and Innovation	6	
<b>Enrichment Program II (Master of Management: Business Management Program)</b>			
ENTR6561013	Design Thinking for Innovation	4	20
MKTG6299013	Business Negotiation	4	
MKTG6300013	Marketing Strategy	4	
MGMT6420013	Human Resources Management Strategy	4	
STAT6187013	Applied Statistics	4	
<b>Enrichment Program II (Master of Industrial Engineering)</b>			
ISYS6850010	Digital Technology and Transformation	6	20
ISYE6322010	System Simulation and Modelling	6	
ISYE6320010	Applied Technology in Computer Engineering*	4	
RSCH6606010	Research Methodology	4	

\*) Students are required to obtain certification no later than the end of the first semester of the master's (S2) program, as outlined in the university's official guidelines. This certification will be transferred as an undergraduate (S1) course and reported in the seventh semester of the undergraduate program.

#### The Table of Prerequisite for Civil Engineering Study Program

Course		SCU	Sem.	Prerequisite Course		SCU	Sem.
MATH6022013	Engineering Mathematics I	4	3	MATH6014013	Calculus I	4	1
CIVL6053013	Structural Analysis	4	4	CIVL6085013	Statics	4	2

#### Student should pass all of these quality controlled courses as listed below:

No.	Course Code	Course Name	Minimal Grade
1.	CHAR6013013	Character Building: <i>Pancasila</i>	B
2.	ENTR6511001	Entrepreneurship: Market Validation	C
3.	CIVL6085013	Statics*	C
4.	CIVL6113013	Soil Mechanics*	C
5.	CIVL6114013	Fluid Mechanics & Hydraulics	C
6.	CIVL6027013	Highway Engineering*	C
7.	CIVL6075013	Theory and Design of Concrete Structure	C
8.	CIVL6115013	Construction Project Management	C

\*) Tutorial & Multipaper