

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 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 protection, highways, rapid transit and rail systems, harbors, airports, tunnels and underground construction, dams, and power generators. Civil engineers are also involved in city planning, water, air, and land remediation, as well as hazardous wastes and chemicals disposal.

Civil Engineering Study Program at Bina Nusantara 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 mission of Civil Engineering Department is to contribute to the global community through the provision of world-class education by:

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 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. Are able to apply knowledge of mathematics, science, and engineering.
2. Are able to design and conduct experiments, as well as to analyze and interpret data.
3. Are able to design a system, components, or process to meet desired needs.
4. Are able to function on multidisciplinary teams.
5. Are able to identify, formulate and solve engineering problems.
6. Have the understanding of professional and ethical responsibility.
7. Are able to communicate effectively.
8. Understands the impact of engineering solutions in a global, economic, environmental, and societal context.
9. A recognition of the need for, and an ability to engage in life-long learning.

10. Have the knowledge of contemporary issues.
11. Are able to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Prospective Career of the Graduates

Graduates of the Civil Engineering Study Program at Bina Nusantara University would 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 education.

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 include, but not limited to, the following:

1. Structural Engineering: Project Civil Engineer, Precast Project Engineer, Civil Designer, Offshore Structure Engineer, Airfield Civil Engineer.
2. Hydrological and Environmental Engineering: Flood Mapping Services Manager, Water Resources Project Manager, Storm Water Management Engineer, Senior Municipal Engineer, Drainage Engineer.
3. Transportation and Traffic Engineering: Transportation Project Manager, Transportation Design Manager, Traffic Engineer.
4. Geotechnical Engineering: Geotechnical Engineering Manager, Reclamation Engineer, Soil Improvement 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.

Curriculum

Civil Engineering Study Program at Bina Nusantara University utilizes information technology as an integral part of the teaching and learning processes, 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 theories with practical experience in laboratory experimentations, problems solving and 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:

- | | |
|---|-----------------------------|
| 1. Structural Engineering | 4. Geotechnical Engineering |
| 2. Hydrological and Environmental Engineering | 5. Highway Engineering |
| 3. Transportation and Traffic Engineering | 6. Construction Management |

As seniors, students receive an even more intense design experience, learning about alternative solution, feasibility, economics, and detailed design descriptions. The students also received additional knowledge from our Guest Lecturer in one subject (Case Study in Civil Engineering), which make use of English media (Lecturer Presentation, handbook, homework, and exams). They also receive General Lecture from national and international professionals (members of Associations, Industries, or Constructions). Students are also 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 | CHAR6013 | Character Building: Pancasila | 2 | 20 | |
| | MATH6014 | Calculus I | 4 | | |
| | SCIE6004 | Physics I | 4 | | |
| | SCIE6014 | Chemistry for Civil Engineering* | 2 | | |
| | CIVL6108 | Drawing Construction* | 2 | | |
| | CIVL6001 | Introduction to Civil Engineering* | 2 | | |
| | LANG6027 | Indonesian | 2 | | |
| | English University Courses I | | | | |
| | ENGL6128 | English in Focus | 2 | | |
| | ENGL6130 | English for Business Presentation | 2 | | |
| 2 | CHAR6014 | Character Building: Kewarganegaraan | 2 | 20 | |
| | SCIE6028 | Physics II | 4/2 | | |
| | MATH6046 | Calculus II | 4 | | |
| | CIVL6085 | Statics*&*** | 4 | | |
| | ENTR6509 | Entrepreneurship: Ideation | 2 | | |
| | English University Courses II | | | | |
| | ENGL6129 | English Savvy | 2 | | |
| | ENGL6131 | English for Written Business Communication | 2 | | |
| 3 | CHAR6015 | Character Building: Agama | 2 | 22 | |
| | COMP6045 | Algorithm & Programming | 2 | | |
| | CIVL6109 | Integrated Pre-Construction Laboratory | 1 | | |
| | CIVL6030 | Environmental Engineering*&*** | 2 | | |
| | MATH6022 | Engineering Mathematics I | 4 | | |
| | CIVL6111 | Surveying*&**** | 3 | | |
| | CIVL6073 | Mechanics of Materials** | 2 | | |
| | CIVL6113 | Soil Mechanics*&*** | 4 | | |
| | CIVL6086 | Engineering Geology* | 2 | | |
| 4 | MATH6024 | Engineering Mathematics II | 4 | 23 | |
| | CIVL6053 | Structural Analysis* | 4 | | |
| | CIVL6114 | Fluid Mechanics & Hydraulics*&*** | 4 | | |
| | CIVL6112 | Construction Material Technology*&**** | 3 | | |
| | MATH6072 | Numerical analysis | 2 | | |
| | CIVL6110 | Integrated Infrastructure Material Laboratory | 1 | | |
| | CIVL6087 | Foundation Engineering*&*** | 2/1 | | |
| | STAT6147 | Statistics Method | 2 | | |
| 5 | CIVL6025 | Hydrology*&*** | 2 | 19 | |
| | CIVL6075 | Theory and Design of Concrete Structures* | 2/1 | | |
| | CIVL6076 | Theory and Design of Steel Structures | 2/1 | | |
| | ENTR6511 | Entrepreneurship: Market Validation | 2 | | |
| | CIVL6054 | Traffic Engineering* | 2 | | |
| | CIVL6027 | Highway Engineering*&*** | 2/1 | | |
| | CIVL6115 | Construction Project Management* | 2 | | |

