Computer Science

Introduction

In this fast-moving era, Computer Science (CS) has gone beyond the simple use of computer software. With the third wave of computing (pervasive computing), the most recent advancement in the computing and technology field, graduates need the ability to understand, create, and support applied computing solutions for their own businesses, their clients, or their employers. This program encourages and challenges students in the areas of:

- General CS, and
- Pervasive Games Technology

In becoming familiar with a broad range of information technologies and how they are used, the students develop the ability to specify and manage the implementation of a wide range of applications to support various needs and the ability to design, develop, and implement viable technological solutions using appropriate platforms, tools, and techniques. The program provides the students with the technical, entrepreneurial, and specialized skills needed to develop and design applications across modern platforms, such as Cloud, the Web, and mobile, in a rapidly changing IT environment.

The Computer Science program has an "A" grade accreditation - the highest level of accreditation that can be given to a private higher education program in Indonesia - and it is designed to provide graduates with a thorough understanding of the theories, methods, and systems used by the computing industry. It produces graduates who are knowledgeable and creative, who have excellent programming skills, who are capable of designing, implementing, and maintaining innovative software systems, and who are readily adaptable to new advances in the rapidly changing IT environment. The program provides double degree and intensive specialist courses in interesting computing areas such as:

- Pervasive Software Engineering
- Cloud and Distributed Systems
- Multimedia and Human Computer Interaction
- Web Application Development and Computer Security
- Computer Networks and Security
- Ethical Hacking and Penetration Testing

- Games Design and Programming
- Advanced Games Design and Programming
- Technopreneurship
- Intelligent Systems
- Computer Graphics
- Network Forensics

Students experience a vast range of innovative learning processes, from blended learning to experiential; student centered, flipped classroom, and Hackerspace/Makerspace. Students get the opportunity to be future entrepreneurs by getting engaged in a series of entrepreneurial courses (Project Hatchery, Market Research, and Design-driven Entrepreneurship), which focus on technology and provide them the necessary skills and knowledge to create and market their work.

The curriculum also provides a scheme and platform whereby through the 3+1 program, students may choose from creating a startup company, internship, research, or community development work that is suitable for their future goals in the final year of their studies. Students benefit from having an internationally recognized curriculum in an internationally diverse environment, get an opportunity to work on international projects, and attain professional certifications in major areas of the IT industry that will enable them to be successful in their careers.

Vision

To become a leading and world class Computer Science school, which is reputable and excellent in teaching and research, in order to keep relevant with the needs of the global industry and society.

Mission

1. Educate students from diverse backgrounds with relevant knowledge and skills for the society by providing computer science courses and internships.
2. Prepare graduates to become smart and good IT leaders, innovators, and entrepreneurs in global industries, as well as prepare them for advanced studies.
3. Build strong connections with international academic and non-academic partners and global corporations.

Program Objectives

The objectives of the program are:

1. Produce reputable professionals with the skills to develop creative and impactful software products and services, including but not limited to computer networks and security and games technology.
2. Produce reputable professionals with a solid foundation of mathematics, algorithms, and principles related to computing that will be needed in problem-solving practice.
3. Equip graduates with communication skills and utilize the latest trends in technology to contribute to the global workplace.
4. Produce reputable professionals with the skills to design and implement various computer networking environments using different security techniques and routing theories to produce secure and robust networks.
5. Produce reputable professionals with the skills to design and develop game applications by combining technology with creative art and design concepts to produce an exceptional game application that is able to run on multi-platform environments.
6. Equip graduates with six key skills (self-management, planning and organizing, teamwork, problem-solving, decision-making, initiative, and enterprise) and foreign language ability as well as use information technology to be useful in the workplace and society.

Student Outcomes

After successful completion of the four-year program, students are expected to be able to:

1. Develop diverse software using appropriate software development methodologies.
2. Apply the principles of design and development of software architecture in the construction of software solutions.
3. Apply the latest technology according to software development requirements.
4. Administer the conceptual knowledge and mathematical principles related to computing to perform any related computing formulations.
5. Administer the conceptual knowledge and algorithm principles related to computing to solve problems.
6. Communicate, work in a team, and utilize the latest trends in technology to contribute in the global workplace.
7. Design and implement various computer networking environments using different security techniques and routing theories to produce secure and robust networks.
8. Design and develop game applications by combining technology with creative art and design concepts to produce good game applications that are able to run on multi-platform environments.

9. Apply the six key skills (self-management, planning and organizing, teamwork, problem-solving, decision-making, initiative and enterprise) and foreign language ability to use information technology in the workplace and society.

