

Computer Science

Introduction

Computer Science Undergraduate Study Program Bina Nusantara University Malang is one of the Study Programs of School of Computer Science Bina Nusantara University Jakarta. This study program focuses on learning process in the field of computer science with a Sarjana Komputer (S.Kom.) Academic Degree. The learning process is managed within 4 years by the 2 + 1 + 1 Program. The learning process in the first to third semesters is carried out in Malang Campus, East Java. The students then have the opportunity to study at Bina Nusantara Jakarta campus for a year, in the fourth and fifth semesters as part of the Mobility Program. Students also have the opportunity to enrich their learning with various partners of Bina Nusantara University for one year in the sixth and seventh semesters through Enrichment Program. The Enrichment Program offers five optional tracks: Internship, Entrepreneurship, Research, Community Development and Study Abroad. On the last semester every student takes a thesis as final course and will be guided by Faculty Member at Bina Nusantara University Malang.

Vision

Become Computer Science study program of choice in informatics that focuses on development creative informatics solution with international recognition.

Mission

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

1. Providing education to students in order to enhance the science, skills, and practice in computer science by providing best learning environment and promote research and collaboration with global industry.
2. Providing professional service based on information technology with emphasis in applied science in order to develop society.
3. Enhancing quality of life in Indonesia by applying applied science in computer science.
4. Promoting students and lecturers to be creative and value added talent in computer science field by creating appropriate environment that support them to compete in international competition.
5. Preparing students to be global leader and ICT professional or technopreneur with smart and good character.

Program Objective

The objectives of the program are:

1. To provide students with a solid foundation of mathematical, algorithm principles, computer science knowledge and ethical that will be needed in information technology practice;
2. To provide students with skills to apply analysis, design and development principles in the construction of software system applied in software engineering;
3. To prepare students with abilities to keep up-to-date with the latest information technology trends assess new trends, developments and industries.

Student Outcomes

After completing the study, graduates are:

1. Able to create software application design with the implementation of database system principal design to solve structured and semi-structured data;
2. Able to design software application solution based on problem analysis which can be solved with structured approach in informatics area;
3. Able to assess Information and Communication Technology trend to deliver alternative solution of software development;
4. Able to develop software application to support a business innovation and digital business transformation;
5. Able to apply interdisciplinary knowledge and skills in developing alternative solutions for problem-solving.

Prospective Career of the Graduates

The curriculum and programs of Computer Science Undergraduate Study Program Bina Nusantara University Malang are designed to develop talents who are ready to become both as specialists in the field of computer science and as digital technopreneurs. In general, every graduate has expertise and skills as a software engineer or entrepreneurial computer programmer.

Streaming program is taken by student for further development of their specialist knowledge and skills in Computer Science in order to obtain additional prospective career.

1. Digital Creative Technology. Career opportunities :

Smart Software Application Developer (Full Stack Developer), Interactive UI&UX Developer, Digital Business Model Developer and Transformer.

2. Digital Technopreneur. Career opportunities :

Frontend Developer, Interactive UI&UX Designer, Digital Business Developer, Digital Technopreneur.

3. Intelligent System. Career opportunity :

Intelligent System Specialist.

4. Database Technology. Career opportunities :

Database Designer, Database Administrator, Business Intelligent Specialist.

5. Network Technology. Career opportunities :

Client Server Programmer, Network Architect, Network Computing & Administrator.

6. Network Security. Career opportunities :

Penetration Tester, Server and Security Engineer, Cyber Forensic Investigator, Secure Developer.

7. Game Technology. Career opportunities :

Game Artist, Game Designer, Game Developer (Programmer), Frontend Developer.

8. Mobile Technology. Career opportunities :

Mobile Apps. Developer, Mobile Programmer.

