

SCHOOL OF ENGINEERING

The largest academic school in Ngee Ann Polytechnic, the School of Engineering (SoE) offers a total of 18 courses, together with an Engineering Common Programme, under the following eight clusters:

- Aerospace
- Biomedical
- Design, Media & Infocomm
- Electrical & Electronics
- Environment & Energy
- Logistics
- Marine, Offshore & Mechanical
- Property

Each cluster offers diploma courses in its respective area of discipline with specialised teaching expertise and learning facilities. Our diplomas are infused with multidisciplinary elements to nurture well-rounded graduates who are highly valued and sought-after by the industry and universities.

ENGINEERING COMMON PROGRAMME

With so many courses to choose from, it is important that our students end up with the diploma course that best matches their interests and aspirations.

To give students the flexibility to make their choice only at the end of the first semester in Year 1, SoE offers an exclusive Engineering Common Programme (ECP).

There are nine courses affiliated with ECP:

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

All first-year students taking the above engineering courses, including those who opt for the ECP, will share a common curriculum in the first semester. However, ECP students have the added advantage of being able to choose the course that they wish to continue with at the end of their first semester. They will also have the opportunity to participate in a wide range of student development programmes such as Image Enhancement Workshops, Music and Arts Appreciation, and Adventure Camp.

COURSES OFFERED

SoE offers a total of 18 full-time diploma courses. Grouped by clusters, these diploma courses are:

Aerospace

- Diploma in Aerospace Electronics (AE)
- Diploma in Aerospace Technology (AT)

Biomedical

- Diploma in Biomedical Engineering (BME)

Design, Media & Infocomm

- Diploma in Audio-visual Technology (AVT)
- Diploma in Network Systems & Security (NSS)
- Diploma in Product Design & Innovation (PDI)

Electrical & Electronics

- Diploma in Electrical Engineering (EE)
- Diploma in Electronic & Computer Engineering (ECE)

Environment & Energy

- Diploma in Civil & Environmental Engineering (CEE)
- Diploma in Clean Energy Management (CEM) **NEW**
- Diploma in Environmental & Water Technology (EWT)

Logistics

- Diploma in International Supply Chain Management (ISCM)
- Diploma in Logistics Management (LMGT)

Marine, Offshore & Mechanical

- Diploma in Marine & Offshore Technology (MOT)
- Diploma in Mechanical Engineering (ME)
- Diploma in Mechatronic Engineering (MTE)

Property

- Diploma in Leisure & Business Facilities Management (LBFM)
- Diploma in Real Estate Business (REB)

These clusters are also related to several other courses as follows:

Clusters	Courses	Other Related Courses
Aerospace	AE, AT	ECE, EE, ME, MTE, ECP
Biomedical	BME	ECE, ME, MTE, ECP
Design, Media & Infocomm	AVT, NSS, PDI	ECP
Electrical & Electronics	ECE, EE	AE, AVT, BME, ECP
Environment & Energy	CEE, CEM, EWT	EE, ME
Logistics	LMGT, ISCM	
Marine, Offshore & Mechanical	MOT, ME, MTE	AT, ECE, EE, ECP
Property	REB, LBFM	CEE, EE, ME

One important aspect of Ngee Ann's Engineering courses is the option for graduating students to participate in a six-month **Internship** or an in-house **Project Design & Development (PDD)** programme. These provide our students with experiential training and facilitate their passage into working life. They work to solve real-life industrial issues encountered by our industry partners. Emphasis has also been placed on research-oriented collaborative projects.

ELECTIVE MODULES AND THE DIPLOMA PLUS PROGRAMME

Since 2008, SoE has adopted a new course structure and curricula to: (i) provide greater flexibility and breadth to cater to students' learning abilities and interests; (ii) strengthen the foundational knowledge of engineering students; and (iii) cater to students with diverse aspirations to pursue further study or join the industry.

Under the new course structure, SoE students can select elective modules from a wide range of engineering and non-engineering clusters. Students have to select two elective modules from any cluster to complete their diploma. Moreover, all SoE students qualify for a Diploma Plus (DP) Certificate when they complete a total of four elective modules with three from the same cluster. This will better prepare students who wish to pursue a university degree, or increase their employability in discipline-specific areas. Students will also be awarded enhancement certificates for each module completed beyond the DP programme. The elective clusters offered by SoE are:

Engineering Clusters

- Advanced Engineering Mathematics
- Aerospace Design
- Aerospace Electronics
- Applied Physics
- Applied Technology
- Biomedical Engineering
- Computer & Communication Systems
- Computing Methodology
- Decision Management for Quality
- Electrical Control & Measurement
- Industrial Control
- Industrial Electronics
- Information Technology
- International Freight Forwarding & e-Logistics
- Mechanical Technology
- Microelectronics
- Network Systems & Security
- Stage Management & Technology
- Telecommunication Distribution Technology
- Workplace Safety & Health

Non-engineering Clusters

- Economics & Financial Applications
- Green Development
- Leisure & Retail Management

For the description of individual modules within each elective cluster, please refer to page 165. For details on the specific clusters available to different diplomas, please refer to the Course Modules section of each diploma under the heading Across-Level Modules.

