DISCLAIMER

The Department of Biomedical Engineering has endeavored to ensure that the material contained in this study guide was correct at the time of being published. However,

1. The department gives no warranty and accepts no responsibility for the accuracy or the completeness of the material.

2. No reliance should be made by any user on the material, but instead, the user should check for confirmation with the originating or authorizing faculty, department or another body.

3. The Department reserves the right at any time to make changes as it deems appropriate.

This handbook is to be used only as a guide and all current information can be obtained via the University of Melbourne website: https://handbook.unimelb.edu.au/search

This handbook has been produced by the Department of Biomedical Engineering. If any incorrect information is found within this guide, please email our Academic Support Coordinator: Jie Sun (jie.sun1@unimelb.edu.au).
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WELCOME TO THE DEPARTMENT OF BIOMEDICAL ENGINEERING

It is my pleasure to welcome all students to the Department of Biomedical Engineering, including Bachelor of Science and Bachelor of Biomedicine students in the Bioengineering Systems major, and our students in the Master of Engineering (Biomedical) and Master of Engineering (Biomedical with Business). I would especially like to welcome students from abroad that are new to Australia and those who may be studying remotely due to COVID-19.

This guidebook provides essential information for all new and current students, including sample course structures, subject information, teaching responsibilities, assessment, study abroad applications, special consideration information, and lecture locations. It is designed to supplement specific course information provided in the official University Handbook https://handbook.unimelb.edu.au. Subject details are included, together with teaching responsibilities, some sample programmes and assessment details.

Please be advised that there are many student services available at the University of Melbourne, including admissions, skills and development services, health and disability services, counseling services, financial services, administrative and information services, as well as course planning services.

Please see Stop 1 for further information via this link: http://students.unimelb.edu.au/stop1 or visit at 757 Swanston Street, Parkville or call 13 MELB (13 6352).

I encourage you to provide feedback on your teaching and learning experiences so that we can continue to improve our courses. This can be achieved by providing comments directly to each subject’s Staff-Student Liaison Committee representative. The Committee meets twice each semester to provide feedback to the Department on our subjects. Towards the end of each semester, you will be provided with a teaching evaluation survey called the Subject Experience Survey (SES), which gives you an opportunity to provide specific comments and feedback on each subject in which you are enrolled. You are also welcome to email or meet with the Course Coordinator, Dr Kathryn Stok, or myself.

On behalf of the Department of Biomedical Engineering, I wish you all the best during your studies here at the Melbourne School of Engineering

Andrea O’Connor Professor and Head of Department
Department of Biomedical Engineering
## DEPARTMENT OF BIOMEDICAL ENGINEERING STAFF

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
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### School of Chemical and Biomedical Engineering Leadership

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<tr>
<td><strong>Associate Professor David Ackland</strong></td>
<td>Associate Professor Ackland is an ARC Future Fellow, and Deputy Director of the ARC Training Centre for Medical Implant Technologies. His research focuses on computational modelling and simulation of human movement, with a particular emphasis on upper limb and maxillofacial surgery and biomechanics. He employs medical imaging, human motion experiments, musculoskeletal modelling, and in vitro biomechanical experiments as his primary research techniques. A/Prof Ackland has close ties to the orthopaedics industry and has a particular interest in the design and evaluation of joint replacements and other implantable devices for the treatment of end-stage bone and joint conditions.</td>
<td></td>
</tr>
<tr>
<td><strong>Professor Anthony Burkitt</strong></td>
<td>Professor Anthony Burkitt holds the Chair in Bio-Signals and Bio-Systems in the Department of Biomedical Engineering at the University of Melbourne. He was the Director of Bionic Vision Australia (2010-2016) - a special research initiative in bionic vision science and technology of the Australian Research Council (ARC). He successfully led the project through all of its phases: project conception, securing $50 million in ARC funding, the research and development programs that led to the development of a prototype bionic eye (suprachoroidal retinal implant), the successful implantation in three patients, and the establishment of the company Bionic Vision Technologies (BVT) with US$18M of venture capital for the ongoing commercial and clinical development of the technology. In addition to his work on the bionic eye, Professor Burkitt’s research encompasses a number of areas of neuroscience and medical bionics, including computational neuroscience, neuro-engineering, cochlear-implant speech processing and bio-signal processing for epilepsy. His research has been instrumental in the development of visual stimulation paradigms for retinal implants, new cochlear implant speech processing strategies, methods for detecting and predicting seizures, and the use of electrical stimulation for seizure abatement in epilepsy.</td>
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</tbody>
</table>
Dr David Collins

Dr David Collins is a DECRA fellow, Head of the Collins Bio-Microsystems Laboratory (CBML) and Lecturer in the Biomedical Engineering Department, Melbourne School of Engineering. David’s main research interests are in micromanipulation of cells and tissues for biosensing, advanced tissue engineering and diagnostic applications. High frequency acoustic fields are particularly suitable for cell manipulation due to their biocompatibility and ability to generate force gradients with micron-scale dimensions. Ongoing projects include those on 3D bioprinting, flow cytometry and organ-on-a-chip systems at the nexus of microsystems and biology. Prior to his role at the University of Melbourne David was a postdoc at MIT and in Singapore. David maintains research linkages with groups across Melbourne as well as Germany, the US and Singapore.

Professor Edmund Crampin

Professor Edmund Crampin is Rowden White Chair of Systems Biology at the University of Melbourne. Edmund is the Director of the Systems Biology Lab at the School of Mathematics and Statistics and the Department of Biomedical Engineering (Melbourne School of Engineering), as well as the Adjunct Professor in the Faculty of Medicine, Dentistry and Health Sciences (School of Medicine). The Systems Biology Lab is a multi-team collaborative group developing mathematical and computer modeling approaches to investigate regulatory processes and pathways underlying complex human diseases, and treatments thereof. The Lab’s recent projects include modeling heart cells to understand the development of heart disease; modeling interactions between cells and nanoparticles; and computational approaches to study the network of genetic interactions underlying breast and skin cancer. The Lab also develops computational tools and standards for integrative systems biology.

Dr Katie Davey

Dr Katie Davey is a Lecturer in the Department of Biomedical Engineering at the University of Melbourne. Katie's current research uses advanced statistical signal processing, in conjunction with simulation and modelling techniques, to mathematically and programmatically model cortical processes and gain insight into how we perceive and process sensory information. Her primary research areas are spike timing dependent synaptic plasticity (STDP) - the process by which neurons adapt connection strengths to other neurons during learning, and functional MRI - the acquisition and analysis of a series of low-resolution magnetic resonance images. Katie has additional collaborations, including with Imperial College of London investigating the encoding and storage of location information by place cells using calcium imaging, and the Florey in modelling neural pathways for bowel disease. Katie completed her doctoral research in functional MRI connectivity, which is a field of research that analyses a series of MRI images to identify how brain regions cooperate to achieve sensory and perception tasks. After completing her PhD, Katie worked at the Defence Science Technology Group, modelling pilot cognition and aircraft control. She then worked in finance, modelling and predicting the movement of stock prices on the S&P500.
Dr Brooke Farrugia is a Senior Lecturer in the Department of Biomedical Engineering at The University of Melbourne. Dr Farrugia has a multifaceted research background including biomaterial development and characterisation, wound healing, including in vitro models, molecular biology and glycobiology. Dr Farrugia received her PhD from UNSW Sydney investigating polyurethane nanocomposites for blood contacting applications and held post-doctoral positions at the Institute of Health and Biomedical Innovation, Queensland University of Technology (2010-2012) and the Graduate School of Biomedical Engineering, UNSW Sydney (2013 – 2018). Specifically, her research activities and interests lie in the fields of wound healing and tissue regeneration; the molecular mechanisms behind their occurrence, and the development of new therapies.

Professor David Grayden is the Clifford Chair in Neural Engineering. Professor Grayden’s main research interests are in understanding how the brain processes information, how best to present information to the brain using medical bionics, such as the bionic ear and bionic eye, and how to record information from the brain, such as for brain-machine interfaces. He is also conducting research in epileptic seizure prediction and electrical stimulation to prevent or stop epileptic seizures, and in electrical stimulation of the vagus nerve to control inflammatory bowel disease.

