INTRODUCTION

2020 is the year that humanity wants to forget. A virus, known as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV2), sent shivers to the world, affecting our health and threatening our existence. Yet, at the same time, much can be learnt from this tiny organism. That’s the beauty of biology: the study of life.

Biological sciences encompass all the divisions of natural sciences examining various aspects of vital processes. The concept includes anatomy, physiology, cell biology, biochemistry and biophysics, and covers all organisms from microorganisms, animals to plants. Over the past millennia, we were able to harness the knowledge of biology (from studying cells and microorganisms) to innovate new technologies that gave us comfort and security. Technologies that cure diseases, transformation and clean up hazardous wastes or the improvement of taste and quality in food are the many practical examples related to the field of biological sciences. Each day, new discoveries are made that shape our understanding about life and these discoveries have the potential to impact our lives; for the better or worse. This makes biological sciences a dynamic field to pursue for career development.

At Sunway University, the Department of Biological Sciences provides high quality yet exciting education and training in applying biology knowledge for practical application, whether it is for medical sciences, pharmaceutical industry, ecology conservation or science communication. The Department’s undergraduate programmes continuously make biological sciences a dynamic field to pursue for career development.

In addition to various forms of classroom activities and learning, significant emphasis is placed on industry engagement and training. The Department established industry links with international and local biotechnology companies for internship and future employment. These companies comprise (but not limited to) hospitals, diagnostic laboratories, healthcare organisations, research institutions and medical device companies. Career prospects of biology graduates are broad. Not only can they work in pharmaceutical industries, they can also thrive in other industries that rely on biological science knowledge, such as scientific writing and patent law.

It is the Department’s mission to groom prospective undergraduates into competent graduates who will excel in biology and health-related careers.
FACILITIES & LAB

Equipped with state-of-the-art facilities for the best learning experience.

- Precision Microtome
  Used to make thin slices of tissue for microscopy observation.

- High Performance Liquid Chromatography
  Sophisticated instrument to separate and identify biological components in a mixture.

- Flow cytometry
  Analysis of individual cells tagged with fluorescent antibody.

- Electroporation system
  Introducing foreign genetic material into cells as part of cloning experimental works.

- High resolution gel imaging
  To capture high quality agarose and protein gels for visualisation and quantification of biological samples.

- Microscopes fitted with digital camera
  Visualise biological samples by either taking images or capturing cellular activity on video.

- CTL Immunospot S6 Versa
  Analysis of a variety of microtitre plate-based bioassays involving bacteria, yeast, stem cell, viral plaques, and tumor colonies.

ACADEMIC MEMBERS

DISTINCTIVE SUNWAY EXPERIENCE

Briefing by internship coordinator to better prepare students for the process and procedures required to secure internship placement. Industry speakers are also invited to guide and equip students via the pre-internship training, shown here is Johnson & Johnson’s Country Talent Acquisition Lead.

Extra-curricular activities

The Sunway Biological Society (SBioS) seeks to encourage a deeper passion for scientific research and serve as a networking platform within the scientific community. Past events saw members assisting in an allergy study and participating in seminars.

Engagement with the university community and the public

The department of Biological Sciences in collaboration with The Star demonstrated how face masks reduce the spread of germs.

Producing hand sanitisers in our labs for students and staff

ACADEMIC LEADERS

DEPARTMENT OF BIOLOGICAL SCIENCES ORGANISATION CHART

HEAD OF DEPARTMENT

Professor Abhi Veerakumarasivam
(Medical Genetics/Science Communication & Leadership)

DEPUTY HEAD OF DEPARTMENT

Dr Jactty Chew
(Infectious Disease/Microbiology)

Programme Leader – BSc (Hons) Medical Biotechnology
Dr Babu Ramanathan
(Infectious Disease/Virology)

Programme Leader – BSc (Hons) Medical Biotechnology
Dr Tommy Tong
(Immunology/Microbiology)

Programme Leader – MSc in Life Sciences
Dr Chen Jit Ern
(Plant Biology/Biochemistry)

