

The Arc sets sail as a new flagship building of the NTU Smart Campus



NTU now has more than 280 high-tech smart classrooms to facilitate the flipped classroom model of learning

Nanyang Technological University, Singapore (NTU Singapore) has launched a new learning hub, a major piece in its transformation from the traditional big lectures, to its modern, interactive flipped classroom pedagogy, an integral part of the NTU Smart Campus vision.

Named The Arc, NTU's new learning hub is equipped with the latest technologies to support the flipped classroom pedagogy. Students learn the course content online before class and the face time with professors and classmates is devoted to collaborative learning.

As with its first learning hub, The Hive, NTU has done away with traditional classroom layouts in designing The Arc, which boasts flowing lines and energy-friendly fittings.

The 6-storey building has 56 new generation smart classrooms. Each smart classroom is equipped with multiple LED screens, wireless communication tools and flexible clustered seating designed for group discussions.

With the completion of The Arc, NTU now has more than 280 smart classrooms. Together with other recently completed buildings such as The Hive and the Clinical Sciences Building in Novena, 116 new smart classrooms have been built since 2015. In addition, NTU has converted 166 smart classrooms from existing tutorial rooms.

The Arc was launched today by **NTU President Professor Subra Suresh** and five Student Club presidents.

Prof Suresh said: “The Arc is designed not just for learning but to create opportunities for students to get together to discuss ideas and interact across disciplines. It is therefore fitting that we have five student leaders with me today to officiate the opening of this new building together.”

He added: “The creation, transmission and dissemination of knowledge is at the heart of any global university. In this digital age, students learn using technologies in pedagogical modes that are often distinctly different from those used by earlier generations, and they will graduate into a rapidly changing workplace which will demand for interdisciplinary and collaborative skills.

“The Arc is one of the key pieces in NTU’s flipped classroom transformation. This model of learning will prepare students with the necessary skills to excel in jobs which may not even exist today.”

NTU on track in flipping its courses

NTU had set a bold target to design at least 50 per cent of its undergraduate courses using the flipped classroom pedagogy by 2020.

The university is on track with 314 or 32 per cent of courses already redesigned, and another 170 currently undergoing conversion.

NTU Students’ Union President (NTUSU), Edward Lim, a third-year undergraduate, said: “Like many other students, I’m looking forward to having lessons at The Arc with its state-of-the-art smart classrooms, project rooms and comfortable nooks and corners that are conducive for group discussions.

“We enjoy the flipped classroom way of learning as we do not just listen to lectures passively but now engage in discussions actively. With lively interactions with professors and fellow students, students take on a more dynamic and participative role in their own learning.”

The Arc provides students with plenty of study spaces with 13 project discussion rooms, a dedicated reading room, and a 108-seat lecture theatre. It has two lower levels with rooms that serve as workshops for engineering students.

The Arc will also house most of NTU's Singapore Centre for 3D Printing (SC3DP) facilities, which researches various areas of smart technologies such as printable electronics, lightweight aircraft components, and even 3D printed medical implants.

Championing sustainability

Incorporating curved structures and spiral stairs, The Arc is designed with innovative and eco-friendly features befitting its place as the newest building on the NTU Smart Campus.

Instead of walls, it comes with an aluminium sunscreen that reduces solar glare and heat. This keeps the rain out while allowing constant ventilation throughout the day.

Its air-conditioning system saves energy by using passive cooling coils to chill the air without the use of fans. These coils work by creating a natural convection cycle, cooling the air as it sinks downwards, which displaces the warm air upwards.

The Arc has already been awarded the **Green Mark Platinum** in 2017 – the highest award for sustainable building design in Singapore from the Building and Construction Authority.

Over 95 per cent of the buildings on the NTU campus are now Green Mark Platinum certified (equivalent to LEED-Platinum certification in the USA), well on track to achieving the target of 100 per cent by 2020.

The Arc also comes with ramp access and bicycle parking stations. Other energy-saving features include energy-efficient LED lighting and motion sensors.

The world's Smart Campus here at NTU

With another key pillar of its education roadmap completed, The Arc also serves as a new nerve centre of the NTU Smart Campus, where digital technologies are adopted to support better learning and discovery, and improve the sustainability of resources.

Prof Suresh said, “We aim to be the world's Smart Campus and demonstrate how innovative tech-enabled solutions can help improve everyday life in a sustainable manner. Of course, technology is just one side of the coin as the other important element NTU will focus on is its impact on society and how it bolsters the natural environment.”

Last month, Prof Suresh announced the first phase of the broad and multi-pronged NTU Smart Campus initiative. Besides eco-friendly buildings, NTU is also a living test bed for various smart technologies including driverless vehicles and fast charging electricity-powered shuttles.

An NTU Smart Pass embedded with a contactless identity chip has also been launched for cash-free payments, and in the near future, for personal identification, security access and more.

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The Arc by the numbers

Gross floor area: 18,113 square metres

Architect: DCA Architects

Design Architect: KIRK

Building height: 6 storeys including 2 lower levels of workshops and a 3D printing research centre

Smart classrooms: 56 smart classrooms, ranging from 30 to 72 clustered seats

Project discussion rooms: 13

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