

Computer Science

Introduction

In the new millennium and the global era, the role of information and automation in the various domains and activities of the business industry are becoming more important. The successes of the activities are determined by its information system. Information must be up-to-date, accurate and comprehensive to allow decision makers to determine the enterprise's strategy. Furthermore, automation can facilitate human activity, accelerate the pace of work and make it more effective and efficient, while also increasing productivity in various activities. The development of communication and computer technology has made it possible to get information that is rapid, exact, and accurate, while increasing the application of automation in various fields such as Industry, business, office affairs and in the development of science and technology.

The Computer Science study program was founded in September 1987, under STMIK BINA NUSANTARA; it became one of the programs under the coordination of the Faculty of Computer Science, BINA NUSANTARA UNIVERSITY in December 1998.

The study of computer science at BINA NUSANTARA UNIVERSITY puts emphasis on the processes, techniques, and tools that go into developing computer-based systems, with specialities in object-oriented software engineering, multimedia, web, database and computer network orientation.

Vision

A study program of choice in Computer Science which focuses on developing creative software solutions for industry, is recognized internationally, champions innovation and delivers graduates with international qualifications.

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 with fundamental and advance knowledge, skill and practice in software development specialized in database technology, intelligence system, networking or multimedia and game development by providing an excellent learning environment and promoting research and collaboration with global industry;
2. Providing IT professional services with emphasis in application of knowledge in terms of society development;
3. Sharing application of knowledge related to computer science for Indonesian and international community quality of life improvement;
4. Promoting students & lecturers to be creative and value-addings talents in computer science by creating suitable environment in order to be able to compete in international level;
5. Preparing students for becoming smart and good ICT professionals, leaders and entrepreneurs in global market or for continuing in advanced studies.

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 IT practice;
2. To provide students with skills to apply design and development principles in the construction of software system applied in database technology, intelligence system, networking and multimedia development;
3. To prepare students with abilities to keep up-to-date with the latest Information Technology trends, developments and industries;
4. To prepare students with abilities in problem solving and good communication skills to be able to work as an individual or in a team in an IT environment.

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 technology trend in Informatics area to deliver alternative solution of software development;
4. Able to produce software applications which can solve the problems in informatics;
5. Able to produce database software with high complexity to solve problems;
6. Able to produce computer network-based software to solve problems;
7. Able to produce smart software using artificial intelligence algorithms to solve problems;
8. Able to produce multimedia-based software to solve the problems.

Prospective Career of the Graduates

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

1. Software Engineer/Developer
2. System Analyst/Developer
3. Web Engineer/Developer
4. Computer Network Specialist
5. Database Specialist
6. Artificial Intelligence Specialist
7. Data Scientist
8. IT Support/Consultant
9. Researcher
10. Multimedia Programmer
11. Lecturer/Trainer

Curriculum

The present curriculum used in the Computer Science 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 program are expected to be able to face competition at both a national and international level.

Generally, the subjects of the curriculum 2018 are divided into these 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 him or her with a professional character, professionalism in their field, management skills, oral and written communication skills, understanding of business ethic, 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, databases, computer graphs, multimedia, computer and human interaction, operation system, computer architecture, and computer network.

Concentration Subject (Stream)

The objective of this group is to give students the opportunity to obtain a deep understanding of a range of disciplines in computer science. The students are expected to develop their skills and master the techniques which will allow them to conduct research for both their thesis and/or to continue their studies.

The Concentration subjects (Stream) provide:

1. Software Engineering: to explore the various methodologies and software engineering equipment.
2. Intelligent Systems: to explore the various techniques of computer intelligence that can be applied to solving problem.
3. Database Technology: to explore the various technologies and Database Application.
4. Network: to explore computer networking which consists of installation, administration, and computer networking management.
5. Applied Networking (CISCO): to explore computer networking technology based on computer network equipment (CISCO equipment).
6. Interactive Multimedia: to explore computer interactive multimedia applications, based on computer programming, design tools, and software engine.
7. Applied Database: to explore computer specialized technology for database application development based on Oracle product.

Entrepreneur and Employability Skill (Internship)