Prospective Careers of the Graduates

Computer Science graduates are in a position to gain employment as computing professionals in a number of fields, such as systems analysis and design, software engineering, applications software development (enterprise and mobile), network computing (forensics and security), and multimedia production, including graphics, animation, and games. Graduates may join commercial organizations, government institutions, financial institutions, telecommunications companies, IT companies, or other organizations. The career opportunities are unlimited for Computer Science graduates.

A wide range of career opportunities in IT and the computer industry are introduced in which students will be prepared throughout the four years of study. The integrated curriculum is designed and developed to support students in building on their technical and non-technical skills as well as engaging with the industry. Typical starting career positions include:

- Web developer
- Software engineer
- Network administrator
- Computer security professional
- Multimedia systems developer
- Games developer
- Technical artist
- Database developer
- IT sales engineer
- Business application developer
- IT project planner

Since computer science graduates are considered as engineers, they are also in a position to obtain employment as professionals in non-IT fields, including sales, marketing, and management. Thus, the career opportunities are unlimited for computer science graduates.

The single-degree program streams provide an internship program for each student, wherein the student may conduct real projects as a practical study within an industrial context. The program develops the student's ability to be involved in professional practices, and ethical and organizational responsibilities. Furthermore, the industrial internship program provides students with real experience in the workplace and teaches them to cope with the work environment. In addition, a series of study/field trips to visiting professionals and industries will be conducted to give good grounds for having a broad overview of the industry. These experiences support individual career aspirations and may provide social and professional networks.

BINUS UNIVERSITY INTERNATIONAL also provides career support for students by disseminating information on the latest job vacancies, internships, and workshops. This support service can be accessed at: www.binuscareer.com.

Award/Degree

- *Sarjana Komputer* from BINUS UNIVERSITY
- Dual Degree with Bachelor of Information Technology from RMIT University at Melbourne, Australia
- Dual Degree with Bachelor of Computer Science from the University of Wollongong at New South Wales, Australia
- Dual Degree with Bachelor of Science (Hons.) from the University of Nottingham, United Kingdom
- Dual Degree with Bachelor in Computer and Information Systems from Auckland University of Technology

Major and Stream

Stream	Degree				Partner
	Single	Title	Double	Title	
General CS	√	S.Kom			
Pervasive Games Technology	√	S.Kom			
Computer Science			√	S.Kom. & B.Sc. (Hons)	Nottingham
Computer Science with Artificial Intelligence			√	S.Kom. & B.Sc. (Hons)	Nottingham
Software Engineering			√	S.Kom. & B.Sc. (Hons)	Nottingham
Application Programming			√	S.Kom. & B.Info.Tech	RMIT
Network Programming			√	S.Kom. & B.Info.Tech	RMIT
Stream	Degree				Partner
	Single	Title	Double	Title	
System Administration			√	S.Kom. & B.Info.Tech	RMIT
Web Systems			√	S.Kom. & B.Info.Tech	RMIT
Games Development			√	S.Kom. & B.Comp.Sc.	Wollongong
Digital Security			√	S.Kom. & B.Comp.Sc.	Wollongong
Enterprise Systems			√	S.Kom. & B.Comp.Sc.	Wollongong
Software Engineering			√	S.Kom. & B.Comp.Sc.	Wollongong
IT Service Science			√	S.Kom. & BCIS	AUT
Software Development			√	S.Kom. & BCIS	AUT
Computer Science			√	S.Kom. & BCIS	AUT

Title: S.Kom (Sarjana Komputer)
B.Sc. (Hons) (Bachelor of Science (Honors))
B.Info.Tech (Bachelor of Information Technology)
B.Comp.Sc.(Bachelor of Computer Science)
BCIS (Bachelor in Computer and Information Systems)

Double Degree in Computer Science

In cooperation with the University of Wollongong (UoW), this double-degree program is designed to provide students with knowledge and practical skills to solve real-world problems using computers. The students have the opportunity to broaden their horizons and experiences by studying abroad at the University of Wollongong in Australia. The students who take the double-degree program at the University of Wollongong will receive S.Kom. and B.Comp.Sc. degrees at the end of the program. The available majors at the University of Wollongong include Digital Systems Security, Multimedia and Game Development, Enterprise Systems, and Software Engineering. Students who would like to pursue careers in the IT industry and business in general are the ideal candidates for this program.

