

## Computer Science

### ***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 the 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 Description***

The School of Computer Science has been dedicated to offer the highest standard of computer science education since its establishment in 2001. The School has a range of focused courses, called stream, at the undergraduate level. Each stream is aimed to build not only a strong conceptual knowledge in computer science, but also well-defined IT industry skill-sets, including General Computer Science, Computer Forensics and Security, and Games Technology. To ensure that the skill-sets match with industry requirements, the school adopts an industry-academic program and embeds this program in different courses in the defined streams. For instance, we embed the CCNA (Cisco Certified Network Associate) curriculum, CEH (Certified Ethical Hacker) curriculum, and SCJP (Sun Certified Java Programmer) curriculum in our courses.

The School is not only concerned with the academic quality of the program, but it also prepares students for their future careers by providing them with opportunities to obtain professional certifications, such as CCNA, CEH, and SCJP, and with work experience in internships with industry and managed internship programs. While in the internship with industry program, students spend a certain period working full time at a company site, in the managed internship the students work on the project brought by a company to the school, at the school site.

Computer Science graduates will find that they will generally fit well into the software development industry, either as a programmer, software engineer, application designer or software architect. However, since they have also gone through a specific streaming process, they will be able to develop their careers in the networking or multimedia industries as network administrator and computer security consultant, or in the games and multimedia industries which involve a lot of outsourcing as games designer and games developer. Computer science graduates also have a good opportunity to develop their entrepreneurial skills by starting up a company themselves.

### ***The objectives of the School of Computer Science are :***

- A. Produce graduates with the skills to develop creative software products and services, including but not limited to computer networks and security and games technology.
- B. Produce graduates with a solid foundation of mathematical, algorithms, and principles related to computing that will be needed in problem solving practice

- C. Equip graduates with the skills of communication and utilizing the latest trend in technology to contribute in the global workforce.
- D. Produce graduates with the skills to design and implement various computer networking environments using different security techniques and routing theories to produce secured and robust networks.
- E. Produce graduates with the skill to design and develop game application by combining technology with creative art and design concept to produce a good game application that is able to run in multi platform environments.
- F. 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 a useful in the workplace and society.

***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

***Graduate Competencies***

Upon successful completion of this 4-year program, students are expected to be able to :

1. Apply design and development principles in the construction of software systems of varying complexity
2. Apply knowledge of computing and mathematics appropriate to the discipline
3. Identify, define and analyse computing problems and requirements appropriate for solution
4. Design, develop and evaluate a computer-based system, process, component, or program to meet desired needs, in compliance with global standards
5. Demonstrate effective communication skills (verbal and written) to international audience
6. Comprehend and apply knowledge of professional, ethical and social responsibilities
7. Comprehend and analyze the impact of computing on individuals, organizations and society, including ethical, legal, security and global policy issues
8. Demonstrate an understanding of the needs and engagement in continuous improvement, including professional development.
9. Apply current techniques, skills, and tools in computing to creatively design and produce innovative computing practices

***Study Completion Requirements***

***Major in Computer Science***

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

***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 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 programme. Upon successful completion of the three years at BINUS, students shall enroll on year 3 of one of Nottingham's three-year undergraduate degree programmes, as listed below. Students may progress to either the United Kingdom campus or the Malaysia campus of Nottingham. Upon successful completion of the four years of study, students shall receive a degree award from Nottingham, which is either BSc. (Hons) Computer Science, BSc. (Hons) Computer Science with Artificial Engineering, or BSc. (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.InfoTech. 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.

***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, or others. Students who would like to pursue careers in the rapidly expanding games, animation and creative industries are ideal candidates for this stream.

***Computer Forensics and Security Stream (Single Degree)***

The Computer Forensics and Security stream is a single degree program and is designed to provide students with knowledge and practical skills to design, build and administer secure large scale computer networks. This stream also provides the student with an opportunity to become a Cisco Certified Network Associate (CCNA). Students who would like to pursue careers in the IT consulting and telecommunication industries are ideal candidates for this stream.

***Teaching, Learning, and Assessment Strategy***

The teaching and learning processes are conducted through lectures, tutorials, practical demonstrations and activities, laboratory teaching, with students' independent study required. It is the responsibility of the lecturer of a particular course to facilitate all students' learning on the course, who can be assisted by a tutor, if necessary. By having qualified lecturers and guest lecturers from professional industries, the students will be able to gain knowledge from both sides, i.e. theoretical and practical frameworks, through in-depth analysis of case studies, laboratory assignments, and individual/group work projects.