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

Course Structure

Sem	Code	Course Name	SCU	Total	
1	CHAR6013	Character Building: Pancasila	2	20	
	MATH6025	Discrete Mathematics	4		
	MATH6030	Linear Algebra	2		
	COMP6047	Algorithm and Programming*	4/2		
	COMP6056	Program Design Methods*	4		
	English University Courses I				
	ENGL6128	English in Focus	2		
	ENGL6130	English for Business Presentation	2		
2	CHAR6014	Character Building: Kewarganegaraan	2	21	
	COMP6048	Data Structures*&***	4/2		
	MATH6031	Calculus	4		
	ENTR6003	Entrepreneurship I	2		
	COMP6175	Object Oriented Programming*&***	2/2		
	LANG6061	Indonesian	1		
	English University Courses II				
	ENGL6129	English Savvy	2		
ENGL6131	English for Written Business Communication	2			
3	CHAR6015	Character Building: Agama	2	23	
	COMP6049	Algorithm Design and Analysis**	4		
	ISYS6169	Database Systems	4/2		
	CPEN6098	Computer Networks	2/2		
	COMP6065	Artificial Intelligence**	4		
	COMP7084	Multimedia Systems*	2/1		
	Streaming : Software Engineering				
COMP6106	Code Reengineering	4			
COMP6107	Agile Software Development*&***	2			
COMP6114	Pattern Software Design	2/2			
4	COMP6575	Research Topics in Computer Science	2	22	
	COMP6060	Programming Language Concepts	2		
	COMP6100	Software Engineering*,&***&***	4		
	COMP6176	Human and Computer Interaction	2/2		
	Streaming : Intelligent System				
	COMP6576	Natural Language Processing*&***	2		
	COMP6577	Machine Learning	4		
	COMP7117	Artificial Neural Network**	2/2		
	Streaming : Interactive Multimedia				
	COMP8129	User Experience*&***	2/2		
	COMP6578	Information Visualization	2		
	COMP7094	Multimedia Programming Foundation**	2/2		
	Streaming : Database Technology				
	ISYS6172	Database Design	2/1		
	COMP6579	Big Data Processing*&***	2/2		
	COMP6580	Database Administration**	2/1		
	Streaming : Applied Database				
	ISYS7155	Applied Database I	4		
	COMP6581	Introduction to Geographical Information System**	2		
	COMP6579	Big Data Processing*&***	2/2		

Sem	Code	Course Name	SCU	Total
4	Streaming : Network			22
	COMP6582	Computer Security**	2	
	COMP6584	Network and System Programming*&**	2/2	
	COMP6585	System Administration	2/2	
	Streaming : Applied Networking			
	CPEN8092	Applied Networking I	4	
	COMP6582	Computer Security**	2	
	COMP6584	Network and System Programming*&**	2/2	
5	COMP6144	Web Programming*,**&****	2/1	23
	COMP6062	Compilation Techniques	4	
	COMP6153	Operating System	2/2	
	ENTR6004	Entrepreneurship II	2	
	Elective Course****			
	MOBI6059	Mobile Programming	2	
	COMP6586	Embedded Systems	2	
	COMP6226	Competitive Programming**	2	
	Streaming : Software Engineering			
	COMP6115	Object Oriented Analysis & Design**	2/2	
	COMP6122	Framework Layer Architecture	2/2	
	Streaming : Intelligent System			
	COMP6587	Deep Learning	2	
	COMP6588	Information Retrieval	2	
	COMP7116	Computer Vision**	2/2	
	Streaming : Interactive Multimedia			
	COMP6583	Computer Graphics	2/2	
	COMP6589	Game Design Programming**	4	
	Streaming : Database Technology			
	COMP6590	Geographical Information System**	2/2	
	COMP6140	Data Mining	2/2	
	Streaming : Applied Database			
	ISYS7156	Applied Database II	4	
	ISYS7157	Applied Database III	4	
	Streaming : Network			
	COMP6591	Portable Operating System Interface**	2/2	
	COMP7142	Popular Network Technology**	2/2	
Streaming : Applied Networking				
CPEN8093	Applied Networking II	4		
CPEN8094	Applied Networking III	4		
6	Enrichment Program I		15	15
7	Enrichment Program II		16	16
8	COMP8074	Thesis	6	6
TOTAL CREDITS 146 SCU				

*) Global Learning System course

***) This course is delivered in English

****) Entrepreneurship Embedded

*****) Elective Course: Student will choose one of three elective courses with 2 credits on 5th semester.

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

Enrichment Program I (6th Semester) & Enrichment Program II (7th Semester):

-) Student will take one of enrichment program tracks (off campus).

Enrichment Track Scheme

Track	Semester 6						Semester 7						
	IN	RS	EN	CD	SA	etc	IN	RS	EN	CD	SA	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	

Notes:

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

Notes:

Student will take one of enrichment program tracks

Students who failed in Enrichment Program I can retake with the same track or change into another track. As for Enrichment Program II, student who failed with Internship, Research, Community Development, and Study Abroad track on Enrichment Program II, can retake with the same track or change into another track. However students who take **Entrepreneurship** track on Enrichment Program II, should **retake with another track**.

