JOINTLY OFFERED BY
DEPARTMENT OF COMPUTER SCIENCE (CS)
DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING (ECE)

BACHELOR OF ENGINEERING
Computer Engineering

Leading the evolution of technology, Shaping the world of tomorrow
The Bachelor of Engineering in Computer Engineering (CEG) programme is jointly offered by the Departments of Computer Science & Electrical & Computer Engineering.

The CEG programme aims to produce graduates with a good foundation to work in the critical layer of technology that interfaces hardware with software. In particular, graduates will be able to attain significant knowledge and abilities in key technologies for real-time embedded systems, computer networking & wireless communication systems, medical imaging & information systems, intelligent control systems, and many others.

Academic Content of the Computer Engineering Curriculum
The computer engineering core curriculum focuses on fundamental computer engineering knowledge: electronics, digital design, microprocessor systems, real-time operating system, software engineering, computer architecture, and networks. The rich set of elective modules permits students to focus or specialise in some sub-disciplines of computer engineering including embedded systems, communications and networking, multimedia processing, control systems, software and algorithms, artificial intelligence, and mathematical tools.
The following is a list of several major specialty areas within computer engineering:

- Coding, Cryptography and Information Protection
- Communications, Wireless Networks, Mobile Computing and Distributed Systems
- Compilers and Operating Systems
- Computer Systems: Architecture, Embedded Systems, Parallel Processing and Dependability
- Computational Science and Engineering
- Computer Vision and Robotics
- Signal, Image and Speech Processing

Accreditation
The Computer Engineering programme is accredited by the Engineering Accreditation Board (EAB) of Singapore.

Admission Criteria
H2 Mathematics and H2 Physics* or H2 Chemistry, OR
Acceptable diploma from a Polytechnic in Singapore.

*Students without ‘A’ level / H2 Physics need to have ‘O’ level /H1 or equivalent Physics and will be required to take specific Physics bridging modules.

Job Prospects
Networked computing technologies have penetrated so many market segments that by 2005, the number of embedded processors used in appliances and handsets exceeded that of traditional processors used in desktops and servers. The popularity of smart phones and tablet devices further opened up new opportunities for mobile applications. After the first wave of products and services going on-line, we are now witnessing a second wave of application migration into the mobile space. Unlike the first migration which involved simple website design, this round of migration requires a new level of sophistication. This is where computer engineers can come in to design, implement and support complex and innovative digital solutions that not only involve software but also specialised hardware. No longer will the platform be generic, as was the case of the desktop. Increasingly, we will see innovative hardware-software solutions that differentiate themselves by giving user new value propositions, and disrupting the traditional ways of doing things. In particular, computer engineers will be involved in many industries including:

- inventing new automation solutions for factories, healthcare, and logistics;
- designing innovative mobile solutions that seamlessly marry usability with back-end operations;
- engineering networking infrastructures for complex environments;
- creating smart controls for robots, engines, automobiles, and all kinds of appliances.

With the solid fundamentals that the NUS computer engineering degree will give you only imagination and ambition will be your limits.

Pedagogy
In this computer engineering curriculum, you do not learn knowledge in compartments.

The knowledge and skill needed for the conceptualisation, design, and realisation of a system is learned in the context of a large complex project introduced in Year 1 and culminating in a capstone project in Year 3.

You are taken through the whole product development cycle with theory on one hand and practice on the other, making the eventual transition from academic study to your future career seamless.

With NUS Computer Engineering, you learn in a holistic environment.
- Sound technical knowledge and skills in computer engineering
- System building or design experiences relevant to industry
- Tools, techniques, and problem solving skills
- Good communication skills, and professional and ethical conduct.
Power to Change the World

Computer engineers are concerned with the design, development, and implementation of computer technology in a wide range of consumer, industrial, commercial, and military applications. In automobiles design, for example, computers are integrated into many systems, including air conditioning, navigation, audio and video systems, and even tire pressure alert systems. As more and more products incorporate or interact with computers, computer engineers are challenged to develop computer applications that improve the quality of life while being sensitive to manufacturing and distribution costs. Computer engineers frequently work on new applications of computers, such as advances in digital television and photography, virtual meeting technology, intelligent cities, control systems, and new technologies for phones, security systems, cars and airplanes.