Curriculum

The curriculum of Computer Science Undergraduate Study Program Bina Nusantara University Malang is consists of 146 credit, 120 student activity transcript point and 30 hours community services regarding the hard skill and soft skill development. For 146 credit is consist of Bina Nusantara Higher Education Wide Courses, Major (Core) Courses, Streaming/Minor/Free Electives Courses, Enrichment Program Courses, Thesis. This curriculum is delivered by 2+1+1 program and supported by interactive multimedia computer laboratory, creative class, smart class, multi-channel learning, local and global partnership, collaborative learning experience with expert, industry sharing knowledge. Student activities, student creativities, student communities, community services and many

other student experiences are supported by Student Activity and Development Center (SADC) and Study Program to ensure the achievement of student development program in hard skill and soft skill.

Streaming

All campuses of Computer Science Undergraduate Study Program Bina Nusantara University have the same core courses to ensure the main competency standards in Computer Science. However, every student also has the opportunity to enrich into various streaming in the fourth and fifth semesters. There are eight streaming (specialization) options for students of Computer Science Undergraduate Study Program Bina Nusantara University Malang, namely Digital Creative Technology, Digital Techno-Engineering, Intelligent System, Database Technology, Network Technology, Network Security, Game Technology and Mobile Technology. Digital Creative Technology and Digital Techno-Preneur are streaming and minor programs that are fully held on the Malang Campus, while other streaming are held on Jakarta Campus by Mobility Program.

1. Streaming BINUS @Malang Campus

- **Digital Technopreneur:** Focus on creative software application development regarding digital business startup development (**Techno-Preneur**).
- **Digital Creative Technology:** Focus on smart software application development based on big data analytics regarding business innovation and digital transformation on Industry 4.0. era (**Digital Business Innovation and Transformation**).

2. Streaming BINUS @Greater Jakarta Campus

- **Intelligent System:** Focus on smart software development through complex algorithm based on Artificial Intelligence to solve problem.
- **Database Technology:** Focus on software development through database technology for business operation and *business analytics and business intelligent*.
- **Network Technology:** Focus on software development on computer network through computer network design and computer network programming.
- **Network Security:** Focus on secure software development through secure computer network design and secure computer network programming.
- **Game Technology:** Focus on interactive software development through game art, game design and game programming for *entertainment* and business solution.
- **Mobile Technology:** Focus on software development through *mobile* devices platform.

Course Structure

Sem	Code	Course Name	SCU	Total	
1	CHAR6030	Character Building: <i>Pancasila</i>	2	20	
	COMP6360	Algorithm and Programming	4/2		
	COMP6363	Program Design Methods	4		
	MATH6118	Discrete Mathematics	4		
	MATH6119	Linear Algebra	2		
	English University Courses I				
	ENGL6198	English in Focus	2		
	ENGL6199	English for Business Presentation	2		

Sem	Code	Course Name	SCU	Total	
2	CHAR6031	Character Building: <i>Kewarganegaraan</i>	2	20	
	COMP6362	Data Structures	4/2		
	MATH6120	Calculus	4		
	COMP6369	Human and Computer Interaction ^{*&**}	2/2		
	ENTR6519	Entrepreneurship: Ideation	2		
	English University Courses II				
	ENGL6201	English Savvy	2		
	ENGL6200	English for Written Business Communication	2		
3	COMP6365	Algorithm Design and Analysis [*]	4	21	
	COMP6674	Artificial Intelligence ^{***}	5		
	COMP6372	Computer Networks ^{**}	2/2		
	ISYS6028	Database Systems	4/2		
	CHAR6032	Character Building: <i>Agama</i>	2		
4	COMP6675	Software Engineering ^{**&***}	5	19/20/20/20/19 /19/19/21/19	
	COMP6712	Research Methodology in Computer Science [*]	2		
	COMP6764	Basic Statistics	2		
	Streaming : Digital Creative Technology				
	COMP6397	User Experience ^{**}	2/2		
	COMP6364	Object Oriented Programming	2/2		
	COMP6767	Mobile Application Programming ^{**}	2		
	Streaming : Intelligent System^{****}				
	COMP6576	Natural Language Processing ^{*&**}	2		
	COMP6475	Machine Learning	2		
	COMP6708	Object Oriented Programming ^{*&**}	2/2		
	COMP7084	Multimedia Systems ^{**}	2/1		
	Streaming: Database Technology^{****}				
	ISYS6294	Database Design	2		
	COMP6734	Big Data Processing ^{*&**}	2		
	COMP6708	Object Oriented Programming ^{*&**}	2/2		
	COMP7084	Multimedia Systems ^{**}	2/1		
	Streaming: Network Technology^{****}				
	COMP6582	Computer Security [*]	2		
	COMP6735	Network and System Programming ^{*&**}	2		
	COMP6708	Object Oriented Programming ^{*&**}	2/2		
	COMP7084	Multimedia Systems ^{**}	2/1		
	Streaming: Game Technology^{****}				
GAME6081	2D Game Art	2			
GAME6082	Game Animation	2			

