chemical | food engineering and technology

SINGAPORE INSTITUTE OF TECHNOLOGY

SingaporeTech.edu.sg

2018

Singapore Institute of Technology

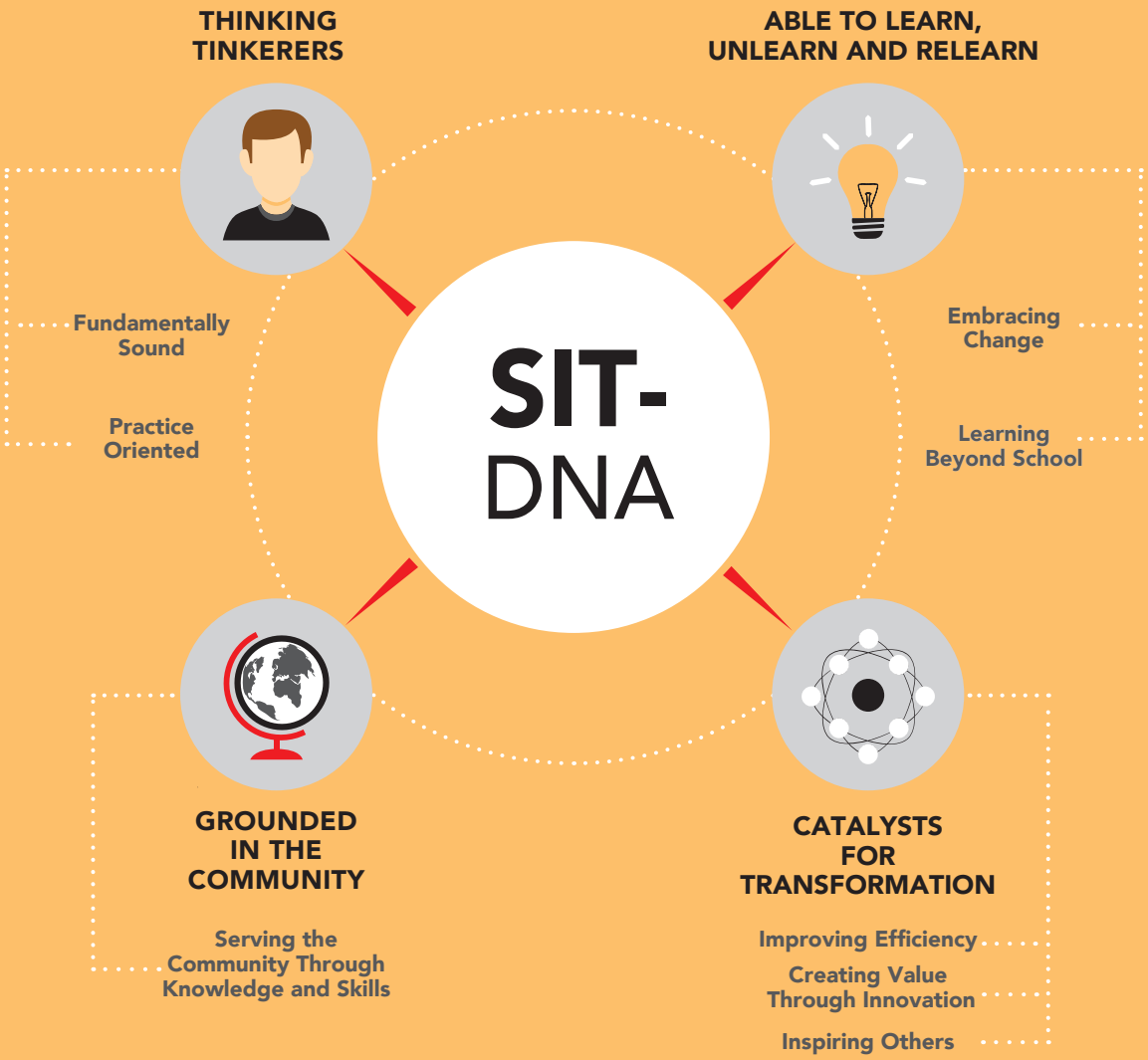
Massey University

Newcastle University

Technical University of Munich

CONTENTS

ABOUT SIT



Singapore Institute of Technology (SIT) is Singapore's university of applied learning. SIT upholds the vision of being a leader in innovative learning by integrating learning, industry and community.