Dr Daniel Heath is a Senior Lecturer with the University of Melbourne’s School of Chemical and Biomedical Engineering. His research focuses on developing next-generation biomaterials. He has a specific interest in blood-material interactions, as poor interactions between blood and biomaterials lead to the failure of many medical devices including vascular grafts and stents. His lab hopes to address these challenges by developing new biomaterials with improved blood-material interactions. In many ways, cells are the best producers of biomaterials. Therefore, the Heath Lab also looks at extracellular matrix materials and their applications as biomaterials. Core to this technology is the decellularization of tissue or cell cultures in order to produce extracellular matrix materials that can be used for a variety of applications.
**Professor Leigh Johnston**

Associate Professor Leigh Johnston is a member of the Department of Biomedical Engineering within the School of Chemical and Biomedical Engineering. Her primary research focus is medical imaging, in particular, Magnetic Resonance Imaging. Leigh holds an honorary appointment at the Florey Institute of Neuroscience and Mental Health, where she is Head of the Animal MRI facility. She is also a member of Melbourne Brain Centre Imaging Unit, with research programs utilizing the Siemens 7T and Siemens PET/CT clinical systems on the Parkville campus. Leigh’s expertise in MRI spans from acquisition sequences to image analysis and applications. Prior to her appointment at the University of Melbourne, Leigh was a postdoctoral researcher at Howard Florey Institute (Melbourne), York University (Canada), and the Université Catholique de Louvain (Belgium).

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**Professor Sandra Kentish**

Professor Kentish holds a Bachelors, Masters and PhD from the University of Melbourne. Before she became an academic, she worked at Qenos, Kodak Australia and Kimberly Clark Australia for a total of nine years. Her research interests lie in membrane technology for gas and liquid separations. She was the Head of Department of Chemical Engineering from October 2012. In early 2017 she moved to a broader role as the Head of the School of Chemical and Biomedical Engineering.

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**Dr Lionel Lam**

Dr Lionel Lam is a Lecturer (Teaching Fellow) within the Department of Biomedical Engineering at the University of Melbourne. He obtained his Bachelor of Engineering in Chemical/Process Engineering (2011) from the University of Western Australia. He then completed his Master of Science in Chemical Engineering Practice (2013) and his PhD in Chemical Engineering (minoring in Biology, 2017) at the Massachusetts Institute of Technology. Dr Lam’s doctoral research focused on the development and application of ex vivo single-cell phenotypic, transcriptomic, and functional assays on tumour-infiltrating immune cells to better understand differential responses to anti-PD-1 immunotherapy in mice.
Professor Peter Vee Sin Lee

Peter (Vee Sin) Lee is Professor and Deputy Head (research and engagement) of the Department of Biomedical Engineering of the University of Melbourne. He obtained his BEng in Mechanical Engineering (1st Class Hons., 1991) and PhD (1996) in Bioengineering from the University of Strathclyde, UK, and continued his post-doc in the same university from 1996 to 1998. He was a Research Fellow with the Biomaterials Group at the Institute of Materials Research and Engineering, Singapore, from 1998 to 2001. In 2001, he joined Defence Medical and Environmental Research Institute, DSO National Laboratories, Singapore, as the Head of the Bioengineering Laboratory. He was appointed as an Adjunct Associate Professor from 2002 to 2008 in the Division of Bioengineering at the National University of Singapore. He joined The University of Melbourne as a Senior Lecturer in 2008.

Professor Andrea O’Connor

Professor O’Connor is the Head of the Department of Biomedical Engineering. Her expertise is in chemical and biomedical engineering with particular focus areas including biomaterials, tissue engineering, porous materials, and 3D printing. She leads the Tissue Engineering Research Group in the Department of Biomedical Engineering. She has active collaborations with several medical research institutes and medical device companies in Australia and has worked in the chemical industry in Australia and overseas.

Dr Vijay Rajagopal

Dr Vijay Rajagopal is a Senior Lecturer at the Department of Biomedical Engineering at the University of Melbourne. Dr Rajagopal leads the Cell Structure and Mechanobiology Group and is a co-founder of the Melbourne School of Engineering Mechanobiology Lab in the Parkville Biomedical Precinct. Cells harness the interplay between electrical, chemical and mechanical signals as well as their own shape to perform a variety of functions in our bodies. This interplay is what makes the heart beat and also enables cancer cells to dynamically change shape and migrate from a tumor to new regions of the body. By making new experimental measurements and developing innovative computational models, Dr Rajagopal primarily focuses on discovering ways to manipulate or engineer this interplay to effect positive treatments for diseases of the heart, cancer metastasis and red blood cell diseases.
<table>
<thead>
<tr>
<th>Associate Professor Kathryn Stok</th>
<th>Kathryn Stok (FIEAust) is Associate Professor of Mechanobiology in the Department of Biomedical Engineering at the University of Melbourne, and an innovative biomedical engineer in quantitative microstructural imaging (micro-computed tomography) and biomechanics of cartilage and joint structures. She uses a variety of experimental and computational approaches. Her research work merges solid engineering approaches with biomedical advancement. She aims to improve mechanobiological measurement and control methods using novel imaging, mechanics and computational modelling. This involves the development of novel, in vivo, imaging-based measurement technologies for hard and soft biological tissues in 3D at different length scales. It will further enable investigation of joint health, with commercial potential in imaging, mechanobiology and biofabrication, and translation into Medtech patents and spinoffs. She is the Head of the Integrative Cartilage Research Group and a co-founder of the Melbourne Mechanobiology Lab in the Parkville Biomedical Precinct.</th>
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<tr>
<td>Associate Professor Andrew Zalesky</td>
<td>Associate Professor Andrew Zalesky is a Senior Researcher, holding a joint appointment in the School of Medicine and School of Engineering at the University of Melbourne. He completed his PhD in electrical engineering in 2006. He is internationally recognized for developing the network-based statistics, one of the most widely used methods for performing statistical inference on brain networks. His contributions to neuropsychiatry include mapping of the schizophrenia connectome and development of advanced methods for analyzing patient neuroimaging data. He co-authored Fundamentals of Brain Network Analysis, one of the best-selling Elsevier neuroscience titles published in 2016 and commended by the British Medical Association. His 2010 nodes paper has become a classic in the field of imaging connectomics. He holds the NHMRC Senior Research Fellowship and leads the Systems Neuropsychiatry Group. His primary research interests are in systems neuroscience, neuroimaging, psychiatry, and networks.</td>
</tr>
<tr>
<td>Associate Professor Hamish Meffin</td>
<td>Dr Hamish Meffin is a Senior Lecturer in the Department of Biomedical Engineering at The University of Melbourne and an Honorary Fellow at the National Vision Research Institute of Australia. His research interests lie in two main fields: (1) medical bionics for the treatment of neural disorders and (2) systems neuroscience that seeks to understand the processing performed by the brain. He combines mathematical modelling and experimental electrophysiology with expertise in device development to progress these fields. He is particularly interested in vision. His work has contributed to the development of a retinal implant for the restoration of vision to people with degenerative retinal diseases. His research also explains how the visual areas of the brain interprets raw sensory input from the retina to allow perception of the world. He has linkages with the National Vision Research Institute and The Bionic Institute</td>
</tr>
</tbody>
</table>
| Dr Sam John | Dr Sam John is the Senior Lecturer in Neural Engineering, in the Department of Biomedical Engineering, Melbourne School of Engineering, University of Melbourne.  
Dr John’s research interests are in neural prosthetics. He is specifically interested in understanding long range interactions in the brain such as how the deep brain regions and the cerebral cortex interact. He will use this information to develop Neural Prosthetics that can help people with motor or sensory loss. Some common application of his work is in the development of the Bionic Ear, the Bionic Eye, Brain Machine Interfaces and Closed Loop Neuromodulation. He has research linkages with The Royal Melbourne Hospital, Florey Institute for Neuroscience and Mental Health, and the Osaka University, Osaka Japan. |

| Dr Vini Gautam | Dr Vini Gautam is a lecturer and ARC DECRA fellow in the department of Biomedical Engineering at the University of Melbourne. Dr Gautam’s main research interests are in developing devices and technologies to address some of the key challenges in biomedicine. Her research spans the areas of bionic vision (e.g. developing artificial photoreceptors for stimulating blind retinal tissues); brain-machine interfaces (e.g. developing flexible electrodes for stimulating brain cells); and neural tissue engineering (e.g. creating scaffolds to understand how brain circuits form and connect). She is also involved in developing new tools to better understand Alzheimer’s Disease. |
SAFETY

The Melbourne School of Engineering is committed to providing and maintaining a workplace that is safe and without risk to the health of our staff, students, and visitors to our facilities.

