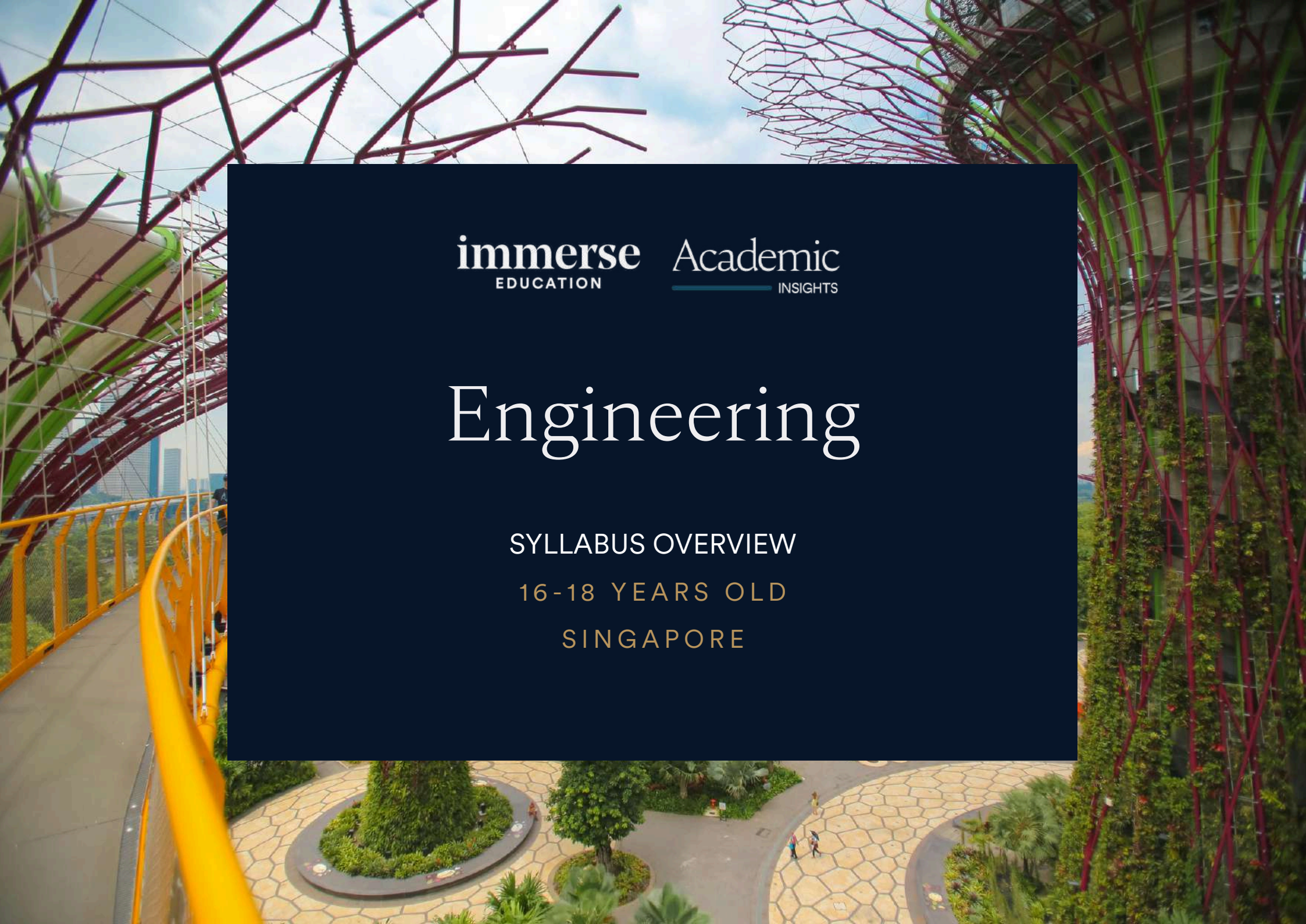

immerse EDUCATION Academic INSIGHTS

Engineering

SYLLABUS OVERVIEW

16-18 YEARS OLD

SINGAPORE

About the Programme

Immerse Education is an award-winning provider of summer experiences offering academic and career-focused programmes for high school students worldwide, in such locations as Boston, Cambridge, London, New York, Oxford, San Francisco, Singapore, Sydney, Tokyo, and Toronto. Our programmes aim to deliver engaging, academically challenging content within a university-style classroom environment.