Our mission is to nurture and develop individuals who build on their interests and talents to impact society in meaningful ways. The university also aims to cultivate in its students four distinctive traits, or the SIT-DNA, which will prepare them to be 'Thinking Tinkerers', 'Able to Learn, Unlearn and Relearn', 'Catalysts for Transformation' and 'Grounded in the Community'.

The university's applied degree programmes offer you a chance to experience a unique pedagogy that integrates work and study. SIT's degree programmes feature a six- to 12-month Integrated Work Study Programme (IWSP) which exemplifies the best of university-industry collaboration.

WHY

PURSUE CHEMICAL ENGINEERING AND FOOD TECHNOLOGY

AT SIT?

KEY PILLARS IN SINGAPORE'S ECONOMY

The chemical, pharmaceutical and food sectors form key pillars of the Singapore economy. There is a greater need to develop graduates with expertise to solve complex and interdisciplinary problems in the chemical, energy, pharmaceutical and food industries.

SPECIALISED TRAINING

At SIT, we offer programmes in Chemical Engineering, Pharmaceutical Engineering and Food Technology, where we scaffold specialist training onto fundamentals grounding to endow our students with practical knowledge that is built on the rudiments of the discipline.

OUR APPLIED LEARNING PEDAGOGY

Students will have the opportunity to learn both in the classroom and in the industrial setting. Through the seven- to eight-month Integrated Work Study Programme (IWSP), students will contextualise their learning and integrate theoretical knowledge with industry-relevant skills.

INDUSTRY-CENTRIC

Our unique pedagogy coupled with an industry-centric curriculum will give our students a competitive edge in the job market. They can apply their integrated knowledge in science, technology and engineering, to develop and improve products and processes, without compromising the environment.

MEANINGFUL CAREER PROSPECTS

Graduates can look forward to careers that will contribute towards the sustainable production of chemicals, pharmaceuticals and food, address energy and food security challenges, and develop innovative solutions and new products that will address today's challenges and tomorrow's needs.

"Each year, we welcome more than 300 new undergraduates into the cluster. We also welcome industry practitioners and visiting academics in a variety of platforms within the university. I invite you to be part of the SIT experience through our programmes!"

Associate Professor Susanna Leong
Assistant Provost (Applied Research) and
Cluster Director
Chemical Engineering and Food Technology
Singapore Institute of Technology

HEAR WHAT OUR STUDENTS SAY

"The programme of my choice, Pharmaceutical Engineering, presents numerous opportunities that will help me stay relevant in the industry. The SIT culture of helping one another and sharing of knowledge with peers, is one that stood out from my previous educational experiences. The Pharmaceutical Engineering programme also incorporates numerous industry-relevant opportunities such as the IWSP and industry induction that will give me a competitive edge over others. Student life is also never boring with the wide variety of events and value-added programmes that students can participate in."

Lim Zhe Huan

Year Two
Pharmaceutical Engineering, BEng (Hons)

HEAR WHAT OUR STUDENTS SAY

"The SIT-Massey Food Technology programme integrates work and study. Students work on real industry projects and undergo laboratory sessions that will equip them with applied food technology skills. The applied learning approach appeals to me as I learn better through hands-on activities. I am looking forward to the seven-month IWSP as we will get to acquire in-depth knowledge in industrial manufacturing operations and build up our work experience in the food industry."

Seah Xin Hui

Year Three
Food Technology, BFoodTech (Hons)

HEAR WHAT THE INDUSTRY SAYS

"We collaborated with SIT where students were offered a week-long learning experience at our Nutritional Innovation Centre premises. The students demonstrated a keen interest and desire that facilitated interactive engagement with our staff. This also resulted in us at DSM, learning from the students in certain areas. Congratulations to SIT for their foresightedness in having industry involvement by integrating this into their teaching module and providing students hands-on practical experience to prepare them for working life."

Mr David Cheng

Head
Nutritional Innovation Centre
DSM Nutritional Products

"As an industrial adjunct faculty, I found that SIT students performed well in my operational excellence class. We certainly look forward to see them applying the knowledge during their Intergrated Work Study Programme (IWSP) to improve the industry processes."

Mr Sankar Dharmaraj

Head PMO and
Site Operation Excellence
Novartis Pharmaceuticals

"We have employed six graduates of SIT since 2015. These young engineers exhibit strong technical competency and good problem-solving skills. We are glad to have them, contributing their knowledge and skills for the progress and growth of our company."