The management of the School will take all measures necessary to ensure adherence to safe work practices and conditions and these will be given priority in the School's planning, procedures and work instructions.

The creation and maintenance of a safe and healthy working environment is an integral part of our operation and we actively pursue the goals of this policy. The University follows the National Assessment Tool (NAT) program to ensure that these goals are achieved, and the Melbourne School of Engineering is committed to maintaining its accreditation under this program.

It is expected that, through consultation and co-operation, all staff, students, contractors, and visitors will observe OHS rules and safe working practices and make every effort to reduce the risk of injury to themselves, their fellow workers and others. A Take risk assessment form will need to be completed for some laboratory classes.

The management of the Melbourne School of Engineering is committed to the provision of appropriate resources and training in order to assist all staff and students to fulfill their responsibilities and maintain a safe working environment.

EMERGENCY CONTACT INFORMATION

The University of Melbourne Security

Emergency phone number: +61 3 8344 6666 (internal extension 46666)
Enquiry phone number: +61 3 8344 4674

Note: University of Melbourne security guards are trained first aiders and can be called upon to supply first aid in an after-hours emergency situation.

MSE Occupational Health and Safety Unit

Emergency phone number: +61 3 8344 2400 (internal extension 42400) and business hours only

Ambulance, Police or Fire Brigade

From a university phone: 0-000
From a mobile phone: 000 or 112
STUDENT SERVICES

The following services are available to all University of Melbourne students:

**Academic Skills**
Academic Skills can help students with academic writing, time and task management, oral presentations, exam preparation, and English language development.

**Counseling and Psychological Services**
Counselling and Psychological Services provides you with free individual appointments, and workshops during the semester.

**Library**
The University Library holds large collections of printed books, e-books, journals, databases, reference materials, audio-visual and other items available for loan to students.

**Melbourne Scholarships**
Melbourne Scholarships is responsible for the administration and promotion of major scholarship programs for undergraduate, graduate coursework and research students.

**Safer Community Program**
The Safer Community Program (SCP) aims to promote an environment that fosters safe learning, working and living at the University of Melbourne, and provides the opportunity to pass on the behavior of concern before it develops into something serious.

**Student Union Legal Service**
The Student Union Legal Service can provide you with legal advice, support and referral service on an initial consultation basis.

**AIRport**
The Academic Interactive Resources portal (AIRport) can help you make a smooth transition to the University and improve your academic writing and study skills.

**Disability Liaison**
The Disability Liaison team provides a range of advice and services for students who experience disability as a result of health conditions or impairment.

**Health Service**
The Health Service provides confidential medical care, at no direct cost to students with Medicare or OSHC World care insurance.

**Melbourne Centre for the Study of Higher Education**
The Melbourne Centre for the Study of Higher Education offers programs to support quality, innovation, and careers in teaching, research, engagement, and leadership and management for graduate researchers and academic staff.
**Student IT**
The Student IT team supports you with setting up your login account, connecting to UniWireless, using the University’s learning tools and systems, printing and document scanning.

**ask.unimelb**
ask.unimelb is the University's comprehensive FAQ database for students and staff. Looking for info? Start here!

**Children’s Services**
Two Children’s Centres provide quality early childhood care and education for your child or children.

**Graduate Student Association**
The University of Melbourne Graduate Student Association (GSA) is the student representative body for graduates at the University of Melbourne.

**Melbourne Careers Centre**
Melbourne Careers Centre provides a range of career programs, services, and resources for students to assist with their career development.

**Melbourne University Sport**
Melbourne University Sport offers a range of resources including a great variety of sporting clubs, fitness facilities, and services.

**Student Housing**
Find out about your housing options and how to manage your tenancy (e.g. lease agreements, bonds, repairs, rent, eviction) through Student Housing.

**Student Union Advocacy Service**
The Student Union Advocacy Service (SUAS) provides independent advocacy services to undergraduate and graduate students.

**Chaplaincy**
Perhaps you are thinking about the meaning of life, wondering where your studies lead, or you are experiencing grief or loss. Chaplains are here to support you.

**Financial Aid**
If you find yourself in financial difficulty, not sure how to fill out a tax return, got a question on government subsidies, then visit Financial Aid.

**International Student Services**
International Student Services support all international students and their families during their time at the University.
Melbourne Global Mobility
Melbourne Global Mobility offers you a range of exciting overseas experiences as part of your degree.

Murrup Barak
The Murrup Barak Melbourne Institute for Indigenous Development provides Aboriginal and Torres Strait Islander students both undergraduate and graduate with a range of support services.

Student Union
The Student Union promotes student welfare and culture on campus.

UMeyecare Clinic
The University of Melbourne Eye Care (UMeyecare) clinic offers patient care primarily for University staff and students but is also open to the general public and for specialist referral by other practitioners.

For more information, please visit: https://services.unimelb.edu.au/finder
If you need ongoing assistance due to long-term circumstances, you can register with Student Equity and Disability Support.

We offer a range of support services:
- Alternative formats for written materials
- Support workers, such as note-takers
- Specialist equipment
- Assistive technology
- Accessible teaching spaces

Visit services.unimelb.edu.au/disability/students
How do I contact STOP 1?

STOP 1 is located at 757 Swanston St, near the corner of Grattan and Swanston Streets (see Map below)
EXCHANGE AND STUDY ABROAD

The Melbourne School of Engineering Exchange and Study Abroad programs facilitate immersion in a different social, cultural and intellectual milieu, with the chance to add an international perspective to study.

There are a number of ways this can be undertaken. First, either an exchange or study abroad program can be initiated. With an approved study plan, this can provide credit or fulfill academic requirements. There are also opportunities to complete a research project or industry project overseas in a full-time placement over the summer break. Please note that due to current travel restrictions in Australia, exchange and study abroad options may be restricted.

There is a wide variety of funding available to assist with overseas study plans.

Why study overseas?

There are many reasons why you may wish to consider study abroad or exchange. Your reasons can be based on academic, personal, career aspirations or those below:

- **Gain a global perspective on your studies:** Study at an international university and gain a different perspective on your studies.
- **Challenge yourself:** Gain independence and build your self-confidence.
- **Make some international connections:** Build links by meeting new people.
- **Improve your language skills:** Immerse yourself in another culture and either refine your foreign language skills or learn a new language.

Student exchange information sessions

A variety of information sessions for students are run regularly throughout the semester.

General information sessions are the first step to hear more about the varied opportunities available around the world. They are intended to provide a general overview of how to undertake part of your studies overseas and get you thinking about where you would like to go.

Further information:

Please contact the Global Mobility Coordinator for Engineering & IT: eng-exchange@unimelb.edu.au

For subject/course-specific information, you can contact Biomedical Engineering Exchange Coordinator: Dr Kathryn Stok kathryn.stok@unimelb.edu.au
VACATION WORK

The Department strongly recommends that you obtain vacation work with an engineering employer during your university studies. This work is of the greatest value at the end of your penultimate year and is highly valuable at any stage of your degree program.

Vacation work is advertised by major companies within Australia from March to July. These positions are highly competitive. Other companies may also offer vacation work informally and you will need to approach these companies yourself. If you are an overseas student, you may find it easier to gain an internship in your home country. Please contact the Academic Support Coordinator for advice on companies in your country who you could approach.

Please ensure that your cover letter and resume are checked by others before you use them. You will not get past the first selection round if these documents contain spelling mistakes or incorrect grammar.

In some cases, you may be able to use your vacation work as credit towards ENGR90033 (see page 23). However, to do so, the university must first sign an agreement with your intended employer. This means that you need to notify the Engineering Placements team (eng-placements@unimelb.edu.au) at least one month in advance of the intended work to determine whether this is possible.

