

Computer Science

Introduction

In this fast-moving era, Computer Science (CS) has gone beyond the simple use of computer software. With the 3rd wave of computing (Pervasive computing) as 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 business, their clients, or their employers. This program encourages and challenges students in areas of:

- General CS, and
- Pervasive Games Technology

Getting 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 a viable technology solution using appropriate platforms, tools and techniques. The program provides the students with the technical, entrepreneurial, and the specialized skills needed to develop and design applications across modern platforms, such as cloud, web, and mobile, in a rapidly changing IT environment.

The Computer Science program is accredited the “A” grade - the highest level 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	Games Design and Programming
Cloud and Distributed Systems	Advanced Games Design and Programming
Multimedia and Human Computer Interaction	Technopreneurship
Web Application Development and Computer Security	Intelligent Systems
Computer Networks and Security	Computer Graphics
Ethical Hacking and Penetration Testing	Network Forensics

Students experience a vast range of innovative learning processes, from blended learning to experiential; student centered, flipped classroom, 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 doing a startup company, internship, research work, or community development work that is suitable for their future goal in the final year of the study. Students enjoy the 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 career.

Vision

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

Mission

- Educate students from diverse backgrounds with the relevant knowledge and skills for the society by providing computer science courses and internship.
- Prepare graduates to become smart and good IT leaders, innovators, and entrepreneurs in global industries, as well as prepare them for advanced studies.
- 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 secured 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 the 6 key skills (self-management, planning and organizing, team work, problem solving, decision making, initiative and enterprise) and foreign languages as well as using information technology and to be useful in the workplace and society.

Student Outcomes

After successful completion of the 4-year program, students are expected to be able to:

1. Develop software using appropriate software development methodologies to produce software with different requirements.
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 formulation.
5. Administer the conceptual knowledge and algorithm principles related to computing to do problem-solving.
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 secured and robust networks.
8. Design and develop game applications by combining technology with creative art and design concept to produce a good game application that is able to run on multi-platform environments.
9. Apply the 6 key skills (self-management, planning and organizing, team work, problem solving, decision making, initiative and enterprise) and foreign languages as well as using information technology beuseful in the workplace and society.

Prospective Career 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, telecommunication companies, IT companies, or other organizations. The career opportunities are unlimited for Computer Science graduates.

A wide range of career opportunities in IT and 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 industrial contexts. 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 work place 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 aspiration and may provide social and professional networks.

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

Award/Degree

- Sarjana Computer 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

Major and Streaming

Streaming	Degree				Partner
	Single	Title	Double	Title	
General CS	√	S.Kom			
Pervasive Games Technology	√	S.Kom			
Computer Science			√	S.Kom. & BSc (Hons)	Nottingham
Computer Science with Artificial Intelligence			√	S.Kom. & BSc (Hons)	Nottingham
Software Engineering			√	S.Kom. & BSc (Hons)	Nottingham
Application Programming			√	S.Kom. & B.Info.Tech	RMIT
Business Applications			√	S.Kom. & B.Info.Tech	RMIT
Multimedia Design			√	S.Kom. & B.Info.Tech	RMIT
Network Programming			√	S.Kom. & B.Info.Tech	RMIT
System Administration			√	S.Kom. & B.Info.Tech	RMIT
Web Systems			√	S.Kom. & B.Info.Tech	RMIT

Streaming	Degree				Partner
	Single	Title	Double	Title	
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

Title: S.Kom (Sarjana Komputer)
BSc (Hons) (Bachelor of Science (Honours))
B.Info.Tech (Bachelor of Information Technology)
B.Comp.Sc.(Bachelor of Computer Science)

Double Degree in Computer Science

In cooperation with 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 experience by studying abroad at the University of Wollongong in Australia. The students who take the double degree program at University of Wollongong will receive S.Kom. and B.Comp.Sc. degrees at the end of the program. The available majors at 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 experience by studying abroad at the University of Nottingham, in the United Kingdom. Students shall initially complete three years study at BINUS on its Computer Science program. Upon successful completion of the three years at BINUS, students shall enroll on year 3 of 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 System. 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 experience 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.

General Computer Science Stream (Single Degree)

The General Computer Science stream is a single degree program which is designed to provide students with knowledge, practical and creative skills to design and create general computer applications and systems. In this stream the students have an opportunity to take more elective courses, so that the students can take courses that match with their future career aspirations.

Pervasive Games Technology Stream (Single Degree)

The Games Technology stream is a single degree program which is designed to provide students with knowledge, practical and creative skills to design and create computer graphics, animation and interactive games. This stream also provides the student with an opportunity to become certified developer in 3D software package such as Maya, 3DsMax, Blender, and others. Students who would like to pursue careers in the rapidly expanding games, animation and creative industries are ideal candidates for this stream.

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	ENGL6171	Academic English I	3	20
	CHAR6013	Character Building: Pancasila	2	
	ENTR6091	Project Hatchery	2	
	COMP6335	Introduction to Programming	8	
	COMP6336	Discrete Structures	5	
2	ENGL6172	Academic English II	3	19
	COMP6337	Programming Languages	6	
	COMP6338	Computational Mathematics	4	
	COMP6339	Database Systems	6	

Sem	Code	Course Name	SCU	Total	
3	CHAR6014	Character Building: Kewarganeraan	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	
	COMP6342	Computer Architecture and Operating Systems	6		
	COMP6343	Web Application Development and Security	8		
	COMP6344	Computer Graphics	4		
	Streaming: Computer Science General				
	COMP6210	Ethical Hacking and Penetration Testing	3		
	Streaming: Pervasive Games Technology				
	GAME6048	Games Design and Programming	3		
5	COMP6345	Intelligent Systems	4	23	
	COMP6346	Pervasive Software Engineering	8		
	COMP6347	Cloud and Distributed Systems	5		
	ENTR6045	Technopreneurship	2		
	LANG6061	Indonesian	1		
	Streaming: Computer Science General				
	COMP6348	Network Forensics	3		
	Streaming : 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 CREDIT 146 SCU					

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

Enrichment Entrepreneurship Track

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

Enrichment Research Track

Code	Course Name	SCU	Total
Enrichment Program I / II			16
RSCH6063	Research Exposure	8	
RSCH6069	Scientific Writing	4	
RSCH6070	Research Methods in Computer Science	4	

Enrichment Study Abroad Track*

Course Name		SCU	Total
Enrichment Program I			
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	

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

The Table of Prerequisite for Computer Science

Subject		SCU	Smt	Prerequisite		SCU	Smt
COMP6340	Analysis of Algorithms	8	3	COMP6335	Introduction to Programming	8	1
COMP6343	Web Application Development and Security	8	4	COMP6337	Programming Language	6	2
COMP6344	Computer Graphics	4	4	COMP6335	Introduction to Programming	8	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	COMP6335	Introduction to Programming	8	1
COMP6345	Intelligent Systems	4	5	COMP6340	Analysis of Algorithms	8	3
COMP6346	Pervasive Software Engineering	8	5	COMP6337	Programming Language	6	2
COMP6347	Cloud and Distributed Systems	5	5	CPEN6200	Computer Networks and Security	6	3
GAME6046	Advanced Games Design Programming	3	5	COMP6335	Introduction to Programming	8	1