Ms Ng Mee Lin

Manager
PP Manufacturing/HSE,
Tech Coordination
The Polyolefin Company (S)
Pte Ltd

"I have hired three SIT graduates in my team as Field Service Engineers. They are eager to learn, hardworking, team players, independent and have great leadership skills. Their polytechnic background has enhanced their ability to be hands-on, which is very important in our industry. I see potential in them to take on roles with increasing accountabilities and responsibilities. Overall, my experience with SIT graduates has been very positive and I would certainly recommend others to consider hiring them."

Mr Lawrence Yeo

Lead Service Resource Manager
Water & Process Technologies
GE Power

PHARMACEUTICAL ENGINEERING

PROGRAMME INFORMATION

DEGREE PROGRAMME
- BEng (Hons)

CAMPUS LOCATION
- SIT@Dover

ELIGIBILITY
- Polytechnic Diploma Holders
- A Level/IB Diploma/NUS High School Diploma Holders

FEATURES
- Eight-month Integrated Work Study Programme (IWSP)

Visit SingaporeTech.edu.sg for the list of relevant qualifications.

Built on an interdisciplinary curriculum that intersects engineering, life sciences and chemistry, the Pharmaceutical Engineering (PharmE) programme aims to deliver a rigorous education that has a strong industry focus. The goal of this programme is to produce graduates who are both theoretically grounded and practice-oriented for the knowledge-intensive pharmaceutical industry and related sectors.

Distinguished by a curriculum that is strongly girded with cutting-edge, industry-compliant concepts and know-how, students will be trained in core competencies in the development and manufacturing of the two largest classes of pharmaceutical drugs – (i) biologics and (ii) small molecule drugs. The curriculum's strong grounding in both engineering and science will strengthen the programme's foundation, upon which students will be trained in the full spectrum of skill sets pertinent to drug manufacturing. This ranges from drug development and production to process development, operations, validation, regulation and compliance.

Modules to develop students' business and management acumen will also be offered to add breadth to the technical specialisation of the programme, allowing them to gain an understanding of the expectations of commercial environments and productivity management. The translational nature of PharmE's curriculum will allow students to readily apply their science and engineering knowledge in the highly advanced and regulated pharmaceutical manufacturing environment, thus grooming graduates who can make impactful contributions to industry.

PROGRAMME HIGHLIGHTS

- Strong Industrial Partnership in Curriculum Development and Industrial Case-Study Sharing
- Obtain Industry-Endorsed Competency-Based Certifications
- Capstone Projects Centred on Solving Industry Problems

SINGAPORE INSTITUTE OF TECHNOLOGY

PHARMACEUTICAL ENGINEERING

CURRICULUM STRUCTURE

YEAR 1

TRIMESTER 1	**Fundamentals** • Engineering Mathematics I • Statistics • Chemistry • Mass and Energy Balance • Biomolecular Science I
TRIMESTER 2	**Core I** • Engineering Mathematics II • Organic Chemistry • Organic Chemistry Lab • Programming for Pharmaceutical Engineering • Engineering Principles I (Heat and Mass Transfer)
TRIMESTER 3	**Core II** • Engineering Mathematics III • Engineering Thermodynamics • Engineering Thermodynamics Lab • Biomolecular Science II • Engineering Principles II (Fluid Mechanics) • Career and Professional Development I

YEAR 2

TRIMESTER 1	Break (Optional Industrial Induction Programme or Overseas Exposure Programme)	
TRIMESTER 2	**Core III** • Operational Excellence • Current Good Manufacturing Practices • Technical Writing and Communication • Engineering Principles III (Reaction Engineering) • Career and Professional Development II	
TRIMESTER 3	**Biologics Specialisation I** • Expression Engineering • Bioprocess Engineering • Cell Culture Lab • Bioseparations I (Primary Purification) • Foundations of Finance	**SMD Specialisation I** • Medicinal Chemistry • Unit Operations I (Reactor Design, Distillation, Extraction) • Unit Operations II (Purification and Isolation) • Downstream Processing I (Particle Technology) • Foundations of Finance

PHARMACEUTICAL ENGINEERING

YEAR 3

TRIMESTER 1	**Biologics Specialisation II** • Bioanalyticals • Bioseparations II (Secondary Purification) • Bioseparations Lab • Process Safety • Process Monitoring, Automation and Control	**SMD Specialisation II** • Analytical Chemistry • Downstream Processing II (Blending and Tableting) • Unit Operations Lab • Process Safety • Process Monitoring, Automation and Control
TRIMESTER 2	Integrated Work Study Programme (IWSP) • Capstone Project	
TRIMESTER 3	Integrated Work Study Programme (IWSP) • Capstone Project	

