ASIIN Seal & European Labels

Accreditation Report

Master's Degree Programmes
Electrical Engineering
Mechatronics Engineering
Mechanical Engineering
Industrial Engineering

Provided by
University of Melbourne, Australia

Version: 25 March 2025

Table of Content

A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
Ma Electrical Engineering		ASIIN, EUR-ACE® Label	ASIIN 30.09.2016 – 30.09.2023	02
Ma Mechatronics Engineering		ASIIN, EUR-ACE® Label	ASIIN 30.09.2016 – 30.09.2023	01, 02
Ma Mechanical Engineering		ASIIN, EUR-ACE® Label	ASIIN 30.09.2016 – 30.09.2023	01
Ma Industrial Engineering		ASIIN, EUR-ACE® Label	–	01, 06

Date of the contract: .24.11.2022

Submission of the final version of the self-assessment report: 12.06.2023

Date of the onsite visit: 12./13.07.2023

at: Melbourne

Expert panel:

Prof. Dr.-Ing. Olaf Wünsch, University of Kassel;

Prof. Dr. Moustafa Nawito, IUBH Internationale Hochschule;

Dr. Stefanija Klaric, Charles Darwin University;

Prof. Dr. Frank Schultmann, Karlsruhe Institute of Technology;

[1] ASIIN Seal for degree programmes; EUR-ACE® Label: European Label for Engineering Programmes

[2] TC: Technical Committee for the following subject areas: TC 01 - Mechanical Engineering/Process Engineering; TC 02 - Electrical Engineering/Information Technology; TC 06 - Engineering and Management, Economics

Nils Barkawitz, Comma Soft AG; Prasanna Ratna Shakya, Student at Charles Darwin University
Representative of the ASIIN headquarter: Dr. Siegfried Hermes
Responsible decision-making committee: Accreditation Commission
Criteria used: European Standards and Guidelines as of May 15, 2015 ASIIN General Criteria, as of December 7, 2021 Subject-Specific Criteria of Technical Committee 01 – Mechanical Engineering/Process Engineering as of December 9, 2011 Subject-Specific Criteria of Technical Committee 02 – Electrical Engineering/Information Technology as of December 9, 2011 Subject-Specific Criteria of Technical Committee 06 – Engineering and Management, Economics as of September 20, 2019.

B Characteristics of the Degree Programmes

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[3]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Electrical Engineering	M.Eng.	Autonomous Systems Business Communications and Networks Electronics and Photonics Low-carbon Power Systems	7	Full time / part time	no	6 Semesters	300 credits/ ca. 170 ECTS	Each semester / Feb 2022
Mechatronics Engineering	M.Eng.	General Manufacturing	7	Full time / part time	no	6 Semesters	300 credits/ ca. 170 ECTS	Each semester / Feb 2022
Mechanical Engineering	M.Eng.	Aerospace Business Manufacturing Materials	7	Full time / part time	no	6 Semesters	300 credits/ ca. 170 ECTS	Each semester / Feb 2022
Industrial Engineering	M.Eng.		7	Full time / part time	no	4 Semesters	200 credits / ca. 110 ECTS	Each semester / Feb 2021

Programme-specific qualification profiles ("intended learning outcomes") and curricula can be found in the Appendix to this report.

Additional characteristics across the degree programmes under consideration are described by the Faculty of Engineering and Information Technology of the University of Melbourne (hereafter FEIT) as follows:

"The *Business specialisations for both the Master of Electrical Engineering and Master of Mechanical Engineering* include 4-6 engineering business subjects, some of which are taught by staff from the Faculty of Business and Economics. In developing the program, stakeholders were engaged at an early stage. The specialisation name, Business, accurately

[3] EQF = The European Qualifications Framework for lifelong learning

reflects that the programs have some engineering business subjects included. It must be stressed that these engineering business subjects are designed with engineering students in mind. They are not generic business subjects of the type usually found in commerce degrees. The engineering business subjects are common across all engineering Business specialisations. In the Master of Industrial Engineering, students can select one Engineering Management subject from a subset of three of these six engineering management subjects. In the Master of Mechatronics Engineering, students can select some of these engineering management subjects as electives.

