

College of Design and Engineering

INBOXING

Innovation & Design Programme

Welcome to NUS College of Design and Engineering

NUS College of Design and Engineering offers flexible programmes which you can tailor to develop your passion and to achieve your aspirations. If your aspiration is to develop products and services to begin your own entrepreneurship journey or simply to make our world a better place for all, the Innovation & Design Programme (*i*DP) is a great choice for you.

The *i*DP is a second major or minor which complements any discipline you choose to pursue at NUS. If you are an engineering enthusiast, the *i*DP is an ideal choice because it gives you the opportunity to enhance your engineering skills through design and developing solutions involving technologies such as artificial intelligence, robotics, internet of things, and many others. If you are taking up a non-Engineering discipline in NUS, the *i*DP gives you the opportunity to work alongside Engineering students to solve real world problems. This brochure has been designed to bring you more information about the *i*DP. Enjoy!





Innovation & Design Programme (*iDP*)

The Innovation & Design Programme engages students in a multidisciplinary project-based learning approach. It empowers students to apply their discipline knowledge in the context of real world projects. Their interaction with professors, team members and project stakeholders helps to develop their professional skills. Students are taught to identify opportunities in a design thinking course which teaches them observation and interview skills to gather insights about their target users and henceforth design products or services which solve pertinent problems for the end users. Their creations are developed in several design courses in the *i*DP. To complement their design skills, students also read elective courses in innovation and enterprise which teach them about the innovation process and strategies, with opportunities to accelerate their ideas to start-ups.





Our Distinctive Approach

Our curriculum brings students through an enriching journey in design and innovation. Students begin by learning what to design before moving on to learn how to design. Those who are keen on entrepreneurship are encouraged to further develop their ideas for commercialisation through a pre-accelerator track. All these happen through projectbased learning within a multidisciplinary team setting.

Learn about the users

Design Thinking

Design Thinking is a human-centred approach to innovation to arrive at solutions that meet the needs, wants, and desires of target users. Students learn how to understand users, build personas, gain insights, identify opportunities, generate ideas, and validate their ideas through prototyping.



TEST

Get user

feedback

TFRATE

Value Creation in Innovation

Innovation happens when users' needs and desires are met in a technologically feasible manner and matched with a viable business strategy. Students learn a variety of tools that help them to generate innovative solutions to a wide range of problems in a manner that creates value to end users as well as exploit market opportunities.





Design Methodology

Design can be carried out through a systematic process that consists of distinct, coherent and well-organised steps. Using well-established design methodologies, students learn how to transform ideas into functional prototypes and thereafter viable products and services.



SEMESTER 8



They may apply at the end of the first semester at NUS.

OF

Our Student Projects

Innovation needs a team-based process to succeed. From day one, our students learn to work together with teammates from different disciplines and are mentored by faculty members with diverse backgrounds. Through open-ended projects, students learn how to apply their design skills as well as their disciplinary knowledge to solve real-world problems.

Special Competition Projects

- 1. NUS Formula SAE Student-designed formula-style electric race car
- 2. Bumblebee AUV NUS award-winning autonomous underwater vehicle (AUV)
- 3. Bumblebee ASV NUS award-winning autonomous surface vehicle (ASV)
- 4. **RoboMaster** Multi-robot competition team











Innovating with Immersive Reality

- 1. **Basic cardiac life support training** Immersive training for healthcare professionals
- 2. MediVR Conversational Al virtual humans for interpersonal training

3. **Museum Alive!** Visible Vault: sculpture metaverse

4. VR robotic surgery simulator Robotic surgical training on tissue shearing



Design and development of novel virtual and augmented reality applications





"al lask lisgle -----

Innovating for Future Mobility

1. Electric manned aircraft model

2. Alpha Electrics Battery swapping and charging system for light electic vehicles

Design future mobility solutions and novel vehicles for people and goods







Innovations in Intelligent Systems

- 1. Galassia NUS student-designed nanosatellite
- 2. Outdoor mobile robot for tree inspection





Design complex engineering systems and automation for various applications

Innovating for Smarter Living

- 1. **ConcreteAl** Smart sensor solution for real-time concrete curing monitoring
- 2. Robotic drain crawler for dengue prevention