Enrichment Internship Track

Code	Course Name	SCU	Total
Enrichment Program I			15
COMP6426	Industrial Experience in Information Technology	8	
COMP6427	Information Technology Practice in Industrial Experience	4	
COMP6428	EES in Information Technology Industry	3	
Enrichment Program II			16
COMP6429	Professional Experience in Information Technology	8	
COMP6431	Information Technology Practice in Professional Experience	4	
COMP6430	Professional Development in Information Technology Industry	4	

Enrichment Entrepreneurship Track

Code	Course Name	SCU	Total
Enrichment Program I			15
ENTR6328	Business Start Up	8	
ENTR6149	IT Business Model & Validation	2	
ENTR6150	Launching New IT Venture	2	
ENTR6379	EES in New Computer Science Business	3	
Enrichment Program II			16
ENTR6356	Growing a Business	8	
ENTR6151	Lean IT Start Up & Business Plan	2	
ENTR6152	Venture Capital in IT Industry	2	
ENTR6367	EES in Computer Science Business Experience	4	

Enrichment Research Track

Code	Course Name	SCU	Total
Enrichment Program I			15
RSCH6243	Research Experience I	8	
RSCH6111	Scientific Writing I in Computer Science	4	
RSCH6290	Global EES I (Team Work, Communication, Problem Solving & Decision Making)	3	
Enrichment Program II			16
RSCH6258	Research Experience II	8	
RSCH6112	Scientific Writing II in Computer Science	4	
RSCH6266	Global EES II (Self-Management, Planning & Organizing, Initiative & Enterprise)	4	

Enrichment Community Development Track

Code	Course Name	SCU	Total
Enrichment Program I			15
CMDV6159	Community Outreach Project Implementation	8	
CMDV6041	Community Outreach IT Project Design	4	
CMDV6203	Employability and Entrepreneurial Skills in Computer Science Community	3	
Enrichment Program II			16
CMDV6184	Community Development Project Implementation	8	
CMDV6042	Community Development IT Project Design	4	
CMDV6193	Employability and Entrepreneurial Skills in Computer Science Community Development	4	

Enrichment Study Abroad Track

Code	Course Name	SCU	Total
Elective courses list for study abroad*			15
Enrichment Program I			
GLOB6005	Elective Course for Study Abroad 1	4	
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	
GLOB6041	Elective Course for Study Abroad 25	3	
GLOB6042	Elective Course for Study Abroad 26	1	
Enrichment Program II			16
GLOB6017	Elective Course for Study Abroad 13	4	
GLOB6018	Elective Course for Study Abroad 14	4	
GLOB6019	Elective Course for Study Abroad 15	4	
GLOB6020	Elective Course for Study Abroad 16	4	
GLOB6021	Elective Course for Study Abroad 17	2	
GLOB6022	Elective Course for Study Abroad 18	2	
GLOB6023	Elective Course for Study Abroad 19	2	
GLOB6024	Elective Course for Study Abroad 20	2	
GLOB6025	Elective Course for Study Abroad 21	2	
GLOB6026	Elective Course for Study Abroad 22	2	
GLOB6027	Elective Course for Study Abroad 23	2	
GLOB6028	Elective Course for Study Abroad 24	2	

*)Transferred courses will be transferred based on credit transfer policies on study program with total of 15 credits for Enrichment Program I and 16 credits for Enrichment Program II.

Enrichment Further Study Track

Code	Course Name	SCU	Total
Enrichment Program II			16
COMP6815	IT Disaster Recovery	4	
COMP6816	Wireless and Cloud Computing Technologies	4	
COMP6817	Internet Tools and Services	4	
COMP6818	Cyber Risk Management	4	

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

No.	Course Code	Course Name	Minimal Grade
1.	CHAR6013	Character Building: Pancasila	B
2.	ENTR6004	Entrepreneurship II	C
3.	COMP6047	Algorithm and Programming*	C
4.	COMP6048	Data Structures*	C
5.	COMP6056	Program Design Methods*	C
6.	COMP6100	Software Engineering*	C
Streaming : Software Engineering			
7.	COMP6107	Agile Software Development	C
8.	COMP6115	Object Oriented Analysis & Design	C
Streaming : Intelligent System			
7.	COMP7117	Artificial Neural Network	C
8.	COMP7116	Computer Vision	C
Streaming : Interactive Multimedia			
7.	COMP7094	Multimedia Programming Foundation	C
8.	COMP6583	Computer Graphics	C
Streaming : Database Technology			
7.	COMP6580	Database Administration	C
8.	COMP6140	Data Mining	C
Streaming : Applied Database			
7.	ISYS7155	Applied Database I	C
8.	ISYS7156	Applied Database II	C
Streaming : Network			
7.	COMP6584	Network & System Programming	C
8.	COMP6591	Portable Operating System Interface	C
Streaming : Applied Networking			
7.	CPEN8092	Applied Networking I	C
8.	CPEN8093	Applied Networking II	C

*) Tutorial & Multipapper