Computer Engineering

Introduction
The Computer Engineering (CEN) Study Program was established in September 1987 under the Faculty of Computer Studies and since 2011 are under Faculty of Engineering BINUS UNIVERSITY. The CEN Study Program is accredited Grade “A” by the National Board of Higher Education (BAN-PT) in 2013 and also accredited by the Engineering Accreditation Commission of ABET, www.abet.org in 2015. It has various alumni who have gone on to take part in various domains of the business industry. The CEN Study Program was founded to meet the demand of knowledge about computer systems encompassing computer hardware, software and computer networks. The Institute of Electrical & Electronic Engineers (IEEE) and the Association for Computing Machinery (ACM), the well established and world-famous organizations, use the following definition: “Computer Engineering embodies the science and the technology of design, construction, implementation and maintenance of the hardware and the software components of modern computing systems and computer-controlled equipment,” and its graduates stated: “Computer Engineers are solidly grounded in the theories and principles of computing, mathematics, and engineering; and apply these theoretical principles to design hardware, software, networks, and computerized equipment and instruments to solve problems in diverse application domains.”

Hence, graduates of the CEN Study Program will enjoy the knowledge of computer software as well as computer hardware. This will allow graduates to contribute to any application wherever computers are used. The development of Information Technology and the need for experienced computer systems professionals is behind the innovative CEN Program. Currently, the Program covers expertise in understanding to build completed computer system solution that consists of hardware and software, ranging from communication system to intelligent embedded systems.

Vision
A world class computer engineering study program that focuses on the development of smart systems and continuously contribute to fostering and empowering society for the benefit of mankind.

Mission
The mission of Computer Engineering Department is to contribute to the global community through the provision of world-class education by:
1. Educating BINUSIAN to meet global standards.
2. Conducting high-impact research to solve nation's problems.
3. Providing a vibrant environment for teaching and research.
4. Fostering BINUSIAN as a lifelong learner in order to adapt to rapid changes.
5. Empowering BINUSIAN to use their knowledge to serve and build the nation.
Program Objectives
The objectives of the program are:
1. Our graduates will excel in methodological and computational skills to solve problems creatively within their professional and communities.
2. Our graduates will lead the team and professionally responsible to benefit the organizations, society, and nation.
3. Our graduates will sustainably update their knowledge by engaging in life-long learning to adapt rapidly changing work environments and to meet evolving global requirements.

Student Outcomes
After completing the study, graduates are:
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
At the career level, computer engineering offers two principle paths – hardware and software engineering – and multiple sub specialty or areas of concentration, such as the following:
- Intelligence
- Operating System & Networks
- Telecommunication
- Robotics
- Software Application
- Computer Design & Architecture

Computer engineering exist at the intersection of electrical engineering and computer science, but its impact stretches well beyond these two areas. It has become part of a larger interdisciplinary field, integrating with areas ranging from biology to medicine, environmental engineering to physics. Indeed, computer engineering is part of numerous emerging industries. Below is a list of five emerging industries creating new opportunities for computer engineers.
- Big Data
- Nano Technology
- Cyber security
- Energy Efficient Computing
- Green Information and Communication Technology
- Internet of Things
Curriculum

The Computer Engineering curriculum is developed based on the IEEE-ACM international curriculum as well as the APTIKOM national curriculum. Both are curricula developed by professional engineers and educators in their fields who are members of a professional association. Concerning the two curriculums above, the curriculum used by the Computer Engineering Study Program can produce graduates who can answer local and global challenges.

The curriculum structure of the Computer Engineering Study Program consists of five parts. The first part is the mathematics and basic science composed of 32 credits. The second part is engineering science consisting of 31 credits. The third part is engineering design consisting of 32 credits. The fourth part is the design consisting of 6 credits, and the last part is the university courses consisting of 45 credits. Enrichment 3 + 1 program is in the university courses part that expect the students to face real computer engineering problems that exist in the area of research, industry, community development and entrepreneurship.

Course Structure

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**TOTAL CREDIT 146 SCU**

*) This course is delivered in English  
**) Global Learning System Course

**Streaming/Free Electives:**

- For 5th Semester: Students are required to choose Streaming or Minor or Free Electives. For Free Electives, students are required to choose from the list of Free Electives in Appendix.