Learning will be an exciting experience for students as they are provided with excellent facilities such as computer lab, and partner's external facilities such as render farm. With a good quality library, the students will be able to access books, journals and magazines for information and research activity.

However, all coursework are assessed through a variety of assessment tasks such as reports, presentations, assignments, individual and group projects, and thesis/final project report as well as mid-semester and final semester examinations. For practical courses, the mid-semester and final semester projects require students to give a presentation describing their produced work. The feedback of the given assessment tasks is given in the class/tutorial, embedded in the scoring rubric/assessment criteria sheet and/or separate feedback forms. The complexity of course content in application/system design problem-solving methods is introduced at different levels of study. A final project work and the written report must be submitted in Year 4 (semester 8).

An innovation habit will be developed through course assessment that put weight on content comprehension and innovation. The innovation thinking, or commonly referred to Design Thinking on the other hand, will be developed through collaboration with BINUS INTERNATIONAL'S School of Art & Design. Students are required to translate their selected innovative ideas into a visible design to comprehend the end-to-end innovation process. This innovation thinking approach is implemented in the teaching, learning, and assessment process of several courses throughout the program.

***Employability and Career Support***

A wide range of career opportunities in IT and computer industry is 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, 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](http://www.binuscareer.com).

**Program Structure**

**CS Mandatory Courses (Include 12 SCU of electives)**

<b>Course Code</b>	<b>Course Name</b>	<b>SCU</b>
COMP6056	Program Design Methods	4
COMP6047	Algorithm and Programming	6
CHAR6013	Character Building: Pancasila	2
CHAR6012	Freshmen Enrichment Program	0
ENGL6171	Academic English I	3
MATH6025	Discrete Mathematics	4
ENTR6038	Project Hatchery	2
COMP6213	Object Oriented Programming	4
CPEN6105	Computer Architecture & Organization	3
MATH6031	Calculus	4
ISYS6169	Database Systems	6
ENGL6172	Academic English II	3
CHAR6014	Character Building: Kewarganegaraan	2
COMP6048	Data Structures	6
CPEN6098	Computer Network	4
COMP6212	Multimedia Systems	3
COMP6216	Scripting Languages	3
ENTR6036	Entrepreneurship 1	4
MATH6030	Linear Algebra	2
COMP6222	Web Programming	3
COMP6217	Systems Analysis and Design	4
COMP6205	Computer Graphics	4
COMP6049	Algorithm Design and Analysis	4
COMP6176	Human and Computer Interaction	4
COMP6210	Ethical Hacking and Penetration Testing (Elective)	3
GAME6048	Games Design and Programming (Elective)	
COMP6065	Artificial Intelligence	4
COMP6153	Operating System	4
COMP6100	Software Engineering	4
COMP6062	Compilation Techniques	4
CHAR6015	Character Building: Agama	2
COMP6206	Computer Security and Network Forensics (Elective)	3
GAME6046	Advanced Games Design and Programming (Elective)	

Course Code	Course Name	SCU
CPEN6107	Wireless Mobile Software Engineering	2
COMP6208	Distributed Systems	4
COMP6209	Enterprise Applications	4
COMP6219	Thesis Preparation	0
COMP6214	Pervasive Computing	2
ENTR6037	Entrepreneurship 2	6
COMP6221	Web Systems Security (Elective)	3
GAME6047	Character Rigging and Animation (Elective)	
COMP6204	Advanced Networking (Elective)	3
GAME6049	Visual Gaming (Elective)	
COMP6211	Internship	8
COMP6218	Thesis	6
		146

In addition to the above list, students are allowed to choose courses from other majors and declare these courses as their electives. Please refer to each course description to check any pre-requisites for these courses.

#### Additional Courses for the Computer Forensics and Security Stream

Course Code	Course Name	SCU
COMP6210	Ethical Hacking and Penetration Testing	3
COMP6204	Advanced Networking	3
COMP6221	Web Systems Security	3
COMP6206	Computer Security and Network Forensics	3

#### Additional Courses for Games Technology Stream

Course Code	Course Name	SCU
GAME6048	Games Design and Programming	3
GAME6046	Advanced Games Design and Programming	3
GAME6047	Character Rigging and Animation	3
GAME6049	Visual Gaming	3