Software Engineering

Introduction

Computer Science Software Engineering Program at Bina Nusantara University was founded in September 2020, at Bina Nusantara University in Bekasi. Software engineering is the branch of computer science that deals with the design, development, testing, and maintenance of software applications.

Software engineers apply engineering principles and knowledge of programming languages to build software solutions for end users. Software engineers design and develop computer games, business applications, operating systems, network control systems, and middleware, to name just a few of the many career paths available.

Computer Science Software Engineering students learn how to assess customer needs and build software that is genuinely useful for and usable by the customer and satisfies all the requirements needed The majors focus is on software development, verification, validation, process, and quality. Emphasized areas include visualization, graphics and informatics.

A career as a software engineer can be both fun and challenging with opportunities to work in almost any industry, including large and small businesses, government agencies, nonprofit organizations, healthcare facilities, and more. And as technology continues to evolve, the need for software developers continues to grow. Many companies are also shifting towards hiring software engineers who work from home, allowing for increased flexibility and more opportunities to enter the field.

Vision

A world class study program by providing excellent educational experiences in Computer Science, which focuses on developing creative technology solutions, fostering and empowering the society in building and serving the nation.

Mission

The mission of Computer Science Department is to contribute to the global community through the provision of world-class education by:

1. Educating students to effectively apply their educational experiences in developing creative solutions in computer science, to solve real-world problems.
2. Preparing graduates to develop exemplary soft skills & technical skills required as computer science professionals, leaders, and entrepreneurs in global market.
3. Promoting high impact computer science research that contributes to the nation.
4. Fostering BINUSIAN as computer science lifelong learners through self- enrichment.
5. Empowering BINUSIAN to continuously improve society's quality of life through knowledge in computer science.

Program Objective

The objectives of the program are:

1. Graduates will become successful professionals in ICT fields

2. Graduates will obtain employment in global companies or become entrepreneurs
3. Graduates will obtain professional certification or continue their study to the postgraduate

Student Outcomes

After completing the study, graduates are:

1. Able to analyze a complex computing problem and to apply principles of computing and other relevant.
2. Able to design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of computer science.
3. Able to communicate effectively in a variety of professional contexts.
4. Able to recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Able to function effectively as a member or leader of a team engaged in activities appropriate to computer science.
6. Able to apply computer science theory and software development fundamentals to produce computing-based.
7. Able to develop software applications which can solve the problems in informatics.

Prospective Career of the Graduates

After finishing the program, the graduate of the Computer Science Software Engineering Program could follow a career as:

1. Application Software Developers
2. IT Consultant
3. Project Manager
4. Automotive Software Engineer
5. Embedded Systems Engineer
6. Lecturer / Researcher
7. Application Architect
8. UI designer
9. Business System Analyst
10. System Analyst
11. Requirement Engineer

Curriculum

The curriculum of the Computer Science Software Engineering Program has been developed in line with the National Curriculum. Also, the local content has been developed in line with the Computer Science Curriculum standard of ACM (Association for Computing Machinery), several local and foreign universities, and market trends, so that the graduates of the Computer Science Software Engineering Program are expected to be able to face competition at both a national and international level.

Generally, the subjects of the curriculum 2024 are divided into the following groups of subjects:

Mathematics Group (Science)

The objective of this group is to provide an understanding of mathematics as one of the principal foundations of computer science. Another objective is to give an understanding of scientific methodology (data collection, hypothesis, research, analysis) in problem-solving.

Character Building Group (Professional Practices)

The objective of this group is to develop the personal strengths of the student and to provide them with a professional character, professionalism in their field, management skills, oral and written communication skills, understanding of business ethics, the ability to work as a team, and to develop a "Binusian" Character.

Core Group

The objective of this group is to provide a grounding in Computer Science through practice as well as applied theory which is required by business both now and in the future. The subjects that are included in this group are programming, algorithm design and analysis, software engineering, database systems, computer graphics, multimedia technology, human and computer interaction, operation systems, computer architecture, and computer networks.