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

### Appendix Foreign Language Courses

<table>
<thead>
<tr>
<th>Foreign Language Courses</th>
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<tr>
<td>ENGL6253010 English for Fronrunners</td>
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<tr>
<td>ENGL6254010 English for Independent Users</td>
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<tr>
<td>ENGL6255010 English for Professionals</td>
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<tr>
<td>JAPN6190010 Basic Japanese Language</td>
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<tr>
<td>CHIN6163010 Basic Chinese Language</td>
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</table>

1. Students with Binus University English Proficiency Test score less than 437 are required to take English for Fronrunners and English for Independent Users.
2. Students with Binus University English Proficiency Test score less than 520 are required to take English for Independent Users and English for Professionals.
3. Students with Binus University English Proficiency Test score equal to or greater than 520 are required to take English for Professionals and choose Basic Japanese Language or Basic Chinese Language.
4. Students are required to pass the foreign language courses before they take enrichment.
5. Students can see the requirements to pass the foreign language courses at BINUSMAYA – Beelingu.

### Minor Scheme

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<td>Sustainable Development</td>
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<td>Cross Cultural Communication</td>
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<td>Interactive &amp; Users Experience Design</td>
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<tr>
<td>Data Analytics</td>
<td>∨</td>
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<tr>
<td>Robotic Process Automation</td>
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<tr>
<td>Event Business and Entertainment</td>
<td>∨</td>
</tr>
<tr>
<td>Creative Digital Storytelling</td>
<td>∨</td>
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<tr>
<td><strong>Minor @ Binus Alam Sutera</strong></td>
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<tr>
<td>Digital Transformation</td>
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<td><strong>Minor @ Binus Bekasi</strong></td>
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<td>Virtual Services Experience</td>
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<td>Culinary</td>
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<td><strong>Minor @ Binus Semarang</strong></td>
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<tr>
<td>Metaverse in Business</td>
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<tr>
<td>Content Creation</td>
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The minor programs can change anytime based on the trends of knowledge and industry each year. Students will receive information about the updated minor programs during the registration period.
### 1. Digital Ecosystem

**Fundamental Courses**

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### 2. Cross Cultural Communication

**Fundamental Courses**

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### 3. Interactive & Users Experience Design

**Fundamental Courses**

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### 4. Data Analytics

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### 5. Robotic Process Automation

**Fundamental Courses**

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7. Creative Digital Storytelling

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8. Digital Transformation

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9. Virtual Services Experience

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<td>ACCT6350020 Virtual Financial Services</td>
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11. Metaverse in Business

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12. Content Creation

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Appendix: Free Electives (5th Semester)

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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

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**Note:**
- **IN**: Certified Internship
- **RS**: Certified Research
- **EN**: Certified Entrepreneurship
- **SA**: Certified Study Abroad
- **IS**: Certified Specific Independent Study
- **FS**: Further Study
**Description:**
Student will take one of enrichment program tracks

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### Enrichment Program I

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### Certified Study Abroad Track

#### Elective courses list for study abroad*

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

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*) 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

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<td>ISYE6230010</td>
<td>System Simulation and Modeling</td>
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<td>RSCH6606010</td>
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### Student should pass all of these quality controlled courses as listed below:

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<td>CHAR6013010</td>
<td>Character Building: Pancasila</td>
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<td>2.</td>
<td>COMP6875010</td>
<td>Physical Computing &amp; Algorithm</td>
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<td>3.</td>
<td>CPEN6219010</td>
<td>Circuit &amp; Electronics*</td>
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<td>5.</td>
<td>CPEN6220010</td>
<td>Computer Network &amp; Information Security</td>
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<td>Mobile Application Development for Engineering*</td>
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<td>7.</td>
<td>CPEN6252010</td>
<td>Introduction to Microcontroller*</td>
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<td>CPEN6254010</td>
<td>IOT Design &amp; Application</td>
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<td>9.</td>
<td>ENTR6511001</td>
<td>Entrepreneurship: Market Validation</td>
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*) Tutorial & Multipaper