ELECTRONIC & COMPUTER ENGINEERING

- Aerospace Electronics (N75)
- Biomedical Engineering (N60)
- Electronic & Computer Engineering (N44)
- Network Systems & Security (N64)
Work with cutting-edge technology at our Technology Centres in Digital Signal Processing, Artificial Intelligence and Biomedical Engineering

Internships with the best in the industry – Motorola and Hewlett Packard

Strong Research & Development initiatives

ECE is the Regional Academy for the Cisco Certified Network Associate curriculum
Take out all things electronic from around us for just one day, and try to imagine if you can actually survive the day. Probably not! Today, almost everything we use from hand phones and medical equipment to airplanes and security systems, are made possible by electronics.

Embrace technology, and you could be the next Sim Wong Hoo! This Ngee Ann graduate and the founder of Creative Technology rocked the world with his Sound Blaster Card.

Join the programmes under the Electronic & Computer Engineering Division (ECE). Our various technology centres and laboratories – Biomedical Engineering, Digital Signal Processing, Embedded Systems, Internetworking Technology, Photonics, Radio Frequency & Microwave and Artificial Intelligence – will give you hands-on training in cutting-edge technology.

Work with Nanyang Technological University, National University Hospital, Alexandra Hospital and Changi General Hospital on research and development programmes. Our close partnerships with industry leaders allow you to go on attachments at Chartered Semiconductor Manufacturing, Data Storage Institute, Motorola and Hewlett-Packard.

The ECE Division is the Regional Academy for the Cisco Certified Network Associate curriculum. Our Diploma in Network Systems and Security (NSS) enjoys strong endorsement and certification from Cisco Systems (USA). NSS students also have the option of sitting for additional Cisco certifications upon graduation.

With all that the ECE Division has to offer, you can be assured of electrifying careers with our diplomas!
Innovations with an Impact

The ECE Division fosters innovation by analysing modern day challenges and responding with projects that provide welcome solutions.

The Personalised Cardiac Telemonitoring System was created because patients with cardiac diseases could not be monitored frequently enough. That risked complications from late detection. With this system, there is greater efficiency in monitoring patients’ progress because they can upload their ECGs onto a web server. This allows their cardiologists to access the ECGs anytime, anywhere, make a diagnosis and prescribe appropriate treatment.

An ECE student Nyuyen Duy Hoang, has designed and developed the Digital Audio Broadcasting (DAB) Data Services Content Management System (DS-CMS) software, which found implementation in SMARTRadio services. SMARTRadio is a DAB service provided by MediaCorp. DAB differs from analogue FM radio not only in providing better sound quality, but more importantly, it supports transmission of data services (text, graphics etc.). It allows broadcasters to provide timely and up-to-date information in easy-to-read text and graphics in their data services. These data services range from news, advertisements, traffic reports, airport flight and entertainment information. ECE Division is a leading provider of DAB-related expertise in Singapore with a proven track record. We have completed a few consultancy projects for MediaCorp Radio and several other companies.

The ECE Division comes under the School of Engineering, which also includes Electrical Engineering, Building & Environment, Multidiscipline Engineering, and Mechanical Engineering.

For more information, log on to http://soe.np.edu.sg/soe/ece
When you graduate and as you move up the career ladder, you will most likely assume roles that require more than what you have learnt as an engineer. You will change jobs a few times, and like many engineers, take on management roles and switch to jobs in entirely new fields.

To help you become More Than An Engineer, the School of Engineering (SoE) is excited to offer you a radically different curriculum structure that spells: More Choices, Greater Flexibility, and Broader Career Opportunities!

This revolutionary broad-based curriculum offers flexibility - breaking away from the limitations that come with the traditionally structured approaches of many engineering diploma courses offered elsewhere.

So, join us and be plugged into the new exciting world of engineering where:

• You can customise your final-year options/electives from a wide range of modules to meet your career aspirations

• You can choose non-engineering options such as Business Management and Marketing & Entrepreneurship, to give you a leg up into the fast growing service and business sectors

• You graduate with more than just a Diploma. You can also choose to take up Diploma Plus and/or Enhancement Certificates depending on your abilities and interests

The Engineering Common Programme (ECP) N71 is the way to go if you are keen on engineering but need more time to decide which course is suitable for you.