Programme Leader – PhD in Biology
Dr Babu Ramanathan
(Infectious Disease/Virology)

Teaching, Learning and Assessment Director
Professor Jeff Tan
(Cancer/Molecular Biology)

Teaching, Learning and Assessment Deputy Director
Associate Professor Dr Shyamala Ratnayeke
(Ecology and Conservation)

Research and Research Degree Director
Research and Research Degree Deputy Director

Associate Professor Dr Reuben Clements
(Ecology and Conservation)

Associate Professor Dr Ayaz Anwar
(Chemistry/Infectious Diseases)

Associate Professor Dr Jane Gew Lai Ti
(Chemistry/Nanotechnology)

Associate Professor Dr Yow Yoon Yen
(Plant Biology/Ecology)
Did you know?
- Dr Audrey demonstrated the neuroprotective properties of Tiger Milk mushroom.
- Dr Yow discovered that a specific species of Malaysian brown algae has potential anti-depression effects.
- A/Prof Shyamala developed non-invasive sampling method to estimate wild sun bear population.

One of the best things about a degree in biological sciences is that it lends itself to postgraduate study. Specialising by undertaking a master’s degree and forward to an academic career.

Did you know?
- Dr Jactty and Dr Tommy have shown that certain bacteria can survive inside amoeba, allowing them to thrive better in the environment.
- Dr Babu has shown that a small change in DNA can cause certain type of bacteria to gain resistance against antibiotics.
- A/Prof Chandrajit has adopted a bio-computing analysis approach to predict virulence proteins in a multidrug resistant bacteria that causes urinary tract infection.
- Dr Ayaz has identified different drug-based nanoparticles that are capable of killing parasitic amoeba.

Did you know?
- A/Prof Reuben discovered a new land snail genus called Minute Land Snail (Whittenia vermiculum), which is the only snail in the world that has a shell with four axes of coiling.
- A/Prof Shyamala developed non-invasive sampling method to estimate wild sun bear population.

Did you know?
- Dr Chen genetically modified dinoflagellate algae which has the potential to assist coral reefs against bleaching.
- A/Prof Babu has shown that a small change in DNA can cause certain type of bacteria to gain resistance against antibiotics.
- A/Prof Chandrajit and Dr Ong developed a method for identifying side-effect free cancer drug targets.

Did you know?
- Dr Jane has successfully converted glycerol into diacylglycerol, which is useful in the food industry.
- Dr Chen genetically modified dinoflagellate algae which has the potential to assist coral reefs against bleaching.
- A/Prof Babu has shown that a small change in DNA can cause certain type of bacteria to gain resistance against antibiotics.
- A/Prof Chandrajit and Dr Ong developed a method for identifying side-effect free cancer drug targets.

Did you know?
- Dr Ayaz has identified different drug-based nanoparticles that are capable of killing parasitic amoeba.
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- A/Prof Chandrajit has adopted a bio-computing analysis approach to predict virulence proteins in a multidrug resistant bacteria that causes urinary tract infection.
- Dr Ayaz has identified different drug-based nanoparticles that are capable of killing parasitic amoeba.
ENTRY REQUIREMENTS

PROGRAMME ENTRY REQUIREMENTS

<table>
<thead>
<tr>
<th>PROGRAMME</th>
<th>ENTRY REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSc (Hons) Biology With Psychology</td>
<td>STPM Average B- or CGPA 2.67 (Minimum 2 principals)</td>
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<td></td>
<td>A-Level Minimum 14 points</td>
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<tr>
<td></td>
<td>Australian Matriculation ATAR 65</td>
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<tr>
<td>BSc (Hons) Medical Biotechnology</td>
<td>Canadian International Matriculation Programme 65%</td>
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<tr>
<td></td>
<td>MUFY 65%</td>
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<tr>
<td></td>
<td>Sunway Foundation in Science &amp; Technology CGPA 2.5</td>
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<tr>
<td>BSc (Hons) Biomedicine</td>
<td>UEC Maximum 24 points from 5 subjects (all Grade Bs including Chinese and non-academic subjects)</td>
</tr>
<tr>
<td></td>
<td>IB Diploma Completed with minimum 26 points (excluding bonus points)</td>
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<tr>
<td></td>
<td>Other qualifications Any other qualifications will be considered on a case-to-case basis</td>
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SPECIFIC REQUIREMENTS