Double Degree in Computer Science (Honors)

In cooperation with the University of Nottingham, this double-degree program is designed to provide students with knowledge and practical skills to solve real world problems using computers. The students have the opportunity to broaden their horizons and experiences by studying abroad at the University of Nottingham, in the United Kingdom. Students shall initially complete three years of study at BINUS in its Computer Science program. Upon successful completion of the three years at BINUS, students shall enroll in year three at one of Nottingham's three-year undergraduate degree programs. Students may progress to the United Kingdom campus, the Malaysia campus, or the China campus of Nottingham. Upon successful completion of the four years of study, students shall receive a degree award from Nottingham, which is either B.Sc. (Hons.) Computer Science, B.Sc. (Hons.) Computer Science with Artificial Engineering, or B.Sc. (Hons.) Software Systems. Degrees awarded by the United Kingdom campus and the Malaysia campus are identical. Students will also receive an S.Kom. degree from BINUS UNIVERSITY. Students who would like to pursue careers in the IT industry and business in general are the ideal candidates for this program.

Double Degree in Information Technology

In cooperation with RMIT University, this double-degree program is designed to provide students with knowledge and practical skills to analyze, design, and implement complex computer software. Students have the opportunity to broaden their horizons and experiences by studying abroad at RMIT University in Australia. The available majors at RMIT include Application Programming, Business Applications, Multimedia Design, Network Programming, System Administration, and Web Systems. At the end of the program, students will receive S.Kom. and B.Info.Tech. degrees. Students who would like to pursue careers in the challenging area of Information Technology are ideal candidates for this program.

Double Degree in Computer and Information Systems

In cooperation with Auckland University of Technology, this double-degree program is designed to provide students with knowledge and practical skills to analyze, design, and implement complex computer software. Students have the opportunity to broaden their horizons and experience by studying abroad at AUT in New Zealand. The available majors at AUT includes IT Service Science, Software Development, and Computer Science. At the end of the program, students will receive S.Kom. and BCIS degrees. Students who would like to pursue careers in the challenging area of Information Technology are ideal candidates for this program.

General Computer Science Stream (Single Degree)

The General Computer Science stream is a single degree program which is designed to provide students with knowledge, as well as practical and creative skills to design, develop, and implement Cloud, Web, Enterprise, Pervasive, and Mobile applications. Students also learn how to design, build, administer, and secure pervasive computer networks This stream also provides students with the opportunity to become certified ethical hackers, network associates, and professionals.

Pervasive Games Technology Stream (Single Degree)

The Games Technology stream is a single degree program that is designed to provide students with knowledge, as well as practical and creative skills to design and create computer graphics, animations, and interactive games. Students gain competence in the design and development of Interactive and Pervasive games in different platforms. This stream also provides students with an opportunity to become certified developers in 3D software packages such as Maya, 3DsMax, and Blender among others. Students who would like to pursue careers in the rapidly expanding games, animation, and creative industries are ideal candidates for this stream.

Teaching, Learning, and Assessment Strategies

- Students experience a vast range of innovative learning processes, from blended learning to experiential; student-centered, flipped classroom, and Hackerspace/Makerspace.
- Students get the opportunity to be future entrepreneurs by becoming engaged in a series of entrepreneurial courses (Project Hatchery, Market Research, and Business Hatchery), which focus on technology and provide them with the necessary skills and knowledge to create and market their work.
- The curriculum also provides a scheme and platform whereby through the 3+1 program, students may choose from creating a startup company, internship, research, or community development work that is suitable for their future goals in the final year of the study.
- Students enjoy the internationally-recognized curriculum in an internationally diverse environment, receive an opportunity to work on international projects, and attain professional certifications in major areas of the IT industry that will enable them to be successful in their careers.

Study Completion Requirements

Major in Computer Science

To complete a major in Computer Science at BINUS UNIVERSITY INTERNATIONAL, students must complete a minimum of 146 SCUs of academic credit.

Course Structure

Sem	Code	Course Name	SCU	Total
1	CHAR6013	Character Building: *Pancasila*	2	20
	ENTR6091	Project Hatchery	2	
	COMP6502	Introduction to Programming	6	
	COMP6056	Program Design Methods	4	
	COMP6503	Discrete Structures	6	
2	COMP6510	Programming Languages	4	20
	COMP6048	Data Structures	6	
	COMP6338	Computational Mathematics	4	
	COMP6339	Database Systems	6	
3	CHAR6014	Character Building: *Kewarganegaraan*	2	23
	ENTR6094	Design Driven Entrepreneurship	3	
	COMP6340	Analysis of Algorithms	8	
	COMP6341	Multimedia and Human Computer Interaction	4	
	CPEN6200	Computer Networks and Security	6	
4	CHAR6015	Character Building: *Agama*	2	23
	ENGL6171	Academic English I	3	
	COMP6504	Computer Architecture and Operating Systems	4	
	COMP6343	Web Application Development and Security	8	
	COMP6505	Computer Graphics	3	
	Stream: Computer Science General			
	COMP6210	Ethical Hacking and Penetration Testing	3	
	Stream: Pervasive Games Technology			
	GAME6048	Games Design and Programming	3	