SoE students can also pursue Diploma Plus Certificates in Business, Innovation & Enterprise, and Foreign Languages, which are offered by other academic schools in Ngee Ann.

MAJOR ACHIEVEMENTS

Over the years, SoE has consistently made its mark in many ways, both locally and abroad.

SoE clinched the Gold and Bronze Medals in the 500g Autonomous Sumo Robot competition at the International RoboGames 2008 held in the United States. In addition, SoE students and staff clinched several awards at the All Japan Micromouse Contest 2007.

In the area of Biomedical research and development, three Mechanical Engineering final-year students, in collaboration with physiotherapists from Singapore General Hospital, invented a mobility aid to help Parkinson's patients regain their walking rhythm. This won the Gold Award at the International Convention on Rehabilitation Engineering and Assistive Technology Student Design Challenge 2008 in Bangkok, Thailand. The project was also awarded the Gold Award by the Institution of Engineers Singapore in 2008 in a polytechnic-wide competition on designing for the elderly and disabled.

Two Biomedical Engineering students, Gracielynn E Flores and Tan Yan Jun Melissa won a Polytechnic Student Research Programme Award in 2008 for software that can accurately identify the stages of diabetic retinopathy, a major cause of blindness in diabetic patients.

Three Electrical Engineering students also bagged the first prize at the 10th Land Transport Authority (LTA)-Polytechnic Collaboration in 2008 for their project on Intelligent Prediction of Pedestrian Movements at Zebra Crossing.

SoE students have also produced ingenious ideas to help protect the environment. Two Electrical Engineering students received a Commendation Award for their Haze Guard project at the Green Wave Competition 2007 organised by Sembawang Shipyard Pte Ltd.



SoE students clinched four Commendation Awards at the Tan Kah Kee Young Inventors' Award 2008 with their creative and cost-effective inventions. The winning inventions included a Vibrating Pillow Alarm Clock, a Hemiplegic Ankle Foot Orthosis (that improves the walking gait of cerebral palsy patients), a vision system that creates low cost 3D images and a defence science Under-vehicle Surveillance Vehicle.

FACILITIES & STAFF

At Ngee Ann Polytechnic, students can look forward to a conducive and engaging learning environment. Depending on the course of study, students will get the opportunity to work in one or more technology and expertise areas such as:

- Aerospace
- Automation, Control and Instrumentation
- Audio-Visual
- Bioengineering
- Building
- Design and Rapid Prototyping
- Digital Audio and Video Broadcast
- Electronics
- Environment and Water
- IT and Networking
- Logistics & Supply Chain Management
- Marine and Offshore
- Photonics and Lasers
- Robotics
- Solar Energy
- Wireless Communication Systems

Students can expect to be involved in projects developing and applying state-of-the-art technologies.

This is made possible by a pool of highly qualified and dedicated lecturers and technical support staff with relevant post-graduate degrees and industry working experience in their respective engineering fields. SoE strongly promotes, amongst its staff, the culture of continuous learning and collaborations with local and overseas partners so as to continuously keep abreast of the latest technological progress. In doing so, we ensure that our curricula remain up-to-date and relevant.

To support our staff and students' quest for excellence in technology capability development, SoE is equipped with some of the latest facilities, such as:

- Alpha Centre (for Robotics)
- Assistive Technology Centre
- Automation & Integrated System Centre
- Biomedical Engineering Centre
- Bluetooth Laboratory
- Design and Rapid Prototyping Centre
- Digital Signal Processing Centre
- Energy & Environment Centre
- Facility Management Centre
- Frontline | AeroScout – Enterprise Visibility Solution Centre
- High Voltage Training Centre
- Instrumentation & Control Centre

- Internetworking Technology Laboratory
- Marine Technology Laboratory
- Microelectronics Design and Application Laboratory
- Photonics Laboratory
- Power Quality Centre
- Radio Frequency Laboratory
- Solar Technology Centre

COLLABORATIONS

SoE has forged numerous collaborations with various partners including educational institutions in Singapore (National University of Singapore and Nanyang Technological University), the UK, Japan, Australia, China and India; industry partners such as SIA Engineering, Eurocopter SEA, Creative Technology, Cisco Systems and IBM; and government agencies such as BCA and NPARKS. These partnerships provide opportunities for SoE staff and students to engage in joint research and consultancy projects, skills and technology transfer, training, and internships.