| Sem | Code | Course Name | SCU | Total |
|-----------------------------|---|--|-----|-------|
| 5 | Elective Subjects : Computer Application**** | | | 19 |
| | COMP6043 | Computer Applications in Structural Engineering* | 2 | |
| | COMP6044 | Computer Applications in Geotechnical Engineering* | 2 | |
| | COMP6046 | Computer Applications in Construction Management | 2 | |
| 6 | Enrichment Program I | | 16 | 16 |
| 7 | Enrichment Program II | | 16 | 16 |
| 8 | CIVL6005 | Thesis | 6 | 10 |
| | CIVL6002 | Case Study in Civil Engineering* | 2 | |
| | Elective Subjects : Infrastructure in CE**** | | | |
| | CIVL6080 | Construction Methods & Heavy Equipment | 2 | |
| | CIVL6007 | Harbour Engineering* | 2 | |
| | CIVL8056 | Bridge Engineering* | 2 | |
| | CIVL6035 | Airport Engineering* | 2 | |
| | CIVL6009 | Urban Drainage | 2 | |
| | CIVL6037 | Railway Engineering* | 2 | |
| | CIVL8038 | Soil Improvement Method | 2 | |
| | CIVL6015 | Geosynthetics Application in Civil Engineering | 2 | |
| TOTAL CREDIT 146 SCU | | | | |

*) This course is delivered in English

**) Global Learning System Course

***) Entrepreneurship Embedded

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

English University Courses:

-) For 1st Semester: English University Courses I, student with score BINUS UNIVERSITY English Proficiency Test less than 500 will take English in Focus, and student with score test greater than or equal to 500 will take English for Business Presentation
-) For 2nd Semester: English University Courses II, student with score BINUS UNIVERSITY English Proficiency Test less than 500 will take English Savvy, and student with score test greater than or equal to 500 will take English for Written Business Communication
-) Students must pass English Savvy with a minimum Grade of C.