<table>
<thead>
<tr>
<th>PROGRAMME</th>
<th>SPECIFIC REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSc (Hons) Biology With Psychology</td>
<td>Pre-University Pass 2 science subjects or have experience/strong interest in biological sciences.</td>
</tr>
<tr>
<td>BSc (Hons) Medical Biotechnology</td>
<td>STPM 2 principals in two of the following subjects: Biology, Physics / Mathematics and Chemistry</td>
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<tr>
<td></td>
<td>A-Level Minimum Grade D in two of the following subjects: Biology, Physics / Mathematics and Chemistry</td>
</tr>
<tr>
<td>BSc (Hons) Biomedicine</td>
<td>Pre-University Passes in two of the following subjects: Biology, Physics/Mathematics, Chemistry</td>
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<tr>
<td></td>
<td>For Malaysian students entering using an entry qualification whereby the medium of instruction is not in English, MQA requires the student to possess a MUET or international English proficiency qualification in order to register for the programme</td>
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</table>

ENGLISH REQUIREMENTS

<table>
<thead>
<tr>
<th>PROGRAMME</th>
<th>ENGLISH REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSc (Hons) Biology With Psychology</td>
<td>IELTS or equivalent 6.0.</td>
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<tr>
<td></td>
<td>MUET Band 5</td>
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<tr>
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<td>SPM English A2 or A-</td>
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<td>UEC English B3</td>
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<td></td>
<td>O-Level English (1111) B3</td>
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<tr>
<td>Sunway Intensive English Programme (IEP) Pass Level 4</td>
<td>with minimum 65%</td>
</tr>
<tr>
<td></td>
<td>ESL/English Satisfactory level in Pre-University programmes, where the medium of instruction is English</td>
</tr>
</tbody>
</table>

PROGRAMME INTRODUCTION

This innovative biology degree incorporates behavioural sciences to make it more relevant, relatable, and applicable in today's world. With 75% of the subjects focussing on biology, graduates will be equipped with a strong foundation to further their studies at the postgraduate level in the area of neuroscience, and in clinical or pharmaceutical research.

Alongside academic studies, students will be given the opportunity to develop research skills and practical experience through working on innovative independent research projects during the final year, as well as gaining valuable experience working in healthcare or biotechnology industries through internship.

Acquire the skills you need to explore career opportunities in academia, healthcare sector, pharmaceutical industry, food industries, environmental consultancy and related disciplines.

VALIDATED BY:
Lancaster University

Note: For A-Level points calculation
A = 10 points B = 8 points C = 6 points D = 4 points E = 2 points
**BSC (HONS) MEDICAL BIOTECHNOLOGY**

**PROGRAMME INTRODUCTION**
Medical Biotechnology is a subset of biotechnology that enriches us with biological knowledge on all living organisms and teaches us how to use these organisms to create products that can help us lead more productive lives and live longer. The world has benefited from many amazing medical discoveries (the past and the present); Dr. Edward Jenner for creating the world’s first vaccine against smallpox, the use of insulin to treat diabetes, and designing noninvasive small capsules to treat diabetes, and designing noninvasive small capsules to treat diabetes, and designing noninvasive small capsules to treat diabetes, and designing noninvasive small capsules to treat diabetes.

In the BSc (Hons) Medical Biotechnology programme, the theoretical component of the programme enhances the learning experience through practical application. Graduates will develop critical thinking and learn how to contribute towards developing beneficial products to prevent or treat human diseases, as well as communicating scientific findings to the general public.