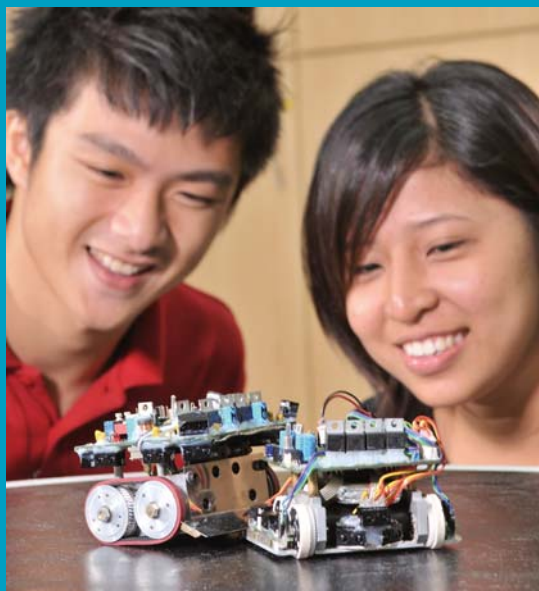
Academic Collaboration

- **Bachelor of Engineering in Naval Architecture with Honours**
With its first intake in September 2008, this specialised two-year degree programme is offered through a partnership between Ngee Ann Polytechnic (NP), Newcastle University, UK and Singapore Polytechnic (SP) under the Ministry of Education's Polytechnic-Foreign Specialised Institution (Poly-FSI) initiative.

This specialised degree programme offers graduates of NP's Diploma in Marine & Offshore Technology and SP's Diploma in Marine Engineering a seamless progression to a prestigious overseas degree course without having to leave Singapore. There is also provision for students to undergo a four-week immersion at Newcastle University. Graduates of the degree programme will be well-positioned to be outstanding practitioners and leaders of the industry.

Technical Collaborations

- **NP - AEM-Evertch Holdings Ltd (AEM) Centre of Innovation**
This Centre links the technical capabilities of NP with the industrial and production expertise and resources of AEM and their customers and suppliers, to develop breakthrough technologies in photonics, imaging systems and microcircuit design and packaging.
- **Centre of Innovation in Environment and Water Technology**
Jointly established by NP and SPRING Singapore, this Centre provides R&D expertise and resources to local enterprises to develop commercially viable environment and water solutions to move up the technology value chain. Focus areas include Water & Wastewater, Waste Management, Pollution Control and Clean Energy.
- **Centre of Innovation in Marine and Offshore Technology**
Also jointly established by Ngee Ann Polytechnic and SPRING Singapore, this Centre provides technology support to local enterprises in their R&D journey to develop innovative products and processes for commercialisation. Focus areas include Offshore Construction & Processing Equipment, Inspection & Testing, Design & Analysis and Product & Process Improvement.



- **Solar Technology Centre**

SoE, in collaboration with the Economic Development Board and under the Clean Energy Research and Testbedding Programme, has set up a new Solar Technology Centre. The centre will be used as a platform by staff, students and industry partners to carry out manpower training and development, as well as apply research and development in solar energy and related technology areas.

- **Commercialisation of Solar Technology-related Products**

Six solar technology related products developed by Ngee Ann Polytechnic have attracted interest from Comlec Technologies Pte Ltd. The company, together with NP Enterprise Pte Ltd, has formed a new spin-off company called Greenova Technologies Pte Ltd to commercialise and market these products.

- **Digital Holographic Microscopy System**

SoE staff, in collaboration with AEM Singapore Pte Ltd, successfully developed and launched a Digital Holographic Microscopy (DHM) System for real-time 3D imaging and measurement with digital focusing capability. Unlike conventional optical microscopy which gives 2D amplitude imaging, DHM records the whole wave front and is capable of providing both amplitude and phase images, thus providing three-dimensional (3D) information and measurement.

Publication

- **Bioinformatics & Biomedical Imaging**
SoE lecturer Dr. Rajendra Archarya, along with Professor Eddie Y.K. Ng (Nanyang Technological University) and Professor Jasjit S. Suri (Biomedical Research Institute in Idaho, USA) co-edited the book "Image Modeling of the Human Eye". It is published by leading technical book publisher Artech House.