Upon completion of vacation work or relevant work experience, please complete a ‘Vacation Work Record’, and ask your company supervisor to also comment and sign. This document can then be kept by both the Department and you as a permanent record of your experience.

Further advice on vacation work and careers can be obtained from:

https://careers.unimelb.edu.au/students/planning-my-career/engineering

https://www.youtube.com/watch?v=5tBO1NUL0EA
RESEARCH HIGHER DEGREES

The Department of Biomedical Engineering drives research and education in medical technologies, health informatics, and healthcare delivery. Combining the expertise of engineers, biomedical researchers, clinical practitioners, and industry partners, we create innovative medical solutions that have a societal and economic impact.

The Department offers Ph.D. and MPhil research programs in several themes, including:

- Biomaterials and tissue engineering
- Biomechanics and mechanobiology
- Bionics and neuroengineering
- Biomedical imaging
- Systems and synthetic biology

More information about research projects may be found on the Department Website: http://www.bme.unimelb.edu.au/research/.

Interested in Further Study by Research?

Who should apply?

Successful applicants for admission to research and scholarships with Engineering & IT will typically:

- Have secured strong support from their nominated supervisor
- Be placed in the top 5% of their graduating class
- Have evidence of research potential by having completed a major research project worth 25% or more of a full year, as part of their final year of their Bachelor or Master degree.

Before you apply, find a supervisor

As a research student, you will work under the guidance of an academic supervisor. Your supervisor will provide advice and direction throughout your research project. Your Ph.D. project is often part of a larger project run by your supervisor. It is your responsibility to identify a supervisor you would like to work with, prior to making an application. You must supply documented evidence that you have secured a supervisor, who has agreed to work with you on your research proposal.

Further details on the application process and Research Scholarships can be found at: http://www.eng.unimelb.edu.au/study/research/.
SKILLS TOWARDS EMPLOYMENT PROGRAM (STEP)

The Skills Towards Employment Program (STEP) aims to develop five key professional skills in all Master of Engineering graduates. The skills that are being targeted are written communication, verbal communication, teamwork and personal and project management.

Engineering Practice Hurdle – Specification

The Engineering Practice Hurdle is the submission of an ePortfolio demonstrating your capabilities in these Professional Skills for internal assessment within the School of Engineering. The primary goal of these applications is to demonstrate that you have achieved good levels of competency in skills required by practicing engineers with a focus on those that are not technical by nature such as communications and teamwork.

You will need to complete the Engineering Practice Hurdle before you can graduate with a Master of Engineering.

Your primary resource for information about the Engineering Practice Hurdle is the dedicated community on the LMS.

Specific to the engineering practice hurdle, this community contains:

- Engineering practice hurdle requirements
- Assessment criteria for the engineering practice hurdle
- A discussion board for seeking assistance
- The link for submitting your applications.

To enrol in the STEP community please follow these instructions:

1. Go to the LMS page
2. Click on the "Communities" tab
3. Search for "employment"
4. Click on the arrow icon next to the community code "com_00631".(Hold the mouse over community code to reveal the icon)
5. Click on "enrol"
6. Click "submit"
7. Click "ok".

For more Information contact: eph-info@unimelb.edu.au.
ENGR90033 INTERNSHIP

ENGR90033 Internship is a 25-point subject that gives students the opportunity to undertake an internship of 10-15 weeks (a minimum 350 hours) for academic credit toward their degree.

ENGR90033 can be taken as a 25-point subject within your Master program, requiring two Approved Electives. Due to the workload required, students are advised not take a standard 50-point load during semester while simultaneously taking this subject. In Semesters 1 and 2, ENGR90033 Internship can be taken along with one additional 12.5-point subject.Summer enrolment is restricted to 25 points so students cannot take another subject alongside ENGR90033 Internship. Students taking ENGR90033 Internship in the summer semester should be aware that they will need to start their internship in December.

Am I eligible?

Students require an average grade of H2B (70%) or above and there are minimum coursework completion requirements to be eligible for a University-sourced internship.

Further information is available in the Handbook: ENGR90033 Internship.

How do I apply?

Eligible students will be invited to register their interest in ENGR90033 Internship. This registration will give students access to our dedicated ENGR90033 Internship portal where internships will be advertised. Students will be able to apply for these internships and successful students will be invited to interview. This is a competitive process and internships will be limited. If you believe that you are eligible, but have not been invited to register your interest, email eng-internships@unimelb.edu.au.

Students may also self-source internships (subject to approval by the Subject Coordinator). Students taking self-sourced internships must still meet the eligibility criteria for the subject. The deadline for advising Eng-internships that you have potentially sourced your own internship is one month before the teaching period commencement date quoted in the Handbook.

Note: Students will not be able to enroll into ENGR90033 Internship through the Student Portal until their internship has been approved and signed off.
SPECIAL CONSIDERATION

What do I need to know about Special Consideration?

Special Consideration is available to students who have had their studies significantly impacted by short-term circumstances reasonably beyond their control such as acute illness.

Accepted Reasons for Applying for Special Consideration

To be eligible for Special Consideration students must have complied with the assessment requirements as set out in the subject outline and met one of the criteria below:

- A student has been prevented from preparing or presenting for all or part of a component of assessment such as assignments and examinations.
- A student has been, to a significant degree, adversely affected during the performance of a component of assessment.

Time Limits

Time limits for Special Consideration applications are enforced.

- Students must submit an application for Special Consideration via the student portal my.unimelb.edu.au no later than 5.00 pm on the third (3rd) working day after the submission/sitting date for the relevant assessment component.
- A completed Health Professional Report and/or other supporting documentation must be submitted within five (5) working days of submission of the online application.

Applying for Special consideration

Administrative functions, such as applying for Special Consideration, can be found in the Student Admin tab of the student portal (my.unimelb.edu.au). Click the “Go to exams & results” button under the Exams & Results in portal on the Student Admin tab and select the “Apply for Special Consideration” link.

If you are navigating to Special Consideration from an “eStudent” screen, please select the “Study Plans” tab from the top menu and access “Special Consideration” from the left sidebar menu.

You must then submit your Health Professional Report (HPR) form or Statutory Declaration and any other supporting documentation within five (5) working days of your online application. The scanned copy of the completed HPR form must be submitted online via my.unimelb.edu.au. If this is not possible please submit the hardcopy HPR to the office listed on the front of your HPR form.

For more information please visit: http://ask.unimelb.edu.au/. Alternatively, speak to a staff member at Stop1 (http://students.unimelb.edu.au/stop1)

P: 13 MELB (13 6352)
E: Submit an enquiry (https://ask.unimelb.edu.au/app/ask)
ACADEMIC INTEGRITY

Introduction

All University of Melbourne students are expected to uphold academic integrity in all aspects of every piece of work that they submit for assessment. This section has some guidelines and links to resources to help you learn about and demonstrate academic integrity.

While there is a lot of detail below, the fundamental issue you have to confront is whether you value the University's position on academic integrity and whether you are willing to uphold those values in every piece of work you do. If you align your values to “learning with integrity”, implementation of the following is easy and becomes second nature. If you don’t value academic integrity, you can still implement the mechanics of the requirements below, but at some stage, you may “forget”, or take some shortcuts in your assessment, which will probably turn out badly for you either while as a student, or as a professional after graduation.

Resources

Please see the University of Melbourne Academic Integrity website for further information: http://academicintegrity.unimelb.edu.au/

Be sure to make clear which ideas are yours and which ideas are from other sources. When you submit work, your assessor needs to be able to discriminate between what is your original work, what is your interpretation of the work of others, and what is completely other authors' work.

Presenting only what is other peoples’ work, even if correctly attributed, is unlikely to achieve a good mark.