**VALIDATED BY:**
Lancaster University

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**BSC (HONS) BIOMEDICINE**

**PROGRAMME INTRODUCTION**
Get involved in the healthcare sector with this medically-oriented degree. Our biomedicine degree provides an ideal platform for careers in biology and biomedicine, including further postgraduate study. Biomedicine is a branch of medical science that deals with the development of diagnostic modalities and treatments for current and emerging threats to human health. This programme imparts the knowledge of anatomy, physiology, pharmacology, biochemistry, cell biology, and genetics which are important for modern medicine and public health. Graduates will develop fundamental skills in critical thinking, problem solving, and communication which are invaluable in understanding the global health trends and biomedical research advances.

**VALIDATED BY:**
Lancaster University

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**PROGRAMME STRUCTURE - Subjects**

### Year 1
- Introduction to Biosciences
- Human Anatomy
- English for Life Sciences
- Introduction to Statistics
- Principles of Genetics
- Impact of Microbes on Human Life
- Cell Biology
- Communication Skills
- Molecular Biology
- Medical Biotechnology
- Biochemistry
- Cell & Tissue Culture
- Human Molecular Genetics
- Molecular Diagnostics
- Instrumental Analysis
- Medical Microbiology
- Social & Professional Responsibilities

**Electives (choose 1)**
- Biodiversity
- Current Issues in Biomedical Sciences

### Year 3
- Bioinformatics
- Immunology
- Pharmaceutical Technology
- Research Project
- Research & Publications
- Internship
- Health and Safety in Laboratory Management
- Additional MOHE Compulsory General Studies Subjects

**For Local students:**
- Islamic & Asian Civilisations
- Ethnic Relations
- Community Service
- Bahasa Kebangsaan A (applicable to students who did not sit for SPM or did not obtain a Credit in SPM Bahasa Melayu)

**For International students:**
- Malay Language for Communication 2
- Malaysian Studies 3
- Community Service

**Programme Structure - Subjects**

### Year 1
- Human Physiology
- General Microbiology
- Basic Biochemistry
- Human Anatomy
- Basic Biostatistics
- English for Life Sciences
- Cell Biology
- Clinical Chemistry
- Basic Genetics
- Histology and Histopathology Techniques
- Communication Skills
- Ethics in Healthcare Science

### Year 2
- Medical Biochemistry
- Human Molecular Genetics
- Medical Microbiology
- Pathology
- Medical Immunology
- Medical Entomology
- Pharmacology and Toxicology
- Medical Statistics and Epidemiology
- Social and Professional Responsibilities
- Current Issues in Biomedical Sciences
- Histopathology and Cytology Practice

**For Local students:**
- Islamic & Asian Civilisations
- Ethnic Relations
- Community Service
- Bahasa Kebangsaan A (applicable to students who did not sit for SPM or did not obtain a Credit in SPM Bahasa Melayu)

**For International students:**
- Malay Language for Communication 2
- Malaysian Studies 3
- Community Service

**Elective 1**
- Molecular Diagnostics
MOBILITY & STUDY ABROAD

PROGRAMME

<table>
<thead>
<tr>
<th>Programme</th>
<th>MOBILITY OPTIONS</th>
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<tbody>
<tr>
<td>Lancaster University</td>
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<tr>
<td>Summer Programme</td>
<td>Study abroad</td>
</tr>
<tr>
<td>3 weeks</td>
<td>1 year</td>
</tr>
</tbody>
</table>

| MEDICAL BIOTECHNOLOGY             | ✓                | ✓                | ✓                |
| BIOMEDICINE                       | ✓                | ✓                | ✓                |
| BIOLOGY WITH PSYCHOLOGY           | ✓                | ✓                | ✓                |

For more information about Lancaster mobility options, visit https://university.sunway.edu.my/SU-LU