The Academic Insights programmes give participants a valuable introduction to studying their chosen subject at an advanced university level, preparing them for future academic success and life at university. During the programme, students experience university-style teaching, explore complex topics, and develop the skills, confidence, and curiosity needed for successful applications and higher-level study.

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Academic Sessions

Sessions during the programme are organised into thematic areas that allow students to explore a broad range of topics in depth. The programme combines two types of sessions: theory-based sessions that introduce advanced concepts similar to university study, and practical-based sessions that encourage students to apply this knowledge to case studies, real-world projects, or research tasks. Topics highlighted in thie guide are indicative and may be adapted by tutors to reflect their academic expertise or participants' interests. This approach helps students develop both subject knowledge and the ability to think critically and independently.

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Preparatory work

Some tutors may ask participants to complete preparatory work before the start of the programme, such as assigned reading, independent pre-research, or a series of short exercises. These tasks help ensure that all students begin the course with a shared foundation of understanding and are ready to engage in higher-level discussion and analysis. Preparatory materials are provided in advance and designed to make students feel more confident, better prepared, and able to get the most out of their academic experience once the programme begins.

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Academic Difficulty

Immerse Education's Academic Insights programmes are designed to introduce students to university-level study and build on necessary skills. The material can be challenging, but tutors provide structured guidance, personalised feedback, and encouragement throughout. Each participant is supported according to their own level and learning goals, ensuring that everyone is able to progress and achieve their potential. This academically stimulating experience is something to look forward to — an opportunity to build confidence, expand knowledge, and develop valuable study skills in a supportive and inspiring environment.

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Academic
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Aim of the Engineering Programme

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Introduction to Engineering

Engineering is both an art and a science — it transforms ideas into solutions that shape the world we live in. This programme helps students understand the theoretical foundations and academic skills that underpin university study in engineering. Set in Singapore, a world leader in innovation, sustainability, and smart city development, the course explores how engineers balance creativity and precision to build a more efficient and connected future.

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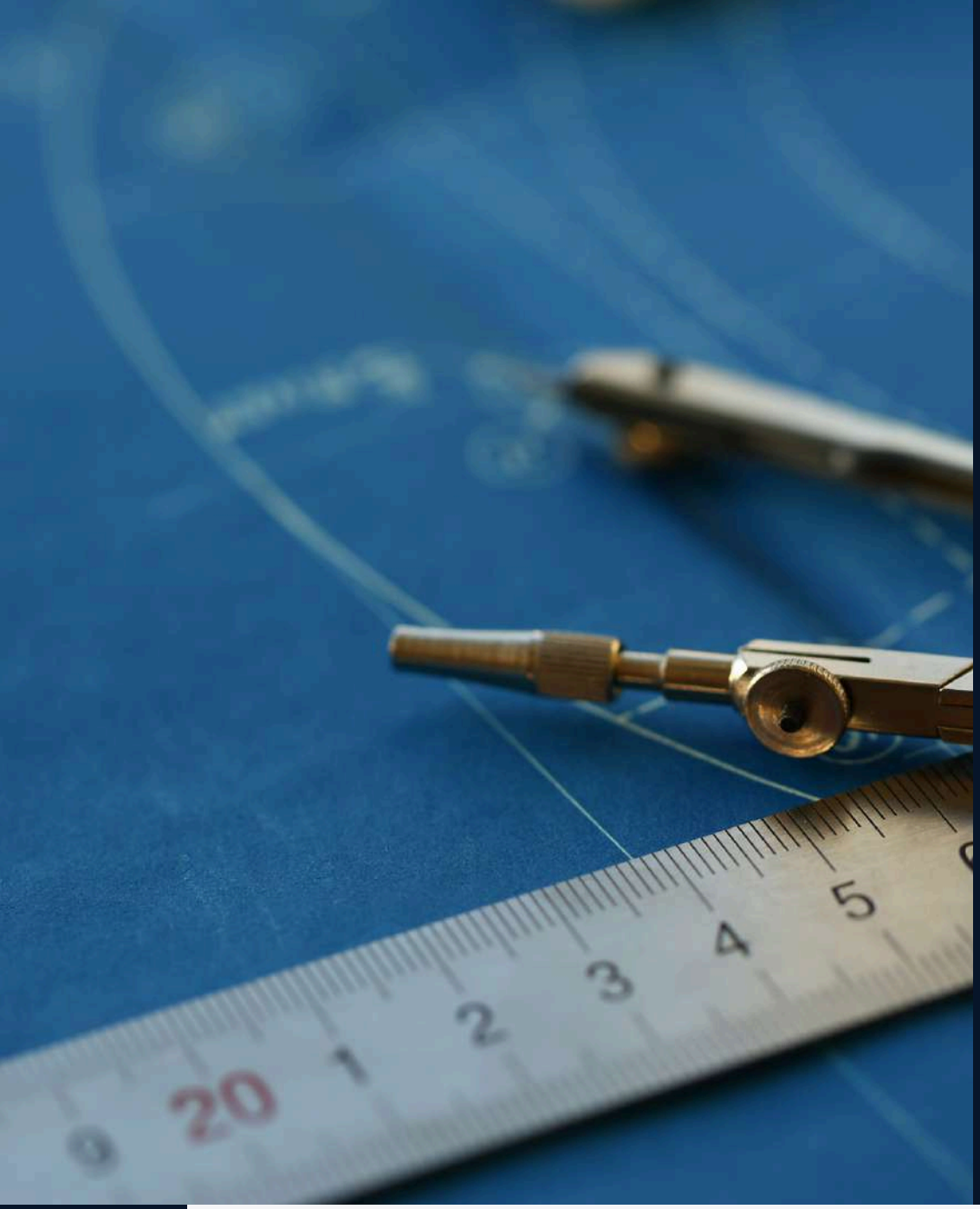