Entrepreneur and Employability Skill

The objective of this group of subjects is to prepare students with professional experience, work ethics and the experience of the working environment. The students are expected to apply and practice their knowledge in the real working area such as industry, research lab, or as an entrepreneur startup. They are also expected to give reports on the result of the subjects.

Program Courses Software Engineering

The objective of this group of subjects is concerned with developing and maintaining software systems that behave reliably and efficiently, are affordable to develop and maintain and satisfy all the requirements that customers have defined for them. The objective of this group is to explore the various methodologies and software engineering equipment and integrate significant mathematics, computer science, and practices whose origins are in engineering.

Course Structure

Sem	Code	Course Name	SCU	Total
1	CHAR6013001	Character Building: Pancasila	2	20
	MATH6025001	Discrete Mathematics	4	
	MATH6030001	Linear Algebra	2	
	COMP6047001	Algorithm and Programming[2] **(AOL)**	4/2	
	COMP6798001	Program Design Methods[1] **(AOL)**	2	
	LANG6027001	Indonesian	2	
	COMP6828001	Introduction to Software Engineering	2	
	Foreign Language Courses		0	
2	CHAR6014001	Character Building: Kewarganegaraan	2	20
	COMP6048001	Data Structures[1&2] **(AOL)**	4/2	
	MATH6031001	Calculus	4	
	ENPR6311001	Creativity and Innovation	2	

Sem	Code	Course Name	SCU	Total
	COMP6829001	Software Design	2/1	
	MATH6183001	Scientific Computing **(AOL)**	2/1	
	Foreign Language Courses			
3	CHAR6015001	Character Building: Agama	2	19
	COMP6049001	Algorithm Design and Analysis[1] **(AOL)**	4	
	CPEN6247001	Computer Networks **(AOL)**	2/1	
	COMP6065001	Artificial Intelligence[2] **(AOL)**	4	
	SCIE6063001	Computational Physics **(AOL)**	2/1	
	COMP6799001	Database Technology[2] **(AOL)**	2/1	
	Foreign Language Courses			
4	COMP6800001	Human and Computer Interaction[2] **(AOL)**	2/1	21
	COMP6100001	Software Engineering[2] **(AOL)**	4	
	SCIE6062001	Computational Biology	2/1	
	STAT6171001	Basic Statistics	2	
	COMP6830001	Machine Learning[2] **(AOL)**	2/1	
	COSC6049001	Framework Layer Architecture **(AOL)**	2/2	
	COMP6697001	Operating System **(AOL)**	2	
	Foreign Language Courses			
5	COMP6062001	Compilation Techniques	4	20
	COMP6549001	Software Security[2]	2	
	ENPR6312001	Venture Creation	2	
	COMP6696001	Research Methodology in Computer Science[1] **(AOL)**	2	
	COMP6832001	Cloud Infrastructure	2	
	COMP6883001	Automation Testing	2/2	
	COSC6048001	Code Reengineering **(AOL)**	4	
6	**Enrichment Program I**			20
7	**Enrichment Program II**			20
8	COMP6833001	Pre-Thesis	2	6
	COMP6834001	Thesis	4	
	COMP6881001	Thesis	6	
				Total Credits 146 SCU

[1]) This course is delivered in English
[2]) Global Learning System Course

-) **(AOL)** *- Assurance of Learning Process System*

Foreign Language Courses:
Students will take foreign language courses according to Beelingua Placement Test results. See foreign language courses appendix for the details. Students must pass with a minimum Grade of C.