- Use a recognized referencing system to acknowledge other sources in written text such as essays and paragraphs are written in response to questions. Please refer to http://library.unimelb.edu.au/recite
- Use the referencing system as above for images and drawings in assessment submissions.
- Most images and drawings in publications are subject to copyright and you may need to get the permission of the copyright holder to use it. Please refer to http://copyright.unimelb.edu.au/information/copyright-and-research/students-introduction-to-copyright
- Even if images are “public” (eg available on the internet), you should provide the URL from which they are sourced.
- For computer programs, any sections of code copied from other sources must be clearly delineated and referenced in comments. Your final code should include:
  (a) A detailed comment at the start of the program or in a header file, stating which part of it (if any) is copied, who originally wrote the copied part and how it was accessed (e.g. by providing a URL)
  (b) Clear comments in the body of the program, marking the start and end of all sections of copied material and giving the name of the original author in the comments
  (c) If the code has been obtained from elsewhere, then modified by the student, the modifications must be explained in a prominent component of the submission. For example, a comment might have the wording “The original code obtained from John Smith was modified to print more detailed error messages”. Each adaptation of the original code must be documented, both in a prominent location and in each part of the code that was modified.
(d) The code should never be solicited or commissioned from any source, including classmates, past students, and pay-for-service tutors and online sources.

- For spreadsheets, use text boxes or comments to clearly differentiate between your work and that of others.

**Our expectations**

The University of Melbourne expects that all students, but especially masters students, will study all the above resources and ensure that they adopt these best-practice approaches.

For individual assignments, the University of Melbourne expects you to learn first, then communicate what you have learned as you work on your assignment. This means you may discuss the topics in question with other students while you are learning, but you must write all your assignment yourself. This includes:

- Choosing which resources you decide to reference
- Creating the overall structure of your communication and argument
- Preparing your own figures, calculations, and analysis.

For team assignments, the University of Melbourne expects you to:

- Discuss and decide as a team how you are going to complete the assignment, and document this agreement via meeting minutes that include the names of people who attended each meeting, what periods they were present for, and what the agreed assignment of duties was
- Learn first (perhaps an aspect allocated by your group)
- Teach others in your team what you have learned
- Collaboratively decide how to communicate your learning and who will write what, and again document that via meeting minutes that are circulated to all group members shortly after the end of the meeting
- Check the work of your teammates before submission, using plagiarism checkers if possible
- Inform your subject coordinator on submission if you have concerns about a team member’s contribution
- Acknowledge that the assignment upholds the principles of academic integrity by way of an assignment coversheet or as part of the electronic submission process (e.g. LMS or TurnItIn declaration), and use a plagiarism checking service before final submission (where provide).

Note that not (or minimally) contributing to a team assignment, but still putting your name on the submission and claiming credit for it is another form of academic misconduct. Group members concerned about the imbalance of contributions to the group project should raise the issue with the subject coordinator as soon as the behavior in question is noted, and again (preferably via formal work-share statements) again when the project is submitted.

**Common ways that students fail to show academic integrity**

- Copying and pasting material from the internet without using quotation marks and/or without providing a reference/URL and proper acknowledgment. This usually results from poor research practice. Please refer to [http://services.unimelb.edu.au/academicskills](http://services.unimelb.edu.au/academicskills), and [http://services.unimelb.edu.au/academicskills/all_resources#research-referencing](http://services.unimelb.edu.au/academicskills/all_resources#research-referencing)
- Incorrectly paraphrasing by simply swapping some words for synonyms, but leaving the structure of a sentence the same
- Failing to acknowledge the source of figures and/or images
- Copying the text, analysis, calculations and/or program code of another student
- Copying from the lecture and or assignment notes of your subject, or from the textbook or other similar resources used in the subject. These are the intellectual property of your lecturer or other authors and should be acknowledged just like any other piece of writing. You must paraphrase these to demonstrate you understand the ideas you are learning or using quotation marks where you have copied material exactly. If you are copying assignment instructions make sure to distinguish these, for example by using a different font style.
- Explicitly giving your work to another student, or in any way allowing your work to be “borrowed” by another student, even if by carelessness (e.g. by allowing them to have access to a memory stick on which you have a copy of your program, even though you didn’t tell them the program was on it).

Regarding the last of these points, note that allowing other students to see your assessment work, “just so that I can take a look and get some ideas, I won’t copy, honest”, is also inappropriate. If another student asks to see your work then they have already violated the friendship that you have with them, and your best answer is a firm “no”. Any other response is a breach of academic integrity on your part as well as their part and is likely to irrevocably damage your friendship with that person.

You can avoid these mistakes through careful note-taking practices and be sure to acknowledge all ideas that are not your own. To learn more about referencing and academic integrity, complete the Referencing and Using Sources Module in the Academic Skills Hub in the LMS. Click on the link: http://bit.ly/ReferencingMSE, then click “Ok” to self-enroll.

Penalties for not following the principles of academic integrity

The processes for investigating plagiarism and possible penalties are outlined here: http://academicintegrity.unimelb.edu.au/plagiarism-investigation-and-penalties

The Academic Board has also published guidelines for common forms of breaches of academic integrity via http://www.unimelb.edu.au/governance/structure/committees/academic-board/appeals/academic-and-general-misconduct-appeals.

Scroll down to the lower half of this page to the section “PENALTIES FOR ACADEMIC MISCONDUCT - INFORMATION FOR STUDENTS”.

The following is an example of the types of penalties from the above document:

*Cheating – copying from or providing to another student or students an answer or answers to any assessment task or essay:*

- *First-year undergraduate student - failure of subject - Mark 0, Grade N*
- **Any other student, second or subsequent offence - suspension or termination of enrolment - Mark 0, Grade N**
- **Second or subsequent offence - termination of enrolment - Mark 0, Grade N.**
This means, if you are a master student, even if it is your first semester of study, if you cheat and get caught you will probably fail the subject. This may cost you:

- An extra semester of study, and/or
- An extra semester of living costs while you remain a student, and/or
- The need to get a visa extension (if applicable), and/or
- Additional tuition fees to re-enroll in the subject.
EXAMINATIONS

Examination Rules

There are several important rules to follow during a University examination. For more information, you should always refer to the Assessments and Results Policy (MPF1326) (item 5.23 onwards).

Note that you must bring an acceptable form of photo ID to all your examinations.

Other general information in relation to exams is provided below:

- Exam Start and Arrival Times (Item 5.27)
- What you can bring into an Exam (Item 5.60-70)
- Storing your personal possessions at an Exam
- Attendance at Exams (most crucially, your availability during the Exam Period).

Calculator Policy

If you are permitted to use a calculator in an examination, there are restrictions on the models allowed. Within the Melbourne School of Engineering, the approved calculator for all subjects is the Casio FX82 (any suffix). For a small number of subjects (mostly those requiring complex number calculations) the Casio FX100 (any suffix) will also be permitted, as indicated by the Subject Coordinator.

You are required to purchase your own calculator and are responsible for ensuring your calculator is in good working order with fresh batteries.
# BIOMEDICAL ENGINEERING COURSE INFORMATION

Biomedical Engineering has an enormous positive impact on human health. Biomedical Engineers address healthcare problems from a unique perspective, blending an understanding of biomedical science with specialist knowledge of engineering techniques and problem-solving skills.

## Courses in Biomedical Engineering

- Master of Engineering (Biomedical)
- Master of Engineering (Biomedical with Business)

You will focus on human systems, the design and operation of devices and processes, and the application of engineering skills to new medical treatments, instruments, and machines. Our reputation for biomedical innovation in areas such as medical bionics, prostheses, and tissue engineering, ensures you are learning from leaders in the field, who are working on exciting projects aimed at solving major health dilemmas. These professional-entry-level courses will lead to a formal qualification in biomedical engineering.

## Career Outcomes

The Department of Biomedical Study Guide Semester 1, 2021
The acquisition of the master degree will enable you to become biomedical engineers to:

- Develop new drug therapies
- Study the electrical and/or mechanical activity of organs such as the brain, heart, muscle, and bone
- Build artificial organs, limbs, heart valves, and bionic implants to replace lost function
- Develop orthopedic devices to treat end-stage bone and joint conditions
- Grow living tissues to replace failing organs.

Employment opportunities exist in a range of areas including biotechnology, biomedical, pharmaceutical, medical device and equipment industries, research and innovation, health services and hospitals, government and consulting, and companies such as Cochlear, Sanofi, Cell Therapies, Compumedics, GlaxoSmithKline and Zimmer Biomet.

**Course Entry**

Master of Engineering (Biomedical) and Master of Engineering (Biomedical with Business) are accredited by EUR-ACE and Engineers Australia. To gain entry into the 2-year Master of Engineering pathway from the BSc or B-BMED programs, students must have completed the Bioengineering Systems Major, which requires successful completion of 4 biomedical engineering subjects: Introduction to Biomechanics (BMEN30005), Circuits and Systems BMEN30006), Biotransport Processes (BMEN30007), and Biosystems Design (BMEN30008).