Academic INSIGHTS

Fundamentals of Engineering Design

Examine how engineers approach complex challenges through research, design, and testing. You will study the stages of the engineering design process, exploring how creative thinking is combined with technical precision to create effective solutions. Case studies of innovative projects help students understand how academic theory informs real-world outcomes. This topic builds reasoning, analysis, and communication skills central to engineering education.

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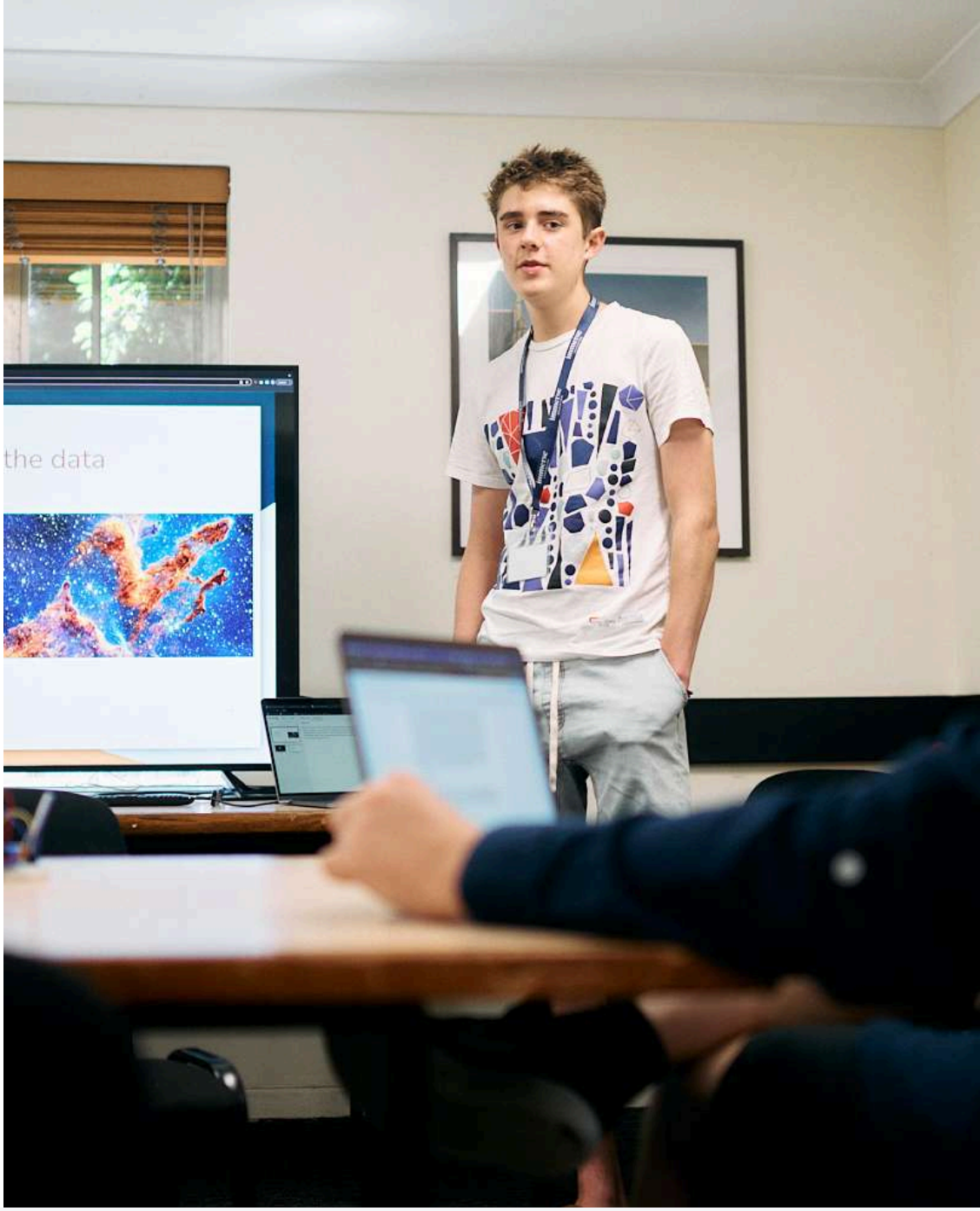
Mechanics and Structural Engineering

Learn how physics and mathematics explain the stability and performance of structures. You will study forces, motion, stress, and equilibrium, applying these principles to examples from transport, construction, and renewable infrastructure. Students develop an understanding of how geometry, materials, and design choices interact to ensure safety and efficiency. This topic builds quantitative reasoning and problem-solving skills vital for higher-level engineering study.



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Electrical and Electronic Engineering

Explore the principles that govern electricity, circuits, and digital technologies. You will learn how engineers use current, voltage, and resistance to design efficient systems that power modern innovation. Examples from automation and data-driven technologies illustrate how electrical engineering connects with computing and robotics. This topic builds mathematical and analytical precision, preparing students for advanced study in electrical and computer engineering.