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

Foreign Language Courses		SCU
ENGL6253001	English for Frontrunners	0
ENGL6254001	English for Independent Users	0
ENGL6255001	English for Professionals	0
JAPN6190001	Basic Japanese Language*	0
CHIN6163001	Basic Chinese Language*	0

*) This course is optional for students

1. *Students with Beelingua Placement Test score less than 60 are required to take English for Frontrunners and English for Independent Users.*
2. *Students with Beelingua Placement Test score between 60 and 99 are required to take English for Independent Users and English for Professionals.*
3. *Students with Beelingua Placement Test score greater than 99 are required to take English for Professionals. Additionally, students may choose to take either 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 – Beelingua.*

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	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			
11					v								v		
12					v									v	
13							v	v							
14							v				v				
15							v					v			
16							v						v		
17	v													v	
18		v												v	
19						v		v							
20						v					v				
21						v						v			

Note:

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

Description:

1. Students will take only one track in each Enrichment Program.
2. Students who failed in Enrichment Program I can retake according to the table above.
3. As for Enrichment Program II, students who failed should retake the same track, except Specific Independent Study.
4. For those who failed in the Study Abroad track will retake the courses from the home campus.

Company Internship Track

Code	Course Name	SCU	Total
Enrichment Program I			20
COMP6426001	Industrial Experience in Information Technology	8	
COMP6762001	Information Technology Practice in Industrial Experience	8	
COMP6514001	EES in Information Technology Industry	4	
Enrichment Program II			20
COMP6429001	Professional Experience in Information Technology	8	
COMP6763001	Information Technology Practice in Professional Experience	8	
COMP6430001	Professional Development in Information Technology Industry	4	

Entrepreneurship Track

Code	Course Name	SCU	Total
Enrichment Program I			20
ENTR6943001	New Venture Initiation in Computer Science	8	
ENTR6945001	Computer Science Product Development Process	8	
ENTR6947001	EES in New Computer Science Business I	4	
Enrichment Program II			20
ENTR6944001	Computer Science Product Launching	8	
ENTR6946001	Computer Science Business Development	8	
ENTR6948001	EES in New Computer Science Business II	4	

Research Fellowship Track

Code	Course Name	SCU	Total
Enrichment Program I			20
RSCH6565001	Research Experience I in Computer Science	8	
RSCH6567001	Scientific Writing I in Computer Science	8	
RSCH6569001	Global EES I (Team Work, Communication, Problem Solving & Decision Making) in Computer Science	4	
Enrichment Program II			20
RSCH6566001	Research Experience II in Computer Science	8	
RSCH6568001	Scientific Writing II in Computer Science	8	
RSCH6570001	Global EES II (Self-Management, Planning & Organizing, Initiative & Enterprise)	4	

Community Impact Internship Track

Code	Course Name	SCU	Total
Enrichment Program I			20
CMDV6159001	Community Outreach Project Implementation	8	
CMDV6343001	Community Outreach IT Project Design	8	
CMDV6208001	Employability and Entrepreneurial Skills in Computer Science Community	4	
Enrichment Program II			20
CMDV6184001	Community Development Project Implementation	8	
CMDV6344001	Community Development IT Project Design	8	
CMDV6193001	Employability and Entrepreneurial Skills in Computer Science Community Development	4	

Study Abroad Track

Code	Course Name	SCU	Total
Elective courses list for study abroad*			20
Enrichment Program I			
GLOB6005001	Elective Course for Study Abroad 1	4	
GLOB6006001	Elective Course for Study Abroad 2	4	
GLOB6007001	Elective Course for Study Abroad 3	4	
GLOB6008001	Elective Course for Study Abroad 4	4	
GLOB6009001	Elective Course for Study Abroad 5	2	
GLOB6010001	Elective Course for Study Abroad 6	2	
GLOB6011001	Elective Course for Study Abroad 7	2	
GLOB6012001	Elective Course for Study Abroad 8	2	
GLOB6013001	Elective Course for Study Abroad 9	2	
GLOB6014001	Elective Course for Study Abroad 10	2	
GLOB6015001	Elective Course for Study Abroad 11	2	
GLOB6016001	Elective Course for Study Abroad 12	2	
GLOB6251001	Elective Course for Study Abroad 29	4	
Enrichment Program II			20