YEAR 4

TRIMESTER 1	**Operations Management** • Process Validation • Plant Design and Operations • Quality by Design in Pharmaceutical Development • Project Management
TRIMESTER 2	GRADUATE

SINGAPORE INSTITUTE OF TECHNOLOGY

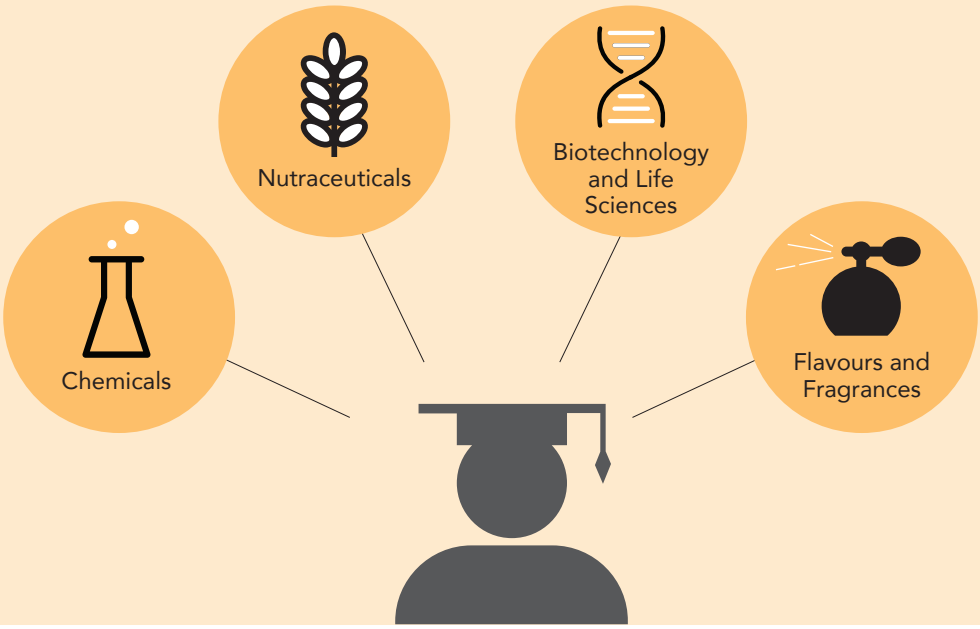
PHARMACEUTICAL ENGINEERING

OVERSEAS EXPOSURE PROGRAMME

During the trimester break, students may opt to embark on a short training attachment at pharmaceutical manufacturing facilities overseas. They will have the opportunity to work with modern industrial-scale unit operations in Good Manufacturing Practice (GMP) or GMP-simulated pharmaceutical manufacturing environments and pick up best industry practices. Students will also have the opportunity to learn state-of-the-art analytical technologies for pharmaceutical product monitoring and certification.

CAREER OPPORTUNITIES

Besides the pharmaceutical industry, graduates can look forward to careers in these areas:



PHARMACEUTICAL ENGINEERING

INDUSTRY ADVISORY COMMITTEE

The members of the Industry Advisory Committee for this programme are:

Ms HO Wengsi
Director
Biomedical Sciences
Economic Development Board

Mr Matthew LECLAIR
Plant Manager
Technical Operations
Shire

Mr LIM Hock Heng
Vice President and Managing Director
Glaxo Wellcome Manufacturing, Singapore

Mr LIM Sing Yong
Operation Readiness and Commissioning Manager
Shell, China

Mr Jose SANCHEZ
Site Head
Novartis Singapore Pharmaceutical Manufacturing Pte Ltd

Mr John SMITH
Managing Director
MSD International GmbH (Singapore)

SINGAPORE INSTITUTE OF TECHNOLOGY

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

FOOD TECHNOLOGY

PROGRAMME INFORMATION

DEGREE PROGRAMME
- BFoodTech (Hons)

CAMPUS LOCATION
- SIT@Dover

ELIGIBILITY
- Polytechnic Diploma Holders
- A Level/IB Diploma/NUS High School Diploma Holders

FEATURES
- 28-week Integrated Work Study Programme (IWSP)
- Overseas Immersion Programme (OIP)

Visit SingaporeTech.edu.sg for the list of relevant qualifications.