INTERNSHIP COMPANIES & COMPANIES OUR GRADUATES WENT TO

Biotechnology (Pharmaceutical, Diagnostic lab, medical supply and services, scientific supply)
- Abbott Labs
- Absolute Genetic Technologies
- Acumen Scientific Sdn Bhd
- Advance Genomics Sdn Bhd
- Agilent Technologies LDA (M) Sdn Bhd
- AHS Laboratories Supplies
- AJ Pharma Holding Sdn Bhd
- Alpha Fertility Centre
- ALS Technichem (M) Sdn Bhd
- Asia Assistance
- AstraZeneca Sdn Bhd
- Attest Research Sdn Bhd
- Asia Pacific Special Nutrients Sdn Bhd
- Boehringer Ingelheim Malaysia
- Biocon Sdn Bhd
- Biomarketing Services Sdn Bhd
- Biovalence Sdn Bhd
- CelsiSafe International Sdn Bhd
- Codon Genomics Sdn Bhd
- Compesti Sdn Bhd
- Cryocord Sdn Bhd
- Ecolab Malaysia Sdn Bhd
- Eppendorf Asia-Pacific Sdn Bhd
- Fisher Scientific (M) Sdn Bhd
- Gribbles Pathology
- IKA Works Sdn Bhd
- Interscience Sdn Bhd
- IQVIA (formerly known as QuintilesMSI)
- Kinesis Sdn Bhd
- Medi-Life (M) Sdn Bhd
- Metro VP Fertility Center
- Myco Medic Sdn Bhd
- Mygenome Sdn Bhd
- Neogenix Laboratoire
- Next Gene Scientific Sdn Bhd
- Peerhealth Malaysia
- SG Global Biotech Sdn Bhd
- Speedy Assay Sdn Bhd
- TeleMe Technologies Sdn Bhd
- Venn Biosciences Sdn Bhd
- Vision Diagnostic Centre
- Vivantis Technologies Sdn Bhd
- RIMBA
- Sunway Lagoon Wildlife Park
- University of Bristol
- University of Hong Kong
- University of Manchester
- Burnet Institute, Australia
- Center for Drug Research, USM
- Clinical Research Malaysia
- EcoKnights
- Food and Drug Authority, Maldives
- Galen Centre for Health and Social Policy
- Malaysia Genome Institute
- Malaysian Biotechnology Information Centre (MABIC)
- Monash University Malaysia
- Nepal Health Research Council
- RIMBA
- Sunway Lagoon Wildlife Park
- University of Bristol
- University of Hong Kong
- University of Manchester

EDUCATION & RESEARCH (Including research institution)

- Biotech Asia-Pacific Sdn Bhd
- Fisher Scientific (M) Sdn Bhd
- Gribbles Pathology
- IKA Works Sdn Bhd
- Interscience Sdn Bhd
- IQVIA (formerly known as QuintilesMSI)
- Kinesis Sdn Bhd
- Medi-Life (M) Sdn Bhd
- Metro VP Fertility Center
- Myco Medic Sdn Bhd
- Mygenome Sdn Bhd
- Neogenix Laboratoire
- Next Gene Scientific Sdn Bhd
- Peerhealth Malaysia
- SG Global Biotech Sdn Bhd
- Speedy Assay Sdn Bhd
- TeleMe Technologies Sdn Bhd
- Venn Biosciences Sdn Bhd
- Vision Diagnostic Centre
- Vivantis Technologies Sdn Bhd
- RIMBA
- Sunway Lagoon Wildlife Park
- University of Bristol
- University of Hong Kong
- University of Manchester

- Burnet Institute, Australia
- Center for Drug Research, USM
- Clinical Research Malaysia
- EcoKnights
- Food and Drug Authority, Maldives
- Galen Centre for Health and Social Policy
- Malaysia Genome Institute
- Malaysian Biotechnology Information Centre (MABIC)
- Monash University Malaysia
- Nepal Health Research Council
- RIMBA
- Sunway Lagoon Wildlife Park
- University of Bristol
- University of Hong Kong
- University of Manchester

CAREER PROSPECTS

- Healthcare research (research officer in CRO, therapeutic medicines, innovation of diagnostic detection kits)
- Insurance industry (insurance product development)
- Medical and scientific product specialist
- Patent law* (intellectual property consultants, regulatory affairs specialists)
- Pharmaceutical industries (quality assurance personnel, product specialists, bioprocessing and biomanufacturing executives)
- Pharmaceutical research and development
- Writer (scientific writer, novelist)