Delay your decision for one semester to gain a better appreciation of the careers that the various engineering diplomas can offer. At the end of the semester, after you have discovered your specific area of interest, you can join one of the following nine engineering diploma courses:

• Aerospace Electronics (AE)
• Aerospace Technology (AT)
• Audio-visual Technology (AVT)
• Biomedical Engineering (BME)
• Electrical Engineering (EE)
• Electronic & Computer Engineering (ECE)
• Mechanical Engineering (ME)
• Marine & Offshore Technology (MOT)
• Mechatronic Engineering (MTE)
Diploma in Aerospace Electronics

- A six-month industrial attachment programme that is well received by the industries
- Course curriculum which is aligned with the Singapore Airworthiness Requirements (SAR) set out by the Civil Aviation Authority of Singapore
- Possible exemption from most of the 12 SAR avionics papers, to become a Licensed Aircraft Maintenance Engineer with further training in the aerospace industry
500 miles – the distance from Singapore to Ipoh. Also, the length of wiring it takes to connect all the electrical parts of the Airbus A380 super jumbo jet.

Now imagine a future where your job, as a licensed aircraft maintenance engineer for a leading airline, is to keep these aviation electronics (avionics) 100 per cent ready for take off. How is this possible? Let our Diploma in Aerospace Electronics (AE) show you the way.

Our curriculum prepares you for this exciting growth industry, by offering a broad-based foundation with basic aircraft-related modules like the Fundamentals of Aerospace Technology. It not only covers maintenance and repair, but offers broad-based aircraft-related modules like Avionics Systems and specialised modules like Aircraft Navigation & Communication Systems, and Aircraft Electrical & Instrumentation Systems.

This three-year course is designed to align with the Singapore Airworthiness Requirements (SAR) as set out by the Civil Aviation Authority of Singapore. With this diploma, you can be exempted from most of the 12 SAR avionics papers and become a Licensed Aircraft Maintenance Engineer with further training in the aerospace industry.

Apply your knowledge and learn with our six-month attachment programme. You could work with aerospace industry leaders like ST Aerospace, Republic of Singapore Air Force, SIA Engineering, Eurocopter, Rockwell Collins and Honeywell.
School of Engineering Electives
Choose your electives and customise your selection from a wide range of modules from engineering and non-engineering categories. See page 22.

### Year 1
- Electrical Technology
- Engineering Mechanics
- Engineering Mathematics 1 & 2
- Avionics Systems
- Fundamentals of Aerospace Technology
- Analogue Electronics

### Year 2
- Aircraft Materials
- Telecommunication Principles
- Analogue Circuit Design and Applications
- Applications Programming
- Engineering Mathematics 3

### Year 3
**Industrial Attachment Programme Path**
- Aircraft Navigation & Communication Systems
- Aircraft Electrical & Instrumentation Systems
- Avionics Project Design
- Industrial Attachment Programme
  - World Issues: A Singapore Perspective
  - Any 1 IS general module

**Non-Industrial Attachment Programme Path**
- Aircraft Navigation & Communication Systems
- Aircraft Electrical & Instrumentation Systems
- Project Design & Development
- Embedded System Design
- Radio Frequency and Microwave Engineering
  - World Issues: A Singapore Perspective
  - Any 1 IS general module

### Interdisciplinary Studies (IS) modules
- Computer Programming
- Electrical & Electronic Drawing & CAD
- Digital Electronics
- Individual & the Community
- Sports & Wellness
- Creativity & Applied Thinking Skills
- Communication Toolkit
- Microcontroller Programming & Interfacing
- Fundamentals of Control Systems
- Aircraft Maintenance Practices
- Electronic Practical Skills
- Innovation & Enterprise in Action
- Any 2 IS general modules
What can you achieve in your career?

With over 100 aerospace companies employing more than 18,000 people in Singapore to serve regional and global markets, your career prospects are excellent.

By 2018, the aerospace industry is expected to create another 18,000 new jobs - one of which could be yours. With our AE diploma, you will be able to work as an aircraft maintenance engineer, participate in research and development, provide engineering support, or even enter sales and marketing.