Design smart solutions to enhance everyday life, work, and play



Innovating for Sustainable Cities

- 1. **the moonbeam co.** Upcycling food by-products to minimise food loss and enhance food security
- 2. Smart community urban farming
- Design solutions to tackle challenges of urbanisation and sustainability







Innovating for Better Healthcare

- 1. Ah Bot Companion robot for seniors
- 2. Biotrack Al-powered wearable ECG monitor
- 3. Internet-of-Things wearables for vital signs monitoring



- 4. Intelligent eye test system for early detection of eye diseases
- 5. Post-discharge information management and care synopsis tool





Design solutions for healthcare needs in hospitals and the community







Our Start-ups

0

We encourage our students to pursue commercialisation of their project ideas.

These are some of the recent start-ups founded by our graduates and faculty members.



MediVR

Anthea Foong (Class of 2021) Aiden Koh (Class of 2021) Ng Han Wei (Class of 2021) Jeremy Ong (Class of 2021) https://medivr.io/

NuSpace

Ng Zhen Ning (Class of 2015) Luo Sha (Faculty member) https://www.nuspace.sg/

FathomX

Amos Heng (Class of 2019) https://www.fathomx.co/

the moonbeam co.

Kong Qi Herng (Class of 2022) Lim Jia Wei (Class of 2022) Varden Toh (Class of 2023) https://themoonbeam.co/

Invigilo

Vishnu Saran (Class of 2019) https://invigilo.ai/

MediVR



- Conversational Al virtual humans that revolutionise interpersonal training to improve confidence and accelerate learning.
- Winner of Startup SG Founder Ignite 2021.
- Winner of NCS Group NEXT Hack 2022.





- Satellite-as-a-service and IoT connectivity for areas underserved by conventional infrastructure.
- Secured funding from a private venture capital firm.
- Successfully delivered first innovative satellite line-up Zeus-1 in 2022.



FathomX

- Al assistant to detect breast cancer.
- Significantly reduces false positive rates by 80% and achieves time saving of 50%.
- Funded by SMART and National Medical Research Council of Singapore.



nonbeam co.

Sustainable food tech start up that upcycles food by-products to minimise food loss and enhance food security.

- Winner of DBS Hungry for Change 2023.
- Winner of Tech for Social 2022 Grand Prize.



TT INVIGILO

- Al video analytics for workplace safety.
- Reduction of 60% in accidents, 40% in cost savings, and a greater than 90% safety hazard detection rate.
- Gaining adoption by clients in construction and manufacturing sectors.







What is the focus of this programme?

Students will be focusing on creating innovative designs and solutions to solve problems. You will also learn various tools and processes for ideation and design.

Who should enroll in this programme?

This programme is for students who aspire to be technopreneurs, whether it involves deep technology or social enterprises. For others, it is a programme that leads you down a learning journey to enhance your discipline skills (e.g. engineering, business, social sciences) through projects which have real-world impact.

What is the mode of learning in this programme?

Much of your learning will involve projects, working in groups with students from other disciplines. You will have ample opportunities to define your own design problem.

What do I learn in this programme?

You will start your journey with design thinking, which is a design process to systematically uncover insights, leading to new ideas for products or services. Your ideas can be prototyped and tested in design projects in your higher years of study.





What projects can I be involved in?

There are various project themes for you to choose from, or you may also propose your own projects.

What are the possible career paths?

This programme trains students to think about developing new ideas and solutions to solve ill-defined problems. Such a mindset is a good starting point for any career. Coupled with some knowledge and skills in design and engineering, you will be well placed to pursue a wide range of careers in the industry such as technology start-ups, product design and management, engineering services, consultancies, and other jobs where design thinking and creativity play a big role. Our graduates have been able to secure their first jobs relatively easily.

FAQs

https://cde.nus.edu.sg/edic/ 🔭



Follow us on



NUS iDP

INUS Innovation and Design Programme



Engineering Design and Innovation Centre

Block E2A, #04-05 5 Engineering Drive 2 Singapore 117579 Tel: +65 6601 3320 Email: idp-query@nus.edu.sg