Methods of Instruction and Design Experience

The CEG programme offers a very flexible curriculum allowing students to customise it to fit their interests. It also allows students to leverage on the fact that NUS is a comprehensive university. The curriculum aims to provide a well-rounded thinking graduate, steeped in fundamentals and able to interpret knowledge from diverse disciplines.

Design, communication, and teamwork are integrated throughout the curriculum, especially in the core modules such as Programming Methodology, Electrical Engineering, Data Structures and Algorithms, Microprocessor Systems, Real-time Operating Systems, Computer Architecture, and Embedded Systems Design Project which is taken in the third year. There is also a project module on technology assessment where students go through the process of product conceptualisation to commercialisation. Further design experiences occur in the elective modules. Students may also spend an extended period of internship (up to one year) in industry and academic credit will be given for this exposure.

Students will also benefit from the varied opportunities provided by our diverse programmes:

- NUS Overseas Colleges
- Student Exchange Programme
- Double Degree Programme
- Minor Programmes
- Enhancement Programmes

For further information, please see http://www.ceg.nus.edu.sg/ or Email: askCEG@nus.edu.sg
“Software is the IN thing now, but hardware is the future. I joined CEG to get the best of both worlds, and learn from the best. I didn’t know I had a passion for electronics, until I joined CEG. I just knew that I wanted to be in the best programme.”

Lho Chen Yang

- Feedback on CG-coded modules

“…the most valuable thing for me is the hands-on learning offered in CEG’s project-based modules. It has enriched me greatly. To quote Richard P. Feynman, a physicist, “What I cannot create, I do not understand.” I had to create my own algorithms and solutions to different problems posed to us, widened my knowledge and deepened my understanding in this particular academic field, theoretically, and, strengthened my application skills, practically. On top of these, the programme enhanced my interpersonal skills and soft skills such as teamwork and public speaking.”

Paul Stephen Rampala Areilla

“The CG-coded modules introduced practical applications of the theoretical concepts. This created a lot of interest amongst the students as we could see the concepts in action. We started with building a strong programming logic with CG1101 and CG1102. Then CG1108 introduced us to the hardware portion. It was fun to see software controlling hardware. CG2271 took us in more details of the software and how it can be made to function well with multi-tasking systems and hardware. Embedded systems and hardware have always been my interest and I believe that this programme is fulfilling my interests.”

Angad Singh

“My experiences in taking CG-coded modules are overall complicated … No past year papers to refer and no senior to ask how the exam questions will be set. With that said, lecturers are friendly and helpful. Additionally, projects were done mostly within groups and it prepares us for the capstone project CG3002 which will include Conceive, Design and Implementation. I never regret my choice of enrolling into this programme and am enjoying my journey so far.”

Nang Mo

- iDA ELITE (Enhanced Learning in Infocomm Technology)

“I’m looking forward to starting my internship under the ELITE programme, where I hope to get some hands-on experience working on industry projects, applying and relating what I have learnt in class to the working world. I think the programme would be a good insight to the infocomm industry and hope that the exposure and work experience gained would better prepare me for making career decisions in the future!”

Gillion Ng

“Through iDA ELITE programme, I am provided with wide networking channels to communicate and secure a wonderful internship to work with some of the best companies and institutions. Other than that, we are given the opportunity to attend important IT seminars and also workshops and training programmes to further upgrade ourselves and get ourselves familiarise with the IT industry.

I really look forward to making an impact and difference in myself through this programme!”

Kevin Lin

- NUS Overseas Colleges (NOC)

“Entrepreneurship is a passion very close to heart and gladly NUS provides me a chance to pursue it. The thrill of taking calculated risks, the excitement in anticipating the results of a new strategy and the joy of meticulous planning bearing fruition excites me. I realise that most great start-ups are grounded in great technology. As a Computer Engineering (CEG) student, I am trained to think analytically across multiple disciplines and infuse ideas to reality.

The NUS Overseas Colleges (NOC) programme allows me to experience entrepreneurship right at the place where it breed; best – Silicon Valley. To experience the culture of entrepreneurial hotspots, to work at the challenging start-ups and to live at the melting pot of opportunities and ideas – would be a dream come true. I am really looking forward to experience the NOC experience and take a step towards opening avenues for my professional goals.”

Apoorv Agrawal going to for NOC in AY2011/12
Jointly Offered by
Department of Computer Science (CS)
Department of Electrical & Computer Engineering (ECE)

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