Not many students get a chance to make their own alcohol. Undergraduate Anushka Prasanna Ogale brewed a full alcohol in her first year as a chemical engineering student at the National University of Singapore (NUS).

“It was exciting to do a practical fermentation project. We had done 10 different experiments in one semester during our first year. For this assignment consolidated our learnings, letting us apply the knowledge in a real-life fermentation project,” said Anushka, a second-year double-degree engineering and economics student.

As an alcohol “maker”, she learned that many “ingredients” contributed to a good drink – not only the alcohol level but also the acidity, colour and smell of the alcoholic beverage, she said.

The exercise was exhilarating and totally unexpected because she had thought that, in the first year, the course would be bookish. Instead, she did a lot of lab work which she found stimulating.

In her first year stimulating and totally unexpected.

Experiential learning led to a better appreciation of the subject, she said, while presenting her work to the class helped her communication skills.

“They are the skills which will benefit me when I start working. It will help see the big picture,” she said.

Anushka is also part of the University Scholars Programme (USP), which is open to NUS undergraduates.

The USP, which started in 2001, is a unique academic programme at NUS which aims to shape future policymakers and leaders by instilling curiosity and critical thinking.

As part of the USP, she has a two-year residential stay at the cute Kymri College in University Town, across from the main NUS Kent Ridge campus. There, she has opportunities to interact with professors and other USP students in a close-knit community.

“USP definitely influenced the way I think. It gives me the ability to analyse, ask the right questions and to reflect on ideas. It gave me the extra, on top of the engineering programme, and helps me see the big picture and various connections,” said Anushka, who wants to carve out a career in management consulting. She wants to work in business development.

“And school is not just all work and no play,” Anushka relates by practising kick-boxing and yoga.

In the new academic year, which starts in August, and for the incoming students like Anushka can look forward to a new programme called Engineering Scholars (E-Scholars) Programme.

This unique programme emphasises critical thinking, and also focuses on holistic understanding of complex systems through interdisciplinary issues.

This will add intellectual depth to policies and social issues.

MORE DISCIPLINES, MORE DISCIPLINED

Engineering for the future

Digitalisation is disrupting industries. This trend, together with a combination of automation, interconnectivity, machine learning and real-time data, describes a new era called Industry 4.0.

Engineering education must evolve in tandem with developments in digitalisation and automation so that future engineers have the skills to cope with them. The faculty will bolster its world-recognised programme with new modules and specialisations for the Industry 4.0 era.

Professor Chua Kee Chaing, Dean of NUS Engineering, says engineering education must evolve in tandem with developments in digitalisation and automation so that

Training for tomorrow’s jobs

Technological advances are relentless, transforming systems, culture, the factory floor and businesses.

New skills are needed to prepare for tomorrow’s jobs. The new engineering specialisations and modules fitted to the needs of NUS 2019/2020 academic year, will better prepare graduates for increasing digitalisation and technological advancements.

The new core modules for all lower year engineering students provide the basic toolkit for tackling new demands of the future, equipping students to be able to use design-thinking to bring about innovations.

The modules that make up the NUS Engineering core syllabus are systems thinking, design and prototyping, Python, computing and machine learning.

These give students a strong foundation, enabling them to branch out to different areas of engineering.

The NUS Bumblebee team was crowned the champion of Marinoff RobotX Challenge 2018, a global autonomous maritime challenge.

In the new academic year, students can also enrol directly in new engineering specialisations and a minor.

1. Specialisation in Robotics

A specialisation that will impact industrial automation, manufacturing and systems and technologies and other systems.

Students will learn about robotics system design, including sensor and actuator technologies and robot motion control. They can pick these technical electives such as an introduction to computer and control systems, machine vision, autonomous systems, and robotics.

2. Specialisation in Internet of Things

By 2020, there will be 21 billion sensor-enabled objects in the world. They will be connected together by Internet of Things (IoT), a network of interactive devices, sensory, actuation and computing nodes. IoT is most applicable to computer and electrical engineering fields.

Students will learn about IoT, the data science needed, and the sensors and devices for IoT applications. Technical electives such as wireless sensor networks, systems projects in IoT, embedded hardware and software design, and computer networks are available.

3. Specialisation in Digitalisation in Urban Infrastructure

Automated driverless transport systems will arrive. Engineers will play a major role in urban mobility, smart cities, sustainable engineering and advanced construction. Among other things, students will learn about system design, urban infrastructure, structural health monitoring, model-based systems engineering, hydraulics and more.

4. Minor in Data Engineering

Data is everywhere, being collected from cars, phones and buildings. Data engineers must be proficient in data science techniques and must be expert in programming and data engineering.

Students will learn about the latest Big Data technologies and tools.

NUS Engineering alumna Lee Hong, who did not have a background in robotics, learnt how robots work when he had to develop a state-of-the-art robot vacuum in his first job.

“It’s a lesson for all engineers to be prepared for all eventualities. It’s not every time that you get to work on something you’re comfortable with. Sometimes, you get thrown into something else, so you just need to learn it really fast and go along with it.”

Lee Hong, who is now driving Singapore’s smart urban transformation as an Embedded Software Engineer with GoTo