*requires Masters or PhD
^requires additional certification
CHOO SUET VEE  
BSc (Hons) Biology with Psychology  
Postgraduate student at Sunway University  
MSc in Life Sciences  
Area of specialisation and research: Neuroscience research

HOR SUET LEE  
BSc (Hons) Biology with Psychology  
Company: Public Bank  
Position: Senior Executive (Acquisition and Placement)

CHARINA PRIA A/P SIVAYOGAM  
BSc (Hons) Biology with Psychology  
Company: Rimba  
Position: Senior Analyst

FOO PAO JIA  
BSc (Hons) Biology with Psychology  
Company: Boehringer Ingelheim  
Position: Medical Sales Representative

TAY VANGENE  
BSc (Hons) Medical Biotechnology  
Postgraduate student at Sunway University  
MSc in Life Sciences  
Area of specialisation and research: Molecular Phylogenetic Analysis of Malaysian Macroalgae

GOH TZE FUNN  
BSc (Hons) Medical Biotechnology  
Company: Next Gene Scientific Sdn Bhd  
Position: Product Specialist

JORDAN ANTHONY PINTO  
BSc (Hons) Medical Biotechnology  
Company: Speedy Assay Sdn Bhd  
Position: Sales Executive

GURPREET KAUR  
BSc (Hons) Medical Biotechnology  
Company: Shell  
Position: Human Resources Advisor

WHERE ARE OUR GRADUATES NOW?

STUDENTS’ ACHIEVEMENTS & ACTIVITIES

Research activities - Allergy study  
Genetic study in collaboration with National University of Singapore to understand the prevalence of allergic diseases in Malaysia. The Sunway Biological Science Society (SBioS) members involved themselves in sample collection for an allergy research, shown here is a skin prick test analysis and blood draw.

Poster presentation award  
Ms. Arcana Thirumorthy (PhD in Biology) won the Best Poster Presentation Award at the 2nd International Conference on Oral Microbiology & Oral Immunology.

Journal publication  
BSc Medical Biotechnology student, ZOEY SEE MAY PHENG published her work in Acta Tropica, an international journal on infectious diseases, about the zoonotic disease - Leptospirosis, endemic in developing countries, focusing on the risk factors and proposed methods for improved management of leptospirosis.

Field visit to a mass spectrometry lab  
As part of the Instrumental Analysis course, BSc (Hons) Medical Biotechnology students visited the liquid chromatography-mass spectrometry laboratory located at the Jeffrey Cheah School of Medicine and Health Sciences, Monash University Malaysia.

Student achievement  
Esther Erin Wong Yan  
- Currently the regional programme officer for the International Network for Government Science Advice (INGSA) Asia Chapter.
- Awarded the “International Life Sciences Institute Young Researcher Award” at the ASEAN Emerging Researchers Conference 2019 for outstanding presentation of her final year research project.

Bonding & having fun  
A December to Remember - Some of the 80 attendees at the Christmas dinner-cum-year end gathering for all Department of Biological Sciences members.

Bonding & having fun  
A December to Remember - Some of the 80 attendees at the Christmas dinner-cum-year end gathering for all Department of Biological Sciences members.
As part of our nation building ambitions, Sunway University has travelled the world seeking out the finest educational opportunities, bringing them closer to you.

**LIVE**

Whilst most universities have a campus, only Sunway University has a city. Experience a world-class education right here at Sunway City, poised to become Malaysia's first fully integrated 5G-enabled smart city.

**LEARN**

International collaborations with the world's most renowned institutions offer Malaysians world-class education at local prices, avoiding the expensive cost of overseas travel and unfavourable exchange rates.

**LEAD**

Currently pioneering research with the University of Cambridge to collaborate on ways to combat the Covid-19 pandemic in the Jeffrey Cheah Biomedical Centre at the University of Cambridge.

**LEGACY**

Located at Sunway City, Malaysia, Sunway University joins New York & Paris as one of the three United Nations Sustainable Development Solutions Network (SDSN) Centres in the world to coordinate continent-wide sustainable initiatives.

**One University, A World of Opportunities.**

**A Class Above**