Sem	Code	Course Name	SCU	Total		
	GAME6069	Game Programming	4			
	MOBI6012	Web Design	2			
	Streaming: Mobile Technology****					
	MOBI6061	Embedded System and Internet of Things	2			
	MOBI6006	Mobile Community Solution	4			
	COMP6708	Object Oriented Programming	2/2			
	Streaming: Network Security****					
	LAWS6110	Cyber Law	2			
	COMP6693	Network Administration	2			
	COMP6708	Object Oriented Programming	2/2			
	COMP6582	Computer Security	2			
	Minor Program				12	
	Free Electives****				10	
	5	COMP6390	Compilation Techniques		4	20/19/19/19/20 /20/20/18/20
		COMP6713	Operating System*		2	
ENTR6521		Entrepreneurship: Market Validation	2			
LANG6089		Indonesian Language	2			
Streaming : Digital Creative Technology						
COMP6678		Big Data Analytics for Business	4			
COMP6679		Web Programming**	4			
COMP6768		Multimedia Systems	2			
Streaming : Intelligent System****						
COMP6587		Deep Learning	2			
COMP7116		Computer Vision	2			
COMP6681		Web Programming*&**	2/1			
COMP6588		Information Retrieval	2			
Streaming: Database Technology****						
COMP6737		Geographical Information System*	2			
COMP6746		Data Mining	2			
COMP6681		Web Programming*&**	2/1			
COMP6578		Information Visualization	2			
Streaming: Network Technology****						
COMP6591		Portable Operating System Interface	2/2			
COMP6681		Web Programming	2/1			
COMP6736		Distributed Cloud Computing	2			
Streaming: Game Technology****						
GAME6071		3D Modelling for Games	2			
GAME6086		Game Development Capstone Project	2			

Sem	Code	Course Name	SCU	Total	
	GAME6085	Object Oriented Game Programming	2		
	MOBI6009	Mobile Multimedia Solution	4		
	Streaming: Mobile Technology****				
	MOBI6009	Mobile Multimedia Solution	4		
	MOBI6057	Wearable Technology	2		
	COMP6122	Framework Layer Architecture	2/2		
	Streaming: Network Security****				
	COMP6544	Network Penetration Testing	4		
	COMP6646	Computer Forensic	2		
	COMP6695	Secure Programming	2		
	MOBI6057	Wearable Technology	2		
	Minor Program				8
	Free Electives****				10
	6	Enrichment Program I			20
7	Enrichment Program II		20	20	
8	COMP6765	Pre Thesis	2	6	
	COMP6766	Thesis	4		
Total Credits 146 Credits					

*) This course is delivered in English

**) Global Learning System Course

***) Entrepreneurship Embedded

****) Conducted for student mobility program in Jakarta

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.