Students seeking to gain entry into the 3-year Master of Engineering (Biomedical) programs must have successfully completed a three-year or more undergraduate degree at a tertiary institution. Students must have completed mathematics subjects equivalent to Calculus 2 and Linear Algebra, as well as two Science subjects including either two biology subjects, two chemistry subjects, or two physics subjects. Students must also have completed their undergraduate program with an average grade equivalent to a Melbourne score of 65%.

*Full course information about all our undergraduate study options can be found on the following link:* [http://www.bme.unimelb.edu.au/study/undergraduate/](http://www.bme.unimelb.edu.au/study/undergraduate/).

**Course Structure**

The Master of Engineering (Biomedical) and Master of Engineering (Biomedical with Business) consist of 300 points of study: a 200-point core including the Biomedical Engineering Capstone Project plus 100-point elective subjects (at least 50 points must be taken from Biomedical Engineering electives).

Advanced standing will be awarded for equivalent subjects taken in a prior study to applicants on the following basis: [https://policy.unimelb.edu.au/MPF1293](https://policy.unimelb.edu.au/MPF1293).
A recent review of the Bioengineering Systems major and the Master of Engineering (Biomedical) and Master of Engineering (Biomedical with Business) highlighted the need to update our course to better reflect current student needs.

Changes to these courses have been designed following a thorough process of consulting with Biomedical Engineering students, alumni, academic staff and industry thought leaders. This includes changes to some core and elective subjects, so if you are a currently enrolled student, you may need to change your study plan. The duration of your degree will not be altered by these changes and we will provide advice to help you choose the right subjects.

We will be scheduling an information session in December where you will have the opportunity to ask questions about the degrees. You may also refer to the 2021 BME Study Guide (posted on the Canvas BME LMS Community page), which has the most up-to-date information on the course, including sample course plans. If you have specific enquiries about your course planning, you may contact the BME course coordinator.

For students planning to complete the Bachelor of Science or Bachelor of Biomedicine majoring in Bioengineering Systems:

- Commencing students are strongly encouraged to take ENGR10004 Engineering Technology and Society, as well as ENGR10006 Engineering Modelling and Design, preferably in that order.
- BMEN30007 Biotransport Processes is no longer offered; students should take BMEN30009 Introduction to Biomaterials instead.
- CHEM10003 Chemistry 1 is required to take BMEN30009 Introduction to Biomaterials. An exception may be made for students completing the Bioengineering Systems major who are in the third year of their undergraduate studies in 2021; please contact the BME Course Coordinator if this applies to you.
- Students who have completed BMEN20001 Biomechanical Physics and Computation and are yet to take BMEN30005 Introduction to Biomechanics should take BMEN30005.
- Students who have failed BMEN20001 Biomechanical Physics and Computation should instead take BMEN20003 Applied Computation in Bioengineering AND BMEN30010 Mechanics for Bioengineering.
- Students who have failed BMEN30005 Introduction to Biomechanics should repeat BMEN30005 Introduction to Biomechanics.
- Students should take BMEN20002 Anatomy and Physiology for Bioengineering, unless taking an alternative anatomy and/or physiology subject(s).
- Students who complete the Bioengineering Systems major and are eligible for entry will receive 100 points of credit (advanced standing) in the Master of Engineering (Biomedical) or (Biomedical with Business).

For students in the Master of Engineering (Biomedical) and (Biomedical with Business):

- The following subjects are no longer required in the degree:
  - BMEN20001 Biomechanical Physics and Computation
  - BMEN30005 Introduction to Biomechanics
  - BMEN30007 Biotransport Processes
  - BMEN90026 Clinical Trials and Regulations
  - BMEN90023 Biomaterials
  - BMEN90028 Anatomy and Physiology for Engineers
  - BMEN90019 Biomedical Engineering Management
  - BMEN90017 Biomedical Engineering Design Project.
However, if you have taken any of these subjects, they will still count towards your degree.

- Students who have previously taken an anatomy or physiology subject will receive credit for BMEN20002 Anatomy and Physiology for Bioengineering.
- Students who have taken BMEN20001 Biomechanical Physics and Computation are exempt from BMEN30010 Mechanics for Bioengineering.
- BMEN30009 Introduction to Biomaterials replaces BMEN90023 Biomaterials (which has been discontinued).
- Students who have taken BMEN90026 Clinical Trials and Regulations but not BMEN90019 Biomedical Engineering Management (which has been discontinued), are exempted from BMEN90037 Bioengineering Data Analytics and, instead of BMEN90039 Biomedical Eng Management & Regulations, must take an alternative management subject such as ENGM90011 Economic Analysis for Engineers, with permission from the course coordinator.
- Students who have taken both BMEN90026 Clinical Trials and Regulations and BMEN90019 Biomedical Engineering Management are exempted from BMEN90039 Biomedical Eng Management & Regulations.
- Students who have taken BMEN90019 Biomedical Engineering Management but not BMEN90026 Clinical Trials and Regulations (which has been discontinued) must take BMEN90039 Biomedical Eng Management & Regulations.
- Students who have taken ENGR30002 Fluid Mechanics will receive an exemption for BMEN90036 Biofluid Mechanics.
- Students who have previously completed BMEN30005 Introduction to Biomechanics will receive an exemption for BMEN90038 Biomechanics.
The following course plans are examples only and are provided as a suggestion only. Individual course plans will vary according to each student’s background and previous degree(s).

### Master of Engineering (Biomedical) – new Semester 1 entry in 2021

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Sem 1</th>
<th>Foundation Selective</th>
<th>BMEN20003 Applied Computation in Bioengineering</th>
<th>BMEN30010 Mechanics for Bioengineering</th>
<th>BMEN30006 Circuits and Systems</th>
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<td>Sem 2</td>
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<td>Sem 1</td>
<td>BMEN90038 Biomechanics</td>
<td>BMEN90037 Bioengineering Data Analytics</td>
<td>BMEN90033 Bioinstrumentation</td>
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<td>BMEN90036 Biofluid Mechanics</td>
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<td>Sem 1</td>
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<td>Sem 2</td>
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<td>Bioengineering Elective</td>
<td>Bioengineering Elective</td>
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An Approved Elective is any Masters-level subject or 3rd year undergraduate subject. Permission must be obtained by the subject coordinator before enrolling in Approved Elective subjects. Students must meet requisite subjects to enroll in an Approved Elective. For enrolment in subjects outside of the Engineering faculty, permission must be obtained from Course Coordinator Dr Kathryn Stok via kathryn.stok@unimelb.edu.au.

Students may replace BMEN90018 and two Bioengineering Electives with BMEN90030 Biodesign Innovation, a 50-point year-long subject. An application and approval process is required for enrolment in BioDesign Innovation.

Students who do not have a study score of 25 or above in VCE Biology units 3 and 4, or equivalent, should take BIOL10008 Introductory Biology: Life’s Machinery

### Foundation Selective:

1. BIOL10002 Biomolecules and Cells for Bachelor of Biomedicine students
2. BIOL10009 Biology: Life’s Machinery or BIOL10008 Introductory Biology: Life’s Machinery for Bachelor of Science students (students without High-School-level Biology should take BIOL10008)
3. CHEM10003 Chemistry 1
4. MAST20029 Engineering Mathematics
Master of Engineering (Biomedical) - Semester 2 entry in 2021 (new structure from 2021)

<table>
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<tr>
<th>Year</th>
<th>Sem</th>
<th>Foundation Selective</th>
<th>Foundation Selective</th>
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<td>Anatomy and Physiology for Bioengineering</td>
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<td>Circuits and Systems</td>
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<tr>
<td>Year</td>
<td>Sem</td>
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<td>Bioengineering Elective</td>
<td>BMEN90035</td>
<td>BMEN90036</td>
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<tr>
<td>2</td>
<td>2</td>
<td>Biosystems Design</td>
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<td>Biofluid Mechanics</td>
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<td></td>
<td>1</td>
<td>BMEN90038</td>
<td>BMEN90033</td>
<td>BMEN90037</td>
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<tr>
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<td>Biomechanics</td>
<td>Bioinstrumentation</td>
<td>Bioengineering Data Analytics</td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>Sem</td>
<td>BMEN90018</td>
<td>Bioengineering Elective</td>
<td>Bioengineering Elective</td>
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<tr>
<td>3</td>
<td>2</td>
<td>Biomedical Engineering Capstone Project*</td>
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<td>Bioengineering Elective</td>
<td>Bioengineering Elective</td>
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<td></td>
</tr>
</tbody>
</table>

An Approved Elective is any Masters-level subject or 3rd-year undergraduate subject. Permission must be obtained by the subject coordinator before enrolling in Approved Elective subjects. Students must meet requisite subjects to enroll in an Approved Elective. For enrolment in subjects outside of the Engineering faculty, permission must be obtained from Course Coordinator Dr Kathryn Stok via kathryn.stok@unimelb.edu.au.