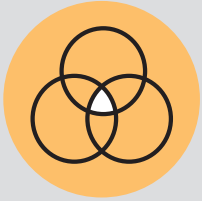
The SIT-Massey University joint degree programme in Food Technology offers a curriculum focussed on Food Product Technology, combining food science, food engineering and food business. The programme educates and equips students with the fundamentals of food science and applied food technology skills required for a global career in the food industry. Beyond the classroom, students will learn through practical laboratory and workshop sessions that focus on industry problems and solutions. Students will obtain hands-on experience in industrial-standard food processing plants under the mentorship of highly qualified lecturers who have valuable work experience in international food industries.

With the growing worldwide focus on health and well-being through food consumption as well as food development and manufacturing, there is a demand for graduates to fill vacancies. Through the joint degree programme in Food Technology, students are trained to be innovators and agents of change in the food industry where they apply scientific and engineering principles, as well as recognise and create what is needed in the marketplace. Students will also gain the entrepreneurial skills needed to bring new ideas to the consumer successfully.

PROGRAMME HIGHLIGHTS

Gain Work Experience while Studying

Classes Focussed on Problem-Solving



Balance of Science, Technology and Business

Real World Problem-Solving

Business and Management Focus

Practise Food Technology from Day One

SINGAPORE INSTITUTE OF TECHNOLOGY

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

FOOD TECHNOLOGY

CURRICULUM STRUCTURE

YEAR 1

TRIMESTER 1	**Fundamentals I** • Chemistry for Food Technology • Biomolecular Science for Food Technology • Mass and Energy Balance • Food Technology 1 and 2: Global and Creative Solutions • Engineering Mathematics 1
TRIMESTER 2	**Fundamentals II** • Engineering Fundamentals (Mechanics and Electricity) • Food Technology 3: Product Development • Programming for Engineering • Industrial Microbiology
TRIMESTER 3	Break

YEAR 2

TRIMESTER 1	**Core I** • Chemical Energetics • Molecules to Materials • Technical Writing and Communication • Heat and Mass - Conservation and Transfer • Fluid Flow and Particle Technology
TRIMESTER 2	**Core II** • Food Technology 4: Manufacturing • Food Technology 5: Food Microbiology and Safety • Food Chemistry • Career and Professional Development • Engineering Mathematics 2
TRIMESTER 3	**Specialisation I** • Food Technology 6: Food Characterisation • Food Formulation Technology • Nutrition and Food Choice • Statistical Modelling for Engineers and Technologists

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MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

FOOD TECHNOLOGY

YEAR 3

TRIMESTER 1	**Specialisation II** • Food Packaging Engineering and Legislation • Industrial Systems Improvement • Process Engineering Operations • Reaction Technology and Process Modelling
TRIMESTER 2	Integrated Work Study Programme (IWSP)
TRIMESTER 3	Integrated Work Study Programme (IWSP)

YEAR 4

TRIMESTER 1	**Development and Management** • Food Technology Project • Prescribed Elective
TRIMESTER 2	**Development and Management** • Advanced Food Technology • Innovative Food Design and Development
TRIMESTER 3	GRADUATE

CAREER OPPORTUNITIES

Graduates can look forward to careers in these areas:

Quality Control and Assurance

Food Microbiology and Safety

Food Manufacturing

Product Development

Sensory, Nutrition and Regulatory

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MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

FOOD TECHNOLOGY

INDUSTRY ADVISORY COMMITTEE

The members of the Industry Advisory Committee for this programme are:

Mr Philip HO
Commercial Lead Asia Pacific
Tereos Asia Pte Ltd

Ms KHOO Gek Hoon
Director
Post-Harvest Technology Department
Agri-Food & Veterinary Authority

Dr Allan LIM
Group Manager
External Partnerships, Intellectual Asset and Regulatory
Nestlé R&D Center (Pte) Ltd

Mr LIM Kay Kong
Executive Director and Group Research and Development Manager
Prima Limited

Ms TONG Shuh Lan
Director
Food, Industry and Enterprise Development Group
SPRING Singapore

SINGAPORE INSTITUTE OF TECHNOLOGY

Newcastle University
UK | Malaysia | Singapore

CHEMICAL ENGINEERING

PROGRAMME INFORMATION

DEGREE PROGRAMME
- BEng (Hons)

CAMPUS LOCATIONS
- SIT@Dover
- SIT@NP Building

ELIGIBILITY
- Polytechnic Diploma Holders
- A Level/IB Diploma/NUS High School Diploma Holders

FEATURES
- 26-week Integrated Work Study Programme (IWSP)
- Three-week Overseas Immersion Programme (OIP)

Visit SingaporeTech.edu.sg for the list of relevant qualifications.