Further Studies

You can pursue an Electrical or Electronic Engineering degree in local universities or an Avionics degree with overseas universities like the Queensland University of Technology, University of Glasgow, University of Bristol and Queen Mary University of London.

Entry Requirements

To be eligible for consideration, candidates must have the following GCE ‘O’ Level examinations (or equivalent) results:

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** Candidates with English as a second language (EL2) must have attained a minimum grade of 6.

Candidates with hearing deficiency or severe vision deficiency including colour appreciation deficiency should not apply for the course.
Diploma in Biomedical Engineering

- A pioneering course in Singapore that bridges engineering with life sciences
- Six-month attachments at hospitals, multinational corporations, research institutes or universities
- A high 65% of 2007 BME graduates offered places in our local universities
About the Diploma

Biomedical engineering has created medical miracles - from regaining movements to extending life, supporting or replicating functions of the human body.

If medical miracles fascinate you, then Ngee Ann Polytechnic’s Diploma in Biomedical Engineering (BME) is the course for you as it plugs you right into the world of biomedical engineering. Our BME diploma pioneered the combination of engineering with life sciences to deliver knowledge and skills which will make you a very valuable asset to the industry with abilities to develop highly specialised medical devices and equipment. Biomedical engineers are the key to unlocking and sustaining the rapid development of the heavily-invested Life Sciences industry – exploring new grounds in research and building new inventions.

You will be equipped with a strong foundation in engineering that complements the life sciences, including areas such as electronics, biophysics, medical instrumentation, cell and molecular biology, biomechanics and implants. In addition, you will learn about Computer Programming, Embedded System (ARM) and Diagnostic, Therapeutic & Laboratory Equipment.

Our six-month industrial attachment allows you to practise what you have learnt. Our students are sought after by our partners, including the BME Departments of hospitals and multinational corporations. If you prefer, you may take in-depth Project Design, Foundational Chemistry and Further Engineering Mathematics modules in place of your industrial attachment.

"My 3 years’ stint in BME has been an incredible one, with great friends, caring lecturers and a conducive learning environment. BME covers a wide range of subjects from engineering to the physiology of human body, even entrepreneurship! During my attachment at KK Women's and Children's Hospital, I realised the importance of BME in the daily functioning of hospitals and how much reliance medical doctors and patients place on medical devices and equipment. I enjoyed my BME days thoroughly!"

- Joanne Lum (2007 BME graduate)
What will you learn in the course?

**Year 1**
- Analogue Electronics
- BioPhysics
- Computer Programming
- Digital Electronics
- Electrical Technology
- Electronic Practical Skills
- Engineering Mathematics 1 & 2
- Engineering Mechanics
- Introduction to Biomedical Engineering
- Creativity & Applied Thinking Skills
- Sports & Wellness
- Individual & the Community
- Communication Toolkit

**Year 2**
- Applications Programming
- Cell & Molecular Biology
- Electronic Design & Prototyping
- Electronic Project Design Practice
- Embedded System (ARM)
- Engineering Mathematics 3
- Fundamentals of Control Systems
- Medical Instrumentation
- Physiological Systems
- Innovation & Enterprise in Action
- Any 2 IS general modules

**Year 3**
**Industrial Attachment Programme Path**
- Industrial Attachment Programme
- BME Project Design
- Clinical Engineering
- Diagnostic, Therapeutic & Laboratory Equipment
- World Issues: A Singapore Perspective
- Any 1 IS general module

**Non-Industrial Attachment Programme Path**
- Project Design & Development
- Biomechanics & Rehabilitation Engineering
- Biomaterials & Implants
- Clinical Engineering
- Diagnostic, Therapeutic & Laboratory Equipment
- Telecommunication Principles
- World Issues: A Singapore Perspective
- Any 1 IS general module

**Interdisciplinary Studies (IS) modules**

**School of Engineering Electives**
Choose your electives and customise your selection from a wide range of modules from engineering and non-engineering categories. See page 22.
What can you achieve in your career?

BME is broad-based and gives you flexibility and versatility in career options upon graduation. You will be highly valued by the industry in the areas of servicing, maintaining and developing highly specialised medical devices and equipment.