Students may replace BMEN90018 and two Bioengineering Electives with BMEN90030 BioDesign Innovation, a 50-point year-long subject. An application and approval process is required for enrolment in BioDesign Innovation.

Students who do not have a study score of 25 or above in VCE Biology units 3 and 4, or equivalent, should take BIOL10008 Introductory Biology: Life’s Machinery

Foundation Selective:

1. BIOL10002 Biomolecules and Cells for Bachelor of Biomedicine students
2. BIOL10009 Biology: Life’s Machinery or BIOL10008 Introductory Biology: Life’s Machinery for Bachelor of Science students (students without High-School-level Biology should take BIOL10008)
3. CHEM10003 Chemistry 1
4. MAST20029 Engineering Mathematics
The following 12.5-point Bioengineering Electives are offered in the Master of Engineering (Biomedical):

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Semester 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMEN90027 Systems and Synthetic Biology (Available in alternate years from 2021; available in 2021)</td>
<td>BMEN90011 Tissue Engineering and Stem Cells</td>
</tr>
<tr>
<td>BMEN90021 Medical Imaging</td>
<td>BMEN9002 Neural Information Processing</td>
</tr>
<tr>
<td>COMP90016 Computational Genomics</td>
<td>BMEN90022 Computational Biomechanics</td>
</tr>
<tr>
<td>BMEN90029 Soft Tissue &amp; Cellular Biomechanics (Available in alternate years from 2022; not available in 2021)</td>
<td>COMP90014 Algorithms for Bioinformatics</td>
</tr>
</tbody>
</table>

The following Approved Electives are suggested for the Master of Engineering (Biomedical):

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Name</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEN90038</td>
<td>Product Design and Analysis</td>
<td>1</td>
</tr>
<tr>
<td>CHEN90039</td>
<td>Pharmaceutical &amp; Biochemical Production</td>
<td>1</td>
</tr>
<tr>
<td>COMP90007</td>
<td>Internet Technologies</td>
<td>1,2</td>
</tr>
<tr>
<td>COMP90038</td>
<td>Algorithms and Complexity</td>
<td>1,2</td>
</tr>
<tr>
<td>COMP90041</td>
<td>Programming and Software Development</td>
<td>1,2</td>
</tr>
<tr>
<td>ENGR90024</td>
<td>Computational Fluid Dynamics</td>
<td>1</td>
</tr>
<tr>
<td>ENGR90033</td>
<td>Internship</td>
<td>1, 2, S</td>
</tr>
<tr>
<td>ELEN90054</td>
<td>Probability and Random Models</td>
<td>1,2</td>
</tr>
<tr>
<td>ELEN90055</td>
<td>Control Systems</td>
<td>1,2</td>
</tr>
<tr>
<td>MAST90007</td>
<td>Statistics for Research Workers</td>
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<tr>
<td>MCEN90015</td>
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<td>MCEN90048</td>
<td>Artificial Intelligence for Engineers</td>
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<tr>
<td>MKTG90022</td>
<td>Commercialisation of Science</td>
<td>2</td>
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<tr>
<td>SCIE90011</td>
<td>From Lab to Life</td>
<td>1</td>
</tr>
<tr>
<td>SKIL90004</td>
<td>Project Management in Science</td>
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</tr>
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</table>

### Master of Engineering (Biomedical with Business) – new Semester 1 entry in 2021

#### Year 1

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sem 1</td>
<td>BMEN20003</td>
<td>Applied Computation in Bioengineering</td>
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<tr>
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</tr>
<tr>
<td></td>
<td>BMEN30006</td>
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#### Semester Selectives:
- Noted as below

#### Year 2

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<th>Semester</th>
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<tbody>
<tr>
<td>Sem 1</td>
<td>BMEN90038</td>
<td>Biomechanics</td>
</tr>
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<td>Bioengineering Data Analytics</td>
</tr>
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<td>BMEN90033</td>
<td>Bioinstrumentation</td>
</tr>
<tr>
<td></td>
<td>BMEN90039</td>
<td>Biomedical Eng Management &amp; Regulations</td>
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</table>

#### Semester Selectives:
- Noted as below

<table>
<thead>
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<th>Semester</th>
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</thead>
<tbody>
<tr>
<td>Sem 2</td>
<td>BMEN90036</td>
<td>Biofluid Mechanics</td>
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<td></td>
<td>BMEN90035</td>
<td>Biosignal Processing</td>
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<tr>
<td></td>
<td>ENGM90006</td>
<td>Engineering Contracts and Procurement</td>
</tr>
<tr>
<td></td>
<td>ENGM90014</td>
<td>The World of Engineering Management</td>
</tr>
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</table>

#### Year 3

<table>
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<th>Semester</th>
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</thead>
<tbody>
<tr>
<td>Sem 1</td>
<td>BMEN90018</td>
<td>Biomedical Engineering Capstone Project</td>
</tr>
<tr>
<td></td>
<td>ENGM90013</td>
<td>Strategy Execution for Engineers</td>
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<tr>
<td></td>
<td>ENGM90011</td>
<td>Economic Analysis for Engineers</td>
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<td>Bioengineering Elective</td>
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<table>
<thead>
<tr>
<th>Semester</th>
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<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sem 2</td>
<td>Bioengineering Elective</td>
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<tr>
<td></td>
<td>Bioengineering Elective</td>
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</tr>
<tr>
<td></td>
<td>ENGM90012</td>
<td>Marketing Management for Engineers</td>
</tr>
</tbody>
</table>

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Students seeking to enrol in BMEN90030 BioDesign Innovation, a 50-point year-long subject, should talk to their course coordinator about the possibility of accommodating this subject. An application and approval process is required for enrolment in BioDesign Innovation.

Students who do not have a study score of 25 or above in VCE Biology units 3 and 4, or equivalent, should take BIOL10008 Introductory Biology: Life’s Machinery.

**Foundation Selectives:**

1. BIOL10002 Biomolecules and Cells for Bachelor of Biomedicine students
2. BIOL10009 Biology: Life’s Machinery or BIOL10008 Introductory Biology: Life’s Machinery for Bachelor of Science students (students without High-School-level Biology should take BIOL10008)
3. CHEM10003 Chemistry 1
4. MAST20029 Engineering Mathematics
Master of Engineering (Biomedical with Business) - Semester 2 entry in 2021
(new structure from 2021)

<table>
<thead>
<tr>
<th>Year</th>
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<th>Foundation Selective</th>
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<td>Noted as below</td>
<td>Introduction to Biomaterials</td>
<td>Anatomy and Physiology for Bioengineering</td>
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<table>
<thead>
<tr>
<th>Year</th>
<th>Sem</th>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>ENGM90011</td>
<td>Economic Analysis for Engineers</td>
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<tr>
<td></td>
<td></td>
<td>BMEN20003</td>
<td>Applied Computation in Bioengineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BMEN30010</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>BMEN30006</td>
<td>Circuits and Systems</td>
</tr>
<tr>
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<td>1</td>
<td>BMEN90008</td>
<td>Biosystems Design</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ENGM90013</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>ENGM90014</td>
<td>The World of Engineering Management (S1/S2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ENGM90006</td>
<td>Engineering Contracts and Procurement (S2)</td>
</tr>
<tr>
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<td>ENGM90012</td>
<td>Marketing Management for Engineers (S2)</td>
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<tr>
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<td>Bioengineering Elective</td>
<td>Bioengineering Elective</td>
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</tr>
<tr>
<td>(Available in alternate years from 2022; not available in 2021)</td>
<td></td>
</tr>
</tbody>
</table>


**LECTURE THEATRE LOCATIONS**

A map of the buildings at the University of Melbourne Parkville campus may be found here: [https://maps.unimelb.edu.au/parkville/building](https://maps.unimelb.edu.au/parkville/building).