The SIT-Newcastle University (NU) joint degree programme in Chemical Engineering aims to produce graduates who have a clear understanding of Chemical Engineering, combining a sound theoretical grasp of the subject with practical experience and an awareness of their responsibility to society and the environment. Consisting of key, traditional Chemical Engineering topics such as Transfer Processes and Unit Operations, and including contemporary and globally important areas such as Sustainable Design and Clean Technology, students will learn how to critically analyse real world process engineering problems through the use of computational tools.

Assessment will be based on several components such as coursework and written examinations. Students will have the opportunity to creatively apply what they have learnt to solve challenges posed by their final year Capstone Project on plant design. The academic training and soft skills acquired through the programme will produce capable graduates who will go on to become professional chemical engineers in the industry. Graduates may also eventually choose to pursue industrial research to develop new solutions and innovative processes or a postgraduate route to an academic career.

PROGRAMME HIGHLIGHTS

- Practical Bias
- Problem-Solving and the Use of Computational Tools
- Gain Work Experience while Studying via IWSP

CHEMICAL ENGINEERING

CURRICULUM STRUCTURE

YEAR 1

TRIMESTER 1	• Engineering Mathematics 1 • Statistics • Mass and Energy Balance • Biomolecular Science
TRIMESTER 2	**Fundamentals II** • Engineering Mathematics 2 • Organic Chemistry • Organic Chemistry Lab • Technical Writing and Communication • Career and Professional Development
TRIMESTER 3	Break

YEAR 2

TRIMESTER 1	• Heat and Mass Transfer • Reactor Engineering 1 • Separation Processes 1 • Thermodynamics • Computing and Simulation • Engineering Practice
TRIMESTER 2	• Engineering Practice • Fluid Mechanics • Process Measurement, Dynamics and Control • Process Safety • Reactor Engineering 2 • Separation Processes 2
TRIMESTER 3	**Specialisation I** • Chemical Process Optimisation • Sustainable Industry, Design and Manufacture Overseas Immersion Programme (OIP) Integrated Work Study Programme (IWSP)

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Newcastle University
UK | Malaysia | Singapore

CHEMICAL ENGINEERING

YEAR 3

TRIMESTER 1	Integrated Work Study Programme (IWSP)
TRIMESTER 2	• Process Control 2 • Process Design, Economics and Project Management • Solids Handling • Renewable Energy Technologies and Clean Technology Applications • Final Year Plant Design Project
TRIMESTER 3	• Final Year Plant Design Project

CAREER OPPORTUNITIES

Graduates can look forward to careers in these areas:

Fine Chemicals

Waste and Water Management

Oil and Gas Processing

Petrochemicals

Pharmaceutical Manufacturing

ADMISSION REQUIREMENTS

SIT adopts a holistic approach in assessing applicants for admission by considering the following criteria.

ONE OF THE QUALIFICATIONS LISTED BELOW:

- Full-time Diploma from one of the five local polytechnics*
- GCE A Level
- International Baccalaureate Diploma (IB)
- NUS High School Diploma
- Other International Qualifications

PASSION	PERSONAL QUALITIES	RELEVANT WORK EXPERIENCE/ INTERNSHIPS	CO-CURRICULA INTERESTS

INTERVIEW PERFORMANCE

All shortlisted applicants will be assessed through interviews. For specific degree programmes, applicants may have to submit portfolios or essays, or be assessed through written tests.

*SIT accepts applications from polytechnic graduates who did not sit for their GCE O Level examination and have come through other forms of secondary education such as the Polytechnic Foundation Programme and ITE (NITEC and Higher NITEC).

