Computer Science

Vision

The School of Computer Science strives to become a leading and world class Computer Science School that is excellent in teaching and research in order to keep abreast with the needs of a global industry and society.

Mission

The School of Computer Science exists to prepare future leaders in Information Technology through innovative and growth-oriented curriculum by meeting the stake-holder expectations, providing academic and service excellence, promoting high quality research, building strong corporate connections, and gaining international recognitions and accreditations. Graduates will have the necessary knowledge and skills to be employed globally. They will be ethical professionals and have practical experiences.

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. To provide students with a solid foundation of mathematical, algorithm principles, and computer science knowledge that will be needed in IT practice
   B. To equip students with knowledge and skills to research and develop creative software products and services, including but not limited to computer networks and security and games technology.
   C. To equip students with the effective communication skill to perform in the global workplace.

D. To complement students with the skills on teamwork, leadership and professionalism in the global workplace.

E. To prepare students with the abilities to keep up-to-date with the latest information technology trends and industries, and use the latest technologies creatively.

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 Science from Murdoch University at Perth, Australia
- Dual Degree with Bachelor of Computer Science from the University of Wollongong at New South Wales, Australia
- Dual Degree with Bachelor of Engineering from the Inholland University of Applied Sciences at Amsterdam, The Netherlands
- 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. These 146 SCUs are comprised of:

– 120 SCU of CS Mandatory Courses, required of all students taking a major in CS, and which meet either BINUS INTERNATIONAL requirements or are mandated by the Indonesian Ministry of Education. This includes the 6-SCU thesis/final project in the final year.

– Additional courses that are designated by the School of Computer Science, and vary based on the specific course of study (stream) selected by the student;

– Electives chosen by the student.

Double Degree in Computer Science

In cooperation with Murdoch University and 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 Murdoch University or University of Wollongong in Australia. For the students who take the double degree program at Murdoch University, they will receive S.Kom. and B.Sc. degrees at the end of the program. 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 Games Technology

In cooperation with Murdoch University.

This double degree program is designed to provide students with knowledge, practical and creative skills to design and create computer graphics, animation and interactive games. Students have the opportunity to broaden their horizons and experience by studying abroad at the Murdoch University in Australia. At the end of the program students will receive S.Kom. and B.Sc. degrees. Students who would like to pursue careers in the rapidly expanding games, animation and creative industries are ideal candidates for this program.

Double Degree in Information Technology

In cooperation with Inholland University of Applied Sciences.

This double degree program is designed to provide students with a solid foundation for the engineering profession and the information technology profession in particular, and to enable you to continue your professional development. The program focuses on applications of mathematics and statistics in IT, software development, networking, database management systems, data mining, and internet programming. Students have the opportunity to analyse, solve (business) problems, and function in multidisciplinary employment at the Inholland University of Applied Sciences in The Netherlands. At the end of the program students will receive S.Kom. and B.Eng. degrees. Students

who would like to pursue careers in the challenging area of engineering and Information Technology are 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.

Master Track Program

In cooperation with Macquarie University.

The Master Track program is designed to allow students to complete their Sarjana Komputer (SKom) degree at Binus International in 7 (seven) semesters, and then continue with a graduate program for 2 (two) semesters at Macquarie University to obtain a Master Degree.

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.

Minors for Computer Science

Some minor programs are available to Computer Science students in the areas of Information Systems, Marketing, Accounting and in Art and Design. Details of the requirements for these minors may be found in this section of the catalog under those subjects. Please refer to course descriptions to check any pre-requisites.

Minor in Computer Science

A minor in Computer Science is available for students from other majors. Students taking a minor in Computer Science will have to take a specified set of courses. Please refer to the information pages of the Minor in Computer Science and the course descriptions to check any pre-requisites.

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.

Program Structure

CS Mandatory Courses

Course Code	Course Name	SCU
MS101	Calculus and Analytic Geometry	4
MS102	Statistics and Probability	2
MS104	Linear Algebra	2
MS107	Discrete Mathematics	4
MS201	Numerical Methods	2
CS101	Introduction to IT	4
IS105	Systems Thinking	2
CS114	Object Oriented Programming	4
CS113	Programming Principles	4
CS201	Data Structures and Algorithm Analysis	4
CS202	Computing Theory	4
CS203	File and Database Systems	4
CS211	Object Technology	4
CS213	Data Communications and Networks	4
CS214	Multimedia Systems	4

Course Code	Course Name	SCU
CS215	Operating Systems	4
CS216	Web Programming	4
CS208	Systems Analysis and Design	4
CS217	Computer Graphics	4
CS206	Artificial Intelligence	4
CS207	Software Engineering	4
CS220	Scripting Languages	4
CS221	Computer Architecture and Organization	4
CS222	User Interface Engineering	4
CS301	Techniques of Parsing and Translation	4
CS316	Wireless Mobile Software Engineering	4
CS317	Distributed System	4
GS499	Thesis	6
GS107	Character Building: Self Development	2
GS209	Character Building: Interpersonal Development	2
GS210	Character Building: Spiritual Development	2
GS303	Character Building: Professional Development	2
GS102	Academic English I	3
GS201	Academic English II	3
AD403	Design Thinking	2
MK404	Entrepreneurship	2

CS Elective Courses

In order to make up the total credit units required to graduate, students may choose courses up to 6 SCU from the following elective list:

Course Code	Course Name	SCU
CS334	Network Programming	4
CS319	Unix System Administration and Programming	4
CS432	Web Database System	4
CS205	Network Applications and Security	4
CS313	Enterprise Applications	4
CS409	Application Services	4
CS410	Pervasive Computing	4

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 General Computer Science Stream

Course Code	Course Name	SCU
	Elective Courses	16

Additional Courses for the Computer Forensics and Security Stream

Course Code	Course Name	SCU
CS337	Ethical Hacking and Penetration Testing	4
CS314	Advanced Networking	4
CS231	Web Systems Security	4
CS232	Computer Security and Network Forensics	4

Additional Courses for Games Technology Stream

Course Code	Course Name	SCU
CS210	Games Design and Programming	4
CS338	Advanced Games Design and Programming	4
CS315	Character Rigging and Animation	4
CS408	Visual Gaming	4

Courses for Minor in Computer Science

Course Code	Course Name	SCU
CS113	Programming Principles	4
CS114	Object Oriented Programming	4
CS214	Multimedia Systems	4
CS216	Web Programming	4
CS220	Scripting Languages	4