Lecture venues according to Building may be found here: [http://learningspaces.unimelb.edu.au/room-search](http://learningspaces.unimelb.edu.au/room-search).
ADVANCED STANDING

After you receive a course offer you can apply to transfer any recognized prior learning credits by applying for Advanced Standing.

What is Advanced Standing

Advanced standing (sometimes known as credit or recognition of prior learning) is an acknowledgement of prior study granted towards your current degree, based on prior study or work experience. If advanced standing is awarded the length of your degree may be reduced.

Types of Advanced Standing

There are two types of advanced standing you can be awarded – General Advanced Standing or Exempt Advanced Standing.

General Advanced Standing

General Advanced Standing, grants credit in relation to an unspecified discipline area, subject or group of subjects. You'll need to complete fewer subjects to satisfy the requirements of the course, and it doesn't prevent you from selecting subjects of your choice.

If you qualify, you'll be granted study credits towards your course, reducing the number of subjects you'll need to study to satisfy course requirements. It will also appear on your transcript as “Advanced Standing”.

Exempt Advanced Standing

Exempt Advanced Standing grants credit in relation to successfully completing a subject, subjects, or studies, equivalent to the subject being waived. It can be awarded:

- With credit: granting an exempt credit for successfully completing a subject or group of subjects equivalent to a subject in your course. “Exempt” will appear on your transcript and will reduce the number of course subjects you need to complete.
- Without credit: granting an exemption for subjects you've completed already, such as a core subject. It doesn't reduce the number of subjects in your course load but grants you the opportunity to choose another subject in its place.

Credit may be granted if any of the previous studies are comparable in content, equivalent in standard and suitable to be included as part of the course. Faculties specify the maximum credit allowable and publish guidelines.

Calculate your credit

To help you plan your studies, you can use our credit tool to calculate how many credits you may be eligible to receive when you apply for Advanced Standing.
How to apply for Advanced Standing

If you have received an undergraduate course offer, you can start the application process following the steps outlined below (please note: University does not assess advanced standing applications until an offer has been made).

If you are applying for a graduate course, your advanced standing application will be assessed at the same time as your course application.

1. **Create a student account**

   Once you have received a course offer, you can go to Get Started at Melbourne and create your student account.

   Ensure you have all your documentation ready when you apply. You will need to provide an official and complete syllabus or subject descriptions from your previous place of study, and a copy of your academic transcript.

2. **Prepare your application**

   Take some time to read through the Course Handbook and the Course Planning Resource page for your Bachelor degree and intended major to see how credit could potentially fit in to your study plan.

   Please note that there are limits to how much advanced standing you can be awarded and policies around how credit is granted. Refer to the Advanced Standing Policy for further details.

   You can find out what advanced standing you may be eligible to receive using our Credit Database.

3. **Apply online**

   Apply online here. You'll need your University of Melbourne student username and password.

   If you are applying for exempt advanced standing (credit for a subject that is deemed substantially equivalent to the one you have completed) you will need to note that subject name and number in your advanced standing application.

   If you cannot find a subject match, you may still be able to apply for general advanced standing provided it fits within the course rules. General advanced standing is credit granted in relation to an unspecified discipline area, subject, or group of subjects.

   In your application you will need to provide an official and complete syllabus or subject descriptions from your previous place of study, and a copy of your academic transcript. Give as much detail as possible so you can be assessed for the maximum amount of credit.

4. **Submit your application before the closing date and wait for a response**

   Timely applications for Semester 1 2020 close at 11:59 pm (AEDT), Monday 10 February 2020. If you submit your application by the timely closing date, you should receive
notification of an outcome by the start of the semester. Ensure you check your new University of Melbourne student email account for any correspondence from our Admissions team.

If you receive advanced standing in your offer letter but it doesn't appear on your study plan, submit an enquiry. Select ‘credit for prior study’ and attach your offer letter. We will then update your study plan.

**Late applications**

Late applications may be accepted up until the end of the first week of the semester and we aim to provide an outcome by the end of the second week of the semester.

Applications received after this will be actioned, but any credit received cannot be applied in the current semester.

5. **Receiving the outcome**

An email will be sent to your new University of Melbourne email account with the outcome of your advanced standing application. If you need help planning your course with the credit you can book an appointment with a Course Planning Advisor or submit an online inquiry.

6. **Rescinding credit**

If you need to rescind or decline part or all of the credit you have received, you can submit an inquiry, and select “Enrolment/Course Advice” then “Credit (for prior study)”. Enter the subject name/s and number/s that you wish to rescind.

**Credit policies**

Credit decisions are subject to the University’s Advanced Standing and Accelerated Entry Policy.

The University is also a signatory to the Go8 Credit Transfer Agreement to help facilitate the transfer of credit earned by students if they move from one Group of Eight university to another.

For further assistance with your application please contact Stop 1
The Melbourne University Biomedical Engineering Society (MUBES) is the faculty-based student-run body for biomedical engineering students at the University of Melbourne. MUBES are affiliated with the University of Melbourne Student Union (UMSU) and serve as a professional and social body for anyone studying or interested in biomedical engineering.

MUBES runs events throughout the year to update students with upcoming learning and job opportunities. MUBES offer academic services with frequent software workshops (MATLAB and Solidworks). They host an Industry Night once per year, which attracts prospective employers and provides invaluable networking opportunities. MUBES also organizes frequent social events including barbeques (free food and drinks) and Trivia Night events.

Follow MUBES using the Facebook group (https://www.facebook.com/groups/mubes.unimelb) and Facebook page (https://www.facebook.com/officialmubespage) where all events are advertised. You may find MUBES during Orientation Week or at any of our events to sign up!

If you have any questions please feel free to get in touch with any of the committee members via email, on the Facebook page, or at mubes.melbuni@gmail.com. Committee Members, 2021

<table>
<thead>
<tr>
<th>Role</th>
<th>Incumbent</th>
</tr>
</thead>
<tbody>
<tr>
<td>President</td>
<td>Monisha Gunawardana</td>
</tr>
<tr>
<td>Vice President</td>
<td>Alina Tan</td>
</tr>
<tr>
<td>Treasurer</td>
<td>Warne Lewis</td>
</tr>
<tr>
<td>Secretary</td>
<td>Cindy Millenia Hidajat</td>
</tr>
<tr>
<td>Education Officer</td>
<td>Shelby Holland</td>
</tr>
<tr>
<td>Publicity Officer</td>
<td>Darren Tan</td>
</tr>
<tr>
<td>Outreach Officer</td>
<td>Asindu Dombepola</td>
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<tr>
<td>Social Coordinator</td>
<td>Alex Qian Wu</td>
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<tr>
<td>International Representative</td>
<td>Shavin Fernando</td>
</tr>
<tr>
<td>President</td>
<td>Monisha Gunawardana</td>
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</tbody>
</table>
HEALTH AND WELLBEING SERVICES ON CAMPUS

Juggling study, work and a social life can be challenging. Your physical and mental wellbeing is important during this time to stay happy and motivated. Make sure you are aware of the support services on offer at the University:

- Service Finder
- Counselling and Psychological Services
- Safer Community Program
- MU Sport
- Health Service

WHERE TO GO FOR HELP

Try the following:

Ask Unimelb: http://ask.unimelb.edu.au/
Stop 1: http://students.unimelb.edu.au/stop1

For matters relating to the Master of Engineering (Biomedical), Master of Engineering (Biomedical with Business) or the Bioengineering Systems major in the Bachelor of Science and Bachelor of Biomedicine, please contact Course Coordinator Dr Kathryn Stok of the Department of Biomedical Engineering, via kathryn.stok@unimelb.edu.au.

You are also welcome to come and visit us at:

203 Bouverie Street
Department of Biomedical Engineering
Biomedical Engineering Department (203 Bouverie Street)