Enrichment Program I (6th Semester) & Enrichment Program II (7th 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 | etc | IN | RS | EN | CD | SA | etc |
| 1 | | | | v | | | v | | | | | |
| 2 | | | | | v | | v | | | | | |
| 3 | | v | | | | | v | | | | | |
| 4 | v | | | | | | v | | | | | |
| 5 | v | | | | | | | v | | | | |
| 6 | v | | | | | | | | | v | | |
| 7 | v | | | | | | | | | | v | |

Notes:

IN : Internship
 RS : Research
 EN : Entrepreneurship
 CD : Community Development
 SA : Study Abroad
 etc : Study Program Special Purposes

Notes:

Student will take one of enrichment program tracks

Enrichment Internship Track

| Code | Course Name | SCU | Total |
|------------------------------|---------------------------------------|-----|-------|
| Enrichment Program I | | | 16 |
| CIVL6077 | Industrial Experience | 8 | |
| CIVL6078 | Technical Design in Civil Engineering | 4 | |
| CIVL6116 | Professional Ethics and Communication | 4 | |
| Enrichment Program II | | | 16 |
| CIVL6081 | Project Experience | 8 | |
| CIVL6082 | Technical Project | 4 | |
| CIVL6083 | Leadership and Organization Behavior | 4 | |

Enrichment Research Track

| Code | Course Name | SCU | Total |
|--------------------------------|---|-----|-------|
| Enrichment Program I/II | | | 16 |
| RSCH6223 | Research Experience | 8 | |
| RSCH6166 | Scientific Writing in Civil Engineering | 4 | |
| RSCH6181 | Global EES in Civil Engineering | 4 | |

Enrichment Community Development Track

| Code | Course Name | SCU | Total |
|--------------------------------|---|-----|-------|
| Enrichment Program I/II | | | 16 |
| CMDV6123 | Community Outreach Project Implementation | 8 | |
| CMDV6083 | Community Outreach Project Design in Civil Engineering | 4 | |
| CMDV6097 | Employability and Entrepreneurial Skills in Civil Engineering | 4 | |

Enrichment Study Abroad Track

| Code | Course Name | SCU | Total |
|--------------------------------|-------------------------------------|-----|-------|
| Enrichment Program I/II | | | |
| GLOB6005 | Elective Course for Study Abroad 1 | 4 | 16 |
| GLOB6006 | Elective Course for Study Abroad 2 | 4 | |
| GLOB6007 | Elective Course for Study Abroad 3 | 4 | |
| GLOB6008 | Elective Course for Study Abroad 4 | 4 | |
| GLOB6009 | Elective Course for Study Abroad 5 | 2 | |
| GLOB6010 | Elective Course for Study Abroad 6 | 2 | |
| GLOB6011 | Elective Course for Study Abroad 7 | 2 | |
| GLOB6012 | Elective Course for Study Abroad 8 | 2 | |
| GLOB6013 | Elective Course for Study Abroad 9 | 2 | |
| GLOB6014 | Elective Course for Study Abroad 10 | 2 | |
| GLOB6015 | Elective Course for Study Abroad 11 | 2 | |
| GLOB6016 | Elective Course for Study Abroad 12 | 2 | |

*) Transferred courses will be transferred based on credit transfer policies on study program with total of 16 credits.

The Table of Prerequisite for Civil Engineering (S1)

| Course | | SCU | Sem. | Prerequisite Course | | SCU | Sem. |
|----------|---------------------------|-----|------|---------------------|------------|-----|------|
| MATH6022 | Engineering Mathematics I | 4 | 3 | MATH6014 | Calculus I | 4 | 1 |
| CIVL6053 | Structural Analysis | 4 | 4 | CIVL6085 | Statics | 4 | 2 |

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

| No. | Course Code | Course Name | Minimal Grade |
|-----|-------------|---|---------------|
| 1. | CHAR6013 | Character Building: <i>Pancasila</i> | B |
| 2. | ENTR6511 | Entrepreneurship: Market Validation | C |
| 3. | CIVL6085 | Statics* | C |
| 4. | CIVL6113 | Soil Mechanics* | C |
| 5. | CIVL6114 | Fluid Mechanics & Hydraulics | C |
| 6. | CIVL6027 | Highway Engineering* | C |
| 7. | CIVL6075 | Theory and Design of Concrete Structure | C |
| 8. | CIVL6115 | Construction Project Management | C |

*) Tutorial & Multipaper