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					
8					v					v		
9					v						v	

Note:

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

Description:

Student will take one of enrichment program tracks

Enrichment Internship Track

Code	Course Name	SCU	Total
Enrichment Program I			
COMP6373	Industry Experience I	8	20
COMP6374	EES in Industry I	4	
COMP6769	IT Practice in Industry I	8	
Enrichment Program II			
COMP6376	Industry Experience II	8	20
COMP6377	EES in Industry II	4	
COMP6770	IT Practice in Industry II	8	

Enrichment Entrepreneurship Track

Code	Course Name	SCU	Total
Enrichment Program I			
ENTR6939	New Business Initiation	8	20
ENTR6940	Product Development Process	8	
ENTR6132	EES in New Business	4	
Enrichment Program II			
ENTR6941	Product Launching	8	20
ENTR6942	Business Development	8	
ENTR6134	EES in Business Experience	4	

Enrichment Research Track

Code	Course Name	SCU	Total
Enrichment Program I			
RSCH6089	Research Experience I	8	20
RSCH6573	Scientific Writing I	8	
RSCH6091	Global EES I (Team Work, Communication, Problem Solving & Decision Making)	4	
Enrichment Program II			
RSCH6092	Research Experience II	8	20
RSCH4574	Scientific Writing II	8	
RSCH6094	Global EES II (Self-Management, Planning & Organizing, Initiative & Enterprise)	4	

Enrichment Community Development Track

Code	Course Name	SCU	Total
Enrichment Program I			
CMDV6028	Community Outreach Project Implementation	8	20
CMDV6347	Community Outreach Project Design	8	
CMDV6030	Employability and Entrepreneurial Skills	4	
Enrichment Program II			
CMDV6031	Community Development Project Implementation	8	20
CMDV6348	Community Development Project Design	8	
CMDV6033	Employability and Entrepreneurial Skills	4	

Enrichment Study Abroad Track

Code	Course Name	SCU	Total
Elective courses list for study abroad*			
Enrichment Program I			
GLOB6093	Elective Course for Study Abroad 1	4	20
GLOB6094	Elective Course for Study Abroad 2	4	
GLOB6095	Elective Course for Study Abroad 3	4	
GLOB6096	Elective Course for Study Abroad 4	4	
GLOB6257	Elective Course for Study Abroad 25	4	
GLOB6258	Elective Course for Study Abroad 26	2	
GLOB6259	Elective Course for Study Abroad 27	2	
GLOB6097	Elective Course for Study Abroad 5	2	
GLOB6098	Elective Course for Study Abroad 6	2	
GLOB6099	Elective Course for Study Abroad 7	2	
GLOB6100	Elective Course for Study Abroad 8	2	
GLOB6101	Elective Course for Study Abroad 9	2	
GLOB6102	Elective Course for Study Abroad 10	2	
GLOB6103	Elective Course for Study Abroad 11	2	
GLOB6104	Elective Course for Study Abroad 12	2	
Enrichment Program II			
GLOB6105	Elective Course for Study Abroad 13	4	20
GLOB6106	Elective Course for Study Abroad 14	4	
GLOB6107	Elective Course for Study Abroad 15	4	
GLOB6108	Elective Course for Study Abroad 16	4	
GLOB6286	Elective Course for Study Abroad 28	4	
GLOB6287	Elective Course for Study Abroad 29	2	
GLOB6288	Elective Course for Study Abroad 30	2	
GLOB6109	Elective Course for Study Abroad 17	2	
GLOB6110	Elective Course for Study Abroad 18	2	
GLOB6111	Elective Course for Study Abroad 19	2	

Code	Course Name	SCU	Total
GLOB6112	Elective Course for Study Abroad 20	2	
GLOB6113	Elective Course for Study Abroad 21	2	
GLOB6114	Elective Course for Study Abroad 22	2	
GLOB6115	Elective Course for Study Abroad 23	2	
GLOB6116	Elective Course for Study Abroad 24	2	

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

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

No.	Course Code	Course Name	Minimal Grade
1.	CHAR6030	Character Building: <i>Pancasila</i>	B
2.	ENTR6521	Entrepreneurship: Market Validation	C
3.	COMP6360	Algorithm and Programming	C
4.	COMP6362	Data Structures	C
5.	COMP6363	Program Design Methods	C
6.	COMP6675	Software Engineering	C
7.	COMP6397	User Experience	C
8.	COMP6678	Big Data Analytics for Business	C

*) Tutorial & Multipaper