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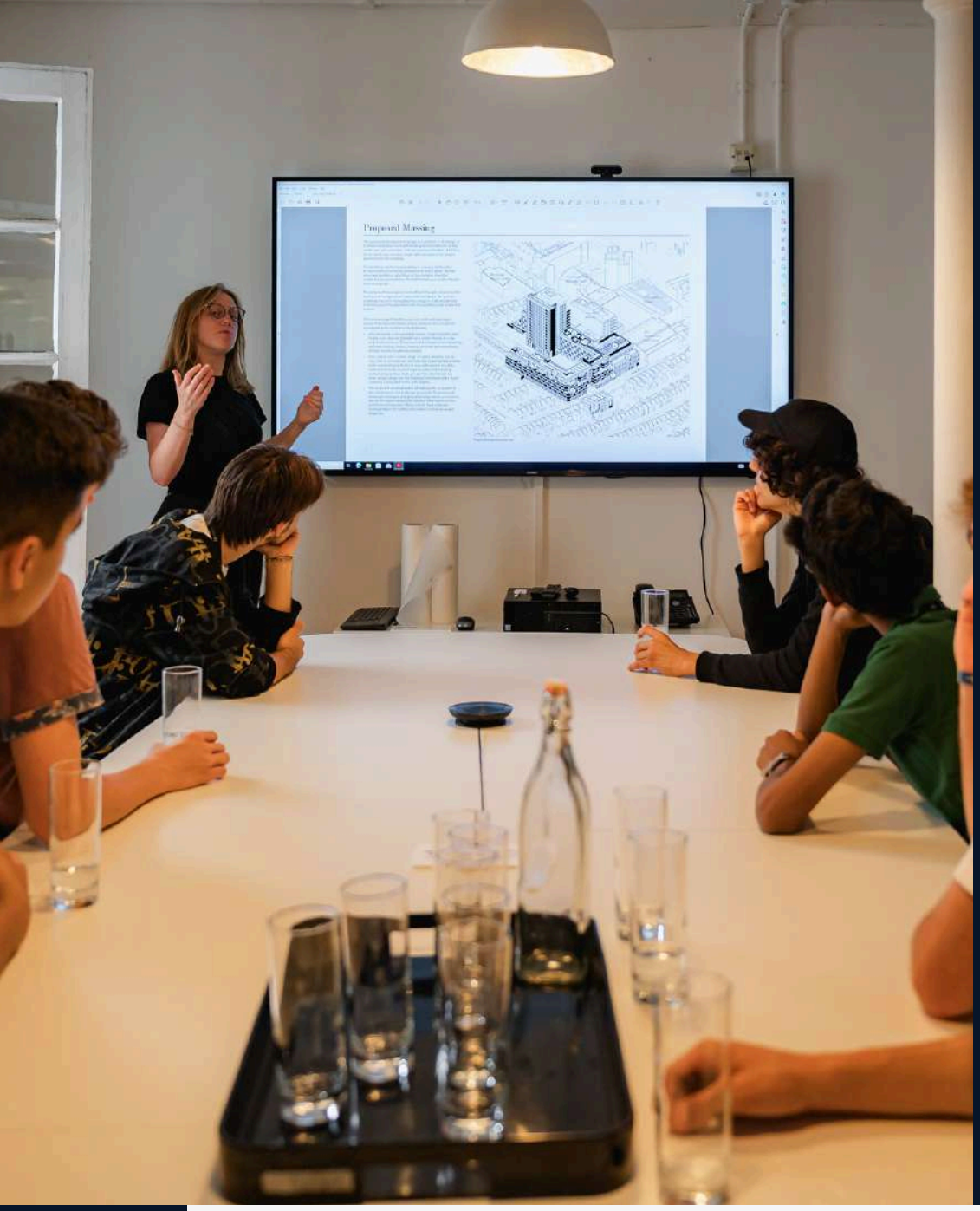

Environmental and Sustainable Engineering

Investigate how engineers design solutions that support sustainability and environmental protection. You will study energy systems, water management, and green building technologies, using Singapore's sustainable infrastructure as a case example. Students explore how engineering theory helps solve environmental challenges such as resource conservation and climate adaptation. This part develops critical awareness of sustainability and its importance in future engineering practice.

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SINGAPORE | **16-18** | **ACADEMIC INSIGHTS**