In Singapore, the fast growing BME segment accounts for more than half of all personnel employed in the biomedical sciences industry. Jobs abound with healthcare service providers like hospitals and medical centres, as well as suppliers of medical equipment. Depending on your job, your scope of work may cover various fields like research, design and development; evaluating, specifying and commissioning new equipment; traveling to various countries and meeting people at various levels to service equipment or to train them.

Further Studies

65% of our 2007 graduates were offered places in the National University of Singapore (NUS), Nanyang Technological University, Singapore Management University or National Institute of Education. You will potentially enjoy up to 40 module credit exemptions with a Certificate of Merit, when you apply for the popular BioEngineering undergraduate course at NUS.

Pursue your studies overseas and enjoy direct entry into the second- or third-year of the degree courses, or be granted substantial exemptions, as a result of good performance in our diploma.

If you wish, you may also diversify into Biomedical Science, Biological Science, Materials Science or Electrical and Electronic Engineering.

Entry Requirements

To be eligible for consideration, candidates must have the following GCE ‘O’ Level examinations (or equivalent) results:

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The aggregate computation for selection is based on grades obtained for English, Mathematics, Science or Design & Technology and two other subjects.

** Candidates with English as a second language (EL2) must have attained a minimum grade of 6.

Candidates with severe vision deficiency should not apply for the course. Those with colour appreciation deficiency may be considered, subject to an in-house test.
Diploma in
Electronic & Computer Engineering

- A curriculum that caters to the diverse interests of students by allowing them to choose engineering and non-engineering options
- Specialisation areas include aerospace electronics, computer & communication systems, microelectronics, business management, and marketing & entrepreneurship
- Aerospace Option is aligned with the Singapore Airworthiness Requirements as set out by the Civil Aviation Authority of Singapore
About the Diploma

Sony Vaio, Apple Macintosh, Fujitsu ... High-end computers from these famous brands would not exist today without the wizardry of modern-day electronics. From our cars to our offices and household appliances, electronics is pivotal to improving our quality of life.

If you would like to shape the way people live, play and work, this is the course for you. The Diploma in Electronic & Computer Engineering (ECE) programme comprises modules that provide a strong foundation and knowledge in electronic circuit design, telecommunications, computer architecture and computer programming, among others. The curriculum also caters to the diverse interests of students by allowing them to choose either engineering or non-engineering options in the final year.

For engineering options, you may choose from:
- Aerospace Electronics
- Computer & Communication Systems
- Microelectronics

For non-engineering options, you can choose from:
- Business Management
- Marketing & Entrepreneurship

The course curriculum ensures that you have a firm foundation in electronics as well as specialised knowledge in one of the key areas of industry to better prepare you for the future.

The engineering track enhances your technical knowledge to better equip you for further studies or the electronic industry. The non-engineering track offers you the opportunity to progress into the fast growing business and marketing industries.

The Aerospace Electronics (AE) option was designed to align with the Singapore Airworthiness Requirements (SAR) as set out by the Civil Aviation Authority of Singapore. Graduates from AE option may be exempted from most of the 12 SAR avionics papers and become a licensed Aircraft Maintenance Engineer with further training in the aerospace industry.

“The flexibility of the ECE curriculum has allowed me to accelerate my studies and complete a three-year course in two and a half years.”

- Jonathan Chon Kok Wai (ECE graduate)
Year 1
• Electrical Technology
• Engineering - A Creative Profession
• Computer Programming
• Engineering Mathematics 1 & 2
• Engineering Mechanics
• Analogue Electronics
• Electronic Practical Skills
• Electrical & Electronics Drawing and CAD
• Digital Electronics
• Sports & Wellness
• Creativity and Applied Thinking Skills
• Individual & the Community
• Communication Toolkit

Year 2
• Analogue Circuit Design & Applications
• Applications Programming
• Digital System Design & Applications
• Engineering Mathematics 3
• Electronic Design & Prototyping
• Telecommunication Principles
• Electronic Project Design Practice
• Object-Oriented Programming
• Microcontroller Programming and Interfacing
• Innovation and Enterprise in Action
• Any 2 IS general modules

Interdisciplinary Studies (IS) modules
### Aerospace Electronics Option
- Project Design and Development
- Aircraft Electrical & Instrumentation Systems
- Aircraft Navigation & Communication Systems