ADMISSION REQUIREMENTS

QUALIFICATIONS	**Pharmaceutical Engineering, BEng (Hons)**	**Food Technology, BFoodTech (Hons) (SIT–Massey Joint Degree)**	**Chemical Engineering, BEng (Hons) (SIT–NU Joint Degree)**
FULL-TIME POLYTECHNIC DIPLOMA FROM SINGAPORE	Completed a full-time local polytechnic Diploma. Subject to approval, diploma applicants may be granted module exemptions, based on the modules taken during their diploma. Exemptions may also be considered for relevant professional or industrial certifications.	Completed a full-time local polytechnic Diploma. Subject to approval, diploma applicants may be granted module exemptions, based on the modules taken during their diploma. Applicants with articulated diplomas such as Food Science and Nutrition (NYP), Food Science and Technology (SP), and Applied Food Science and Nutrition (TP) may gain direct entry to Year Two of the programme.	Completed a full-time local polytechnic Diploma.
GCE A LEVEL	Obtained passes in at least two A/H2 Level subjects and offered General Paper (GP) or Knowledge & Inquiry (KI) in the same sitting while satisfying the Mother Tongue (MTL) requirements.		
INTERNATIONAL BACCALAUREATE DIPLOMA (IB)	Obtained a minimum grade five for at least two Higher Level (HL) and one Standard Level (SL) subjects and the IB Diploma while satisfying the Mother Tongue (MTL) requirements.		
NUS HIGH SCHOOL DIPLOMA	Obtained the NUS High School Diploma while satisfying the Mother Tongue (MTL) requirements.		
OTHER INTERNATIONAL QUALIFICATIONS	Completed at least 12 years of formal education deemed as acceptable, equivalent qualifications to be considered for admission.		

OTHER PROGRAMMES OFFERED UNDER CHEMICAL ENGINEERING AND FOOD TECHNOLOGY

CHEMICAL ENGINEERING

TUM Asia

DEGREE PROGRAMME
- BSc

CAMPUS LOCATION
- SIT@SP Building

ELIGIBILITY
- Relevant Polytechnic Diploma Holders
- A Level/IB Diploma/NUS High School Diploma Holders

Chemical engineering and process engineering involve the conversion of basic raw materials into a wide variety of useful intermediate or end products such as fuels, cosmetics, dyes, foods and medical preparations. In addition to improving existing processes, TUM Chemical Engineering students will also learn to develop new process engineering applications in response to changes in safety and environmental protection requirements.

LOCATE US >

SIT@DOVER
10 Dover Drive, Singapore 138683

SIT@NP BUILDING
Ngee Ann Polytechnic
537 Clementi Road, Singapore 599493

SIT@NYP BUILDING
Nanyang Polytechnic
172A Ang Mo Kio Ave 8, Singapore 567739
(beside Blk Q of NYP campus)

SIT@RP BUILDING
Republic Polytechnic
43 Woodlands Ave 9, Singapore 737729

SIT@SP BUILDING
Singapore Polytechnic
510 Dover Road, Singapore 139660

SIT@TP BUILDING
Temasek Polytechnic
Blk 29B Tampines Ave 1, Singapore 528694

OPERATING HOURS
Mondays to Fridays:
10:00 am to 5:00 pm
Closed on Saturdays,
Sundays and Public Holidays

CONTACT US >

SINGAPORE INSTITUTE OF TECHNOLOGY
SIT@Dover, 10 Dover Drive, Singapore 138683
Tel: +65 6592 1189 (Main Line)

STUDENT ADMISSION MATTERS
Tel: +65 6592 1136
Adm@SingaporeTech.edu.sg

FINANCIAL ASSISTANCE AND SCHOLARSHIP MATTERS
Tel: +65 6592 1136
FAS@SingaporeTech.edu.sg

CAREER SERVICES
Tel: +65 6592 8150
CareerServices@SingaporeTech.edu.sg

DEGREE PROGRAMME RELATED QUERIES
Tel: +65 6592 2021
AcdPrg@SingaporeTech.edu.sg

FINANCE, BILLINGS AND GIRO
Tel: +65 6592 8149
StudentFinance@SingaporeTech.edu.sg

REGISTRAR'S OFFICE
Tel: +65 6592 2091
Registrar@SingaporeTech.edu.sg

STUDENT LIFE MATTERS
Tel: +65 6592 1191
SLD@SingaporeTech.edu.sg

TECHNOLOGY, INNOVATION & ENTERPRISE
Tel: +65 6592 6917
Innovate@SingaporeTech.edu.sg

GIVING TO SIT
Tel: +65 6592 1138
Tel: +65 6592 1094
Advancement@SingaporeTech.edu.sg

SINGAPORE INSTITUTE OF TECHNOLOGY

SingaporeTech

@SingaporeTech

@SingaporeTech

Singapore Institute of Technology
SIT@Dover, 10 Dover Drive,
Singapore 138683

Registration Number: 200917667D