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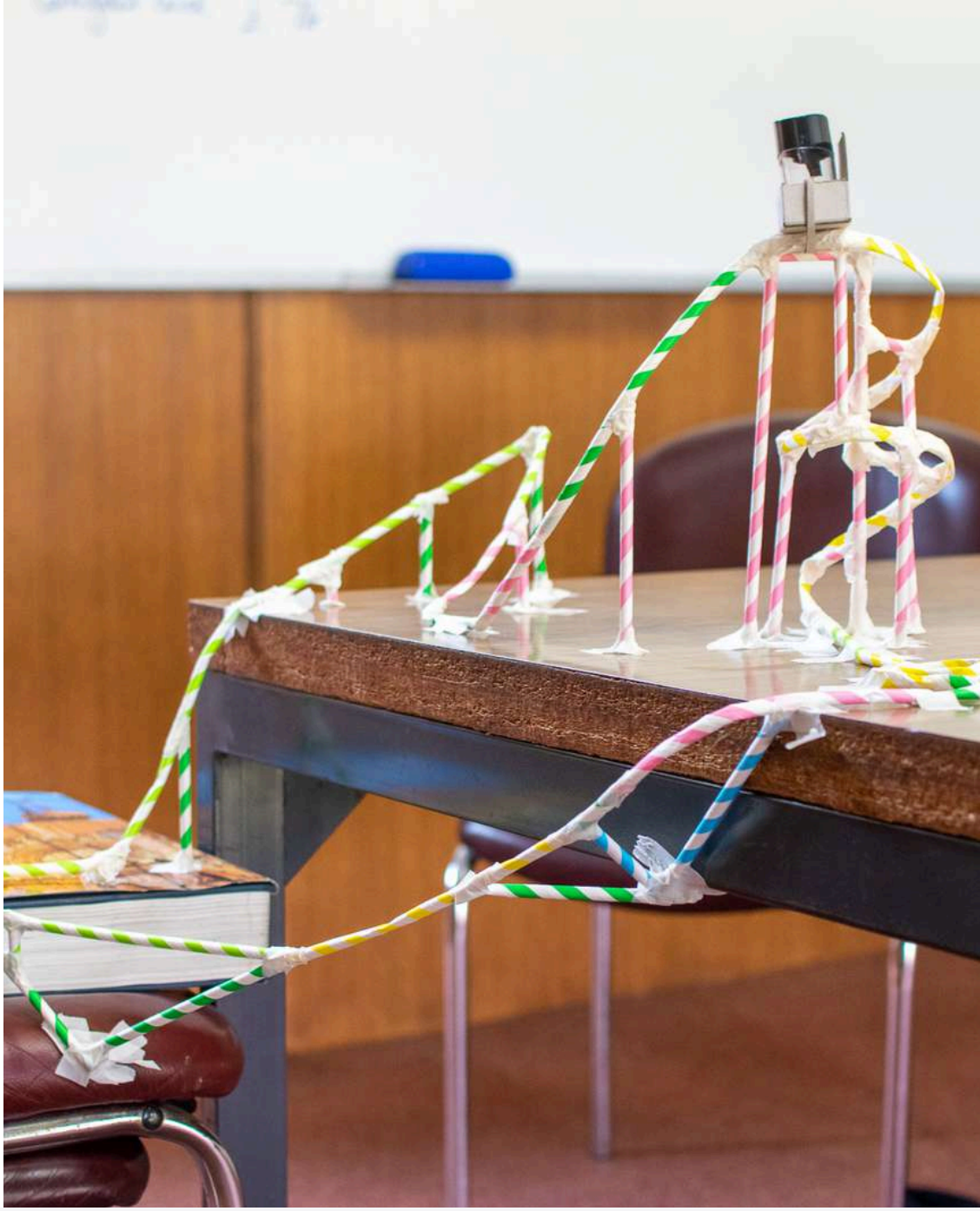
Materials Science and Manufacturing

Understand how materials science supports the design and production of engineering systems. You will explore the properties of metals, polymers, and composites, learning how these influence durability, cost, and performance. Through practical examples, students assess how materials innovation contributes to sustainable manufacturing and product design. This topic enhances research, analysis, and evaluation skills — key components of scientific and engineering education.



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Innovation and Future Technologies

Explore how engineers use innovation and research to address future challenges. You will study current developments in robotics, renewable energy, and smart infrastructure, analysing how technology influences design and decision-making. Drawing on Singapore's leadership in sustainable solutions, students discuss how academic research drives progress. This topic encourages forward-thinking, curiosity, and reflection on how engineering contributes to a changing global society.

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Personal Project

Each Academic Insights programme includes an individual project focused on independent research and academic reflection. The Personal Project allows students to explore a specific topic or question in greater depth, applying theoretical knowledge and original thinking. With guidance from their tutor, participants develop their ideas throughout the programme and present their findings at the end. The Personal Project may take the form of essay, presentation, creative piece, or report.

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After Your Programme

By the end of the programme, students gain a solid understanding of their chosen subject and how it is studied at university. They leave with enhanced independent thinking, critical research and analysis, and communication skills, as well as confidence for advanced learning. Each participant receives an individual feedback report from their tutor, highlighting strengths, progress, and personalised recommendations for future study. Students can also use their Personal Project and tutor feedback as part of their university applications or portfolios, showcasing both academic ability and intellectual curiosity.

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