### Computer & Communication Systems Option
- Industrial Attachment Programme Path
  - Data Communications and Networking
  - Industrial Attachment Programme
  - Non-Industrial Attachment Programme Path
  - Project Design and Development
  - Data Communications and Networking
  - Computer Systems Architecture & Administration

### Microelectronics Option
- Industrial Attachment Programme Path
- Microelectronics Test Systems
- Industrial Attachment Programme
- Non-Industrial Attachment Programme Path
- Project Design and Development
- Wafer Fabrication Technology
- Advanced Wafer Fabrication Technology

### Business Management Option
- Project Design and Development
- Customer Relationship Management
- Service Operation Management
- E-commerce

### Marketing and Entrepreneurship Option
- Project Design and Development
- Business Creation
- Product Design & Marketing
- Enterprise Development

### Interdisciplinary Studies (IS) modules

### School of Engineering Electives
Choose your electives and customise your selection from a wide range of modules from engineering and non-engineering categories. See page 22.
What can you achieve in your career?

A high demand for engineers exists in the electronic industry according to a 2007 study by the Workforce Development Agency. Computers, mobile phones, game stations, portable music players and other electronic products are advancing at a pace not seen before in the last decade. As electronics is arguably the largest industry in the world, you will have virtually no restrictions on where you wish to work. With strong growth expected in the aerospace electronics, computer and telecommunications sectors, you can launch your careers in these fields. Or hold positions in design and development, operations and sales.

Delve into the communications sector, in satellite, digital, mobile and optical communication. Go into computing and explore the boundaries of computer hardware and software. Any industry involving circuit design and analysis, as well as signal processing, will be open to you with your ECE diploma.

Further Studies

Gain advanced standing in degree courses in local and overseas universities in Australia, United Kingdom and United States. Some of these include the National University of Singapore (NUS), Nanyang Technological University (NTU), University of New South Wales and Manchester University.

For example, with an average A to B grade, you will potentially enjoy one year of credit exemption when applying for any Electronics & Computer Engineering degree courses at NUS and NTU. Many of our graduates have received scholarships and progressed to Masters and Doctoral programmes.

Entry Requirements

To be eligible for consideration, candidates must have the following GCE ‘O’ Level examinations (or equivalent) results:

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** Candidates with English as a second language (EL2) must have attained a minimum grade of 6.

Candidates with severe vision deficiency should not apply for the course. Those with colour appreciation deficiency may be considered, subject to an in-house test.
Diploma in 
Network Systems & Security

- The only diploma of its kind in Singapore
- A unique emphasis on security with specialised modules on risk assessment, offensive and defensive network security, and discussions on ethical hacking
- Industry certifications from Cisco Systems (USA)
- ECE is a Cisco Systems training academy for the Cisco Certified Network Associate, Cisco Certified Network Professional, Network Security and Wireless LAN
About the Diploma

In The Matrix, Keanu Reeves plays Neo, a freedom fighter who hacks into a simulated reality created by machines, to free humans. In this instance, hackers are the good guys.

The reality however, can be the opposite.

Hackers are often responsible for online crimes that range from online vandalism to theft of personal data. As such, online security has become a pressing issue in modern societies, where Internet use is widespread.

As the only diploma of its kind, our Diploma in Network Systems & Security (NSS) is unique in its emphasis on security. Every NSS course module touches on network systems and security, with specialised modules dealing with both offensive and defensive network security, as well as risk assessment. You will even be able to discuss issues such as ethical hacking.

Learn about PC hardware and software including network cabling and design, network security, converging voice and data networks, network management and administration, and basic programming. NSS is designed to equip you with the knowledge and skills to implement and integrate wired and wireless networked solutions in today’s world.

Study in the only institution in Singapore that allows students access to state-of-the-art training equipment – anytime, anywhere.

Our six-month attachment programme also allows you to connect and work with IBM, ST Electronics, Datacraft, NCS and Fujitsu Asia.

With certification from industry leader, Cisco Systems (USA) and use of Cisco equipment in training, you will soon be more than prepared to enter this exciting industry.