Sem	Code	Course Name	SCU	Total
5	COMP6345	Intelligent Systems	4	22
	COMP6506	Pervasive Software Engineering	4	
	COMP6347	Cloud and Distributed Systems	5	
	ENTR6045	Technopreneurship	2	
	ENGL6172	Academic English II	3	
	LANG6061	Indonesian	1	
	Stream: Computer Science General			
	COMP6348	Network Forensics	3	
	Stream: Pervasive Games Technology			
	GAME6046	Advanced Games Design and Programming	3	
6	**Enrichment Program I**		16	16
7	**Enrichment Program II**		16	16
8	COMP6128	Thesis	6	6
			TOTAL CREDITS 146 SCU	

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

-) *Students will take one of the enrichment program tracks (off campus).*

Enrichment Track Scheme

Track	Semester 6						Semester 7					
	I	RS	ENTR	CD	SA	Other	I	RS	ENTR	CD	SA	Other
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					

Notes:
I: Internship
RS: Research
ENTR: Entrepreneurship
CD: Community Development
SA: Study Abroad
Other: Program's specific need

Notes:
Student can choose one of the available tracks.

Enrichment Internship Track

Code	Course Name	SCU	Total
Enrichment Program I			
COMP6349	Industry Experience I	8	16
COMP6350	Software Development Practice	4	
COMP6351	Software Quality Practice	4	
Enrichment Program II			
COMP6352	Industry Experience II	8	16
COMP6353	Information Technology in Industry	4	
COMP6354	IT Project Practice	4	

Enrichment Entrepreneurship Track

Code	Course Name	SCU	Total
Enrichment Program I			
ENTR6092	Business Model Innovation	8	16
ENTR6096	Creative Business Planning	4	
ENTR6097	Managing Teams and Cultures	4	
Enrichment Program II			
ENTR6093	Sustainable Startup Creation	8	16
ENTR6098	Business Networking	4	
ENTR6099	Business Story Telling	4	

Enrichment Research Track

Code	Course Name	SCU	Total
RSCH6063	Research Exposure	8	16
RSCH6069	Scientific Writing	4	
RSCH6070	Research Methods in Computer Science	4	

Enrichment Study Abroad Track*

Course Name		SCU	Total
GLOB6085	Elective Course for Study Abroad 1	4	16
GLOB6086	Elective Course for Study Abroad 2	4	
GLOB6087	Elective Course for Study Abroad 3	4	
GLOB6088	Elective Course for Study Abroad 4	4	
GLOB6047	Elective Course for Study Abroad 5	2	
GLOB6048	Elective Course for Study Abroad 6	2	
GLOB6049	Elective Course for Study Abroad 7	2	
GLOB6050	Elective Course for Study Abroad 8	2	
GLOB6051	Elective Course for Study Abroad 9	2	
GLOB6052	Elective Course for Study Abroad 10	2	
GLOB6053	Elective Course for Study Abroad 11	2	
GLOB6054	Elective Course for Study Abroad 12	2	

*) *Elective courses for study abroad will be transferred to BINUS UNIVERSITY INTERNATIONAL's SCUs based on the transferred credit policies.*

Table of Prerequisites for Computer Science

Subject		SCU	Smt	Prerequisite		SCU	Smt
COMP6340	Analysis of Algorithms	8	3	COMP6502	Introduction to Programming	6	1
COMP6343	Web Application Development and Security	8	4	COMP6510	Programming Languages	4	2
COMP6505	Computer Graphics	3	4	COMP6502	Introduction to Programming	6	1
COMP6210	Ethical Hacking and Penetration Testing	3	4	CPEN6200	Computer Networks and Security	6	3
COMP6348	Network Forensics	3	5	CPEN6200	Computer Networks and Security	6	3
GAME6048	Games Design Programming	3	4	COMP6502	Introduction to Programming	6	1
COMP6345	Intelligent Systems	4	5	COMP6340	Analysis of Algorithms	8	3
COMP6506	Pervasive Software Engineering	4	5	COMP6510	Programming Languages	4	2
COMP6347	Cloud and Distributed Systems	5	5	CPEN6200	Computer Networks and Security	6	3
GAME6046	Advanced Games Design Programming	3	5	COMP6502	Introduction to Programming	6	1