Code	Course Name	SCU	Total
GLOB6017001	Elective Course for Study Abroad 13	4	
GLOB6018001	Elective Course for Study Abroad 14	4	
GLOB6019001	Elective Course for Study Abroad 15	4	
GLOB6020001	Elective Course for Study Abroad 16	4	
GLOB6021001	Elective Course for Study Abroad 17	2	
GLOB6022001	Elective Course for Study Abroad 18	2	
GLOB6023001	Elective Course for Study Abroad 19	2	
GLOB6024001	Elective Course for Study Abroad 20	2	
GLOB6025001	Elective Course for Study Abroad 21	2	
GLOB6026001	Elective Course for Study Abroad 22	2	
GLOB6027001	Elective Course for Study Abroad 23	2	
GLOB6028001	Elective Course for Study Abroad 24	2	
GLOB6253001	Elective Course for Study Abroad 31	4	

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

Specific Independent Study

Code	Course Name	SCU	Total
Elective courses list for specific independent study*			20
CSIS6001001	Course Certification	3	
CSIS6002001	Technical Skill Enrichment	4	
CSIS6003001	Industrial Project	9	
CSIS6004001	Soft Skill Enrichment	4	
CSIS6005001	Elective Course for Specific Independent Study 1	8	
CSIS6006001	Elective Course for Specific Independent Study 2	8	
CSIS6007001	Elective Course for Specific Independent Study 3	6	
CSIS6008001	Elective Course for Specific Independent Study 4	6	
CSIS6009001	Elective Course for Specific Independent Study 5	6	
CSIS6010001	Elective Course for Specific Independent Study 6	5	
CSIS6011001	Elective Course for Specific Independent Study 7	5	
CSIS6012001	Elective Course for Specific Independent Study 8	5	
CSIS6013001	Elective Course for Specific Independent Study 9	5	
CSIS6014001	Elective Course for Specific Independent Study 10	4	
CSIS6015001	Elective Course for Specific Independent Study 11	4	
CSIS6016001	Elective Course for Specific Independent Study 12	4	
CSIS6017001	Elective Course for Specific Independent Study 13	4	
CSIS6018001	Elective Course for Specific Independent Study 14	4	
CSIS6019001	Elective Course for Specific Independent Study 15	3	
CSIS6020001	Elective Course for Specific Independent Study 16	3	
CSIS6021001	Elective Course for Specific Independent Study 17	3	
CSIS6022001	Elective Course for Specific Independent Study 18	3	
CSIS6023001	Elective Course for Specific Independent Study 19	3	

Code	Course Name	SCU	Total
CSIS6024001	Elective Course for Specific Independent Study 20	3	
CSIS6025001	Elective Course for Specific Independent Study 21	2	
CSIS6026001	Elective Course for Specific Independent Study 22	2	
CSIS6027001	Elective Course for Specific Independent Study 23	2	
CSIS6028001	Elective Course for Specific Independent Study 24	2	
CSIS6029001	Elective Course for Specific Independent Study 25	2	
CSIS6030001	Elective Course for Specific Independent Study 26	2	
CSIS6031001	Elective Course for Specific Independent Study 27	2	
CSIS6032001	Elective Course for Specific Independent Study 28	2	
CSIS6033001	Elective Course for Specific Independent Study 29	1	
CSIS6034001	Elective Course for Specific Independent Study 30	1	
CSIS6035001	Elective Course for Specific Independent Study 31	1	
CSIS6036001	Elective Course for Specific Independent Study 32	1	

**) For students who take BINUS 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 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
Enrichment Program II			20
COMP6981001	Applied Technology in Computer Science	4	
COMP6816001	Wireless and Cloud Computing Technologies	4	
COMP6997001	IT Disaster Recovery	6	
Stream: Data Science			
COMP6998001	Knowledge Engineering	6	
Stream: Information Security Management			
COMP6980001	Networking and Security Concepts	6	

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

No	Course Code	Course Name	Minimal Grade
1.	CHAR6013001	Character Building: Pancasila	B
2.	COMP6047001	Algorithm and Programming*	C
3.	COMP6798001	Program Design Methods*	C
4.	COMP6048001	Data Structures*	C
5.	COMP6799001	Database Technology	C
6.	COMP6100001	Software Engineering*	C
7.	COMP6697001	Operating System	C
8.	ENPR6312001	Venture Creation	C

*) Tutorial