Ngee Ann Polytechnic is a Cisco Systems training academy for the Cisco Certified Network Associate, Cisco Certified Network Professional, Network Security and Wireless LAN.

“I have benefited a lot from this course. Throughout my three years, I was exposed to network security, network designing and hands-on practical lab session, which proved to be very useful during my industrial attachment with ST Electronics.”

- Kristen Lee (NSS Year 3)
What will you learn in the course?

Year 1
• Electrical Technology
• Engineering Mathematics 1 & 2
• Internetworking 1 & 2
• Computer Programming
• Digital Electronics
• Applications Programming
• Creativity & Applied Thinking Skills
• Sports & Wellness
• Individual & the Community
• Communication Toolkit

Year 2
• Network Cabling
• Communication Systems Fundamentals
• Engineering Mathematics 3
• Internetworking 3 & 4
• Object-Oriented Programming
• Fundamentals of Network Security
• Voice Convergence Networks
• Innovation & Enterprise in Action
• Any 2 IS general modules

Year 3
• Advanced Routing
• Multilayer Switching Networks
• Advanced Network Security
• Wireless LAN Technologies
• Industrial Attachment Programme (IAP)
• World Issues: A Singapore Perspective
• Any 1 IS general module

Interdisciplinary Studies (IS) modules

School of Engineering Electives
Choose your electives and customise your selection from a wide range of modules from engineering and non-engineering categories. See page 22.
What can you achieve in your career?

You will be entering the infocomm industry at an exciting time – the Infocomm Development Authority of Singapore (IDA) has launched a new 10-year Intelligent Nation 2015 plan to prepare for the creation of 80,000 new jobs. With your Diploma in NSS, a large number of jobs in network systems design and implementation, wired and wireless networked solutions, security assessment, and systems administration and support will be available to you. You can be Network Support Technologists, Network Security Assessment Technologists, Network System Administrators, or Sales Engineers.

Further Studies

Gain advanced standing in relevant degree courses at the National University of Singapore, Nanyang Technological University and Singapore Management University, as well as universities in United Kingdom and United States. You can choose to further your studies in the University of Melbourne, University of Western Australia, University of Queensland, University of Adelaide or the Australian National University in Australia.

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Candidates with colour appreciation deficiency may be considered, subject to an in-house test.

Candidates who have successfully completed the Cisco Certified Network Associate (CCNA) course at ITE (for holders of Higher NITEC in relevant disciplines with GPA of at least 3.5) or at the local secondary schools will be granted exemptions for relevant modules if they pass a practical test on a module that is equivalent to their highest completed CCNA module.
You will take two elective modules to complete your diploma. Choose your elective modules from a wide range of clusters available under both engineering and non-engineering categories.

You want more? Just top up with two additional elective modules. If any three of the four elective modules completed are from the same cluster, you will qualify for a Diploma Plus!

The Diploma Plus will better prepare you if you wish to pursue a university degree or increase your employability in discipline-specific areas.

**Engineering Category**
Advanced Engineering Mathematics Cluster *
Aerospace Electronics Cluster
Applied Physics Cluster *
Biomedical Engineering Cluster
Computer & Communication Systems Cluster
Industrial Control Cluster
Industrial Electronics Cluster
Information Technology Cluster
Mechanical Technology Cluster
Microelectronics Cluster
Network Systems & Security Cluster
Telecommunication Distribution Technology Cluster

**Non-Engineering Category**
Economics & Financial Applications Cluster
Green Development Cluster
Leisure & Retail Management Cluster

**Other Available Diploma Plus Certificates**
Business
Innovation Management
Languages (Japanese)

*Designed in collaboration with the Department of Electrical and Computer Engineering, National University of Singapore (NUS). The syllabus is based on the first-year engineering mathematics and science curricula of NUS.*
Join Us
If you took the 2007 GCE ‘O’ Level examinations as a school candidate, you may apply on-line through the Joint Admissions Exercise (JAE). Details will be available in the JAE information booklet which you will receive when collecting your results.

Applicants who are not eligible to apply under the JAE and holders of other qualifications may refer to our website at http://www.np.edu.sg/aa/info.html for application details.

Fees
S$2,100 per academic year (for local students)

All information correct at time of printing (Oct 2007)