The *Low-Carbon Power Systems specialisation of the Master of Electrical Engineering* develops key expertise in the operation, planning and design of low-carbon power systems and energy markets with deep penetration of renewables, distributed energy resources, and smart grid technologies. This specialisation was designed in conjunction with world-leading experts in power systems and smart grids and represents both current and future industry needs as the world moves to more sustainable forms of power generation and distribution. The specialisation is an essential learning/skills development ingredient for future power system practitioners within an emerging low-carbon electricity supply ecosystem.

The *aerospace specialisation of the Master of Mechanical Engineering* was created to address not only longstanding student demand but also industry and government demands. By taking the subjects Advanced Fluid Dynamics; Vibration and Aeroelasticity; Aerospace Dynamics and Control; and Aerospace Propulsion, graduates are well-equipped to innovate and contribute to traditional aerospace companies such as BAE Systems, Boeing and Lockheed Martin, wind engineering companies such as Neoen, as well as Australian government defence and space agencies.

The *materials specialisation of the Master of Mechanical Engineering and Master of Chemical Engineering* was created to replace the Master of Engineering (Materials). A particular feature of the materials specialisation is subjects on Integrated Computational Materials Engineering, a developing field of research that will transform the practice of materials engineering over the next few decades.

The *manufacturing specialisation of the Master of Mechanical Engineering* was created for students who wish to develop strengths in traditional mechanical engineering disciplines while also being knowledgeable in manufacturing and industrial systems. The manufacturing specialisation features subjects from the Master of Industrial Engineering, which was created in close consultation with the Industry Advisory Group."

C Peer Report for the ASIIN Seal[4]

1. The Degree Programme: Concept, content & implementation

Criterion 1.1 Objectives and learning outcomes of a degree programme (intended qualifications profile)

Evidence:

- Intended programme learning outcomes according to the SAR (see Appendix to this report)
- Handbook website of UoM: https://handbook.unimelb.edu.au/search?query=electrical+engineering&types%5B%5D=all&year=2023&level_type%5B%5D=all&campus_and_attendance_mode%5B%5D=all&org_unit%5B%5D=all&page=1&sort=_score%7Cdesc (Access: 31.07.2023)
- Audit discussions

Preliminary assessment and analysis of the peers:

The expert panel recognises that the Faculty of Engineering and Information Technology (FEIT) and the programme coordinators have thoroughly formulated programme-related learning outcomes that comprise both appropriate disciplinary knowledge and skills sets, as well as professional and transversal competences. The experts highly value that the significance of the Master's programmes with specialisations has been elevated by breaking down the exercise of defining learning outcomes on the programme level to the level of specializations.

It is commendable to present a clear idea of which competences graduates of the respective specialisations in either Electrical Engineering, Mechanical Engineering, or Mechatronics Engineering Master's programmes could expect to gain, in addition to the competences achieved upon the completion of the full Master's programme. The expert panel notes that core engineering competences concerning Engineering Analysis, Engineering Design, Engineering Practice, and key research and evaluation competences have been addressed not

[4] This part of the report applies also for the assessment for the European subject-specific labels. After the conclusion of the procedure, the stated requirements and/or recommendations and the deadlines are equally valid for the ASIIN seal as well as for the sought subject-specific label.

only in the overall competence set defined for each programme but also in the case of the different specialisations offered in the Electrical Engineering, Mechanical Engineering, and Mechatronics Engineering programmes. This is even more important as FEIT has implemented a major change in its engineering programmes since their previous accreditation. Presenting *disciplinary* engineering programmes – instead of an integrated engineering programme with several disciplinary specialisations – not only enhances the visibility of these programmes but also allows FEIT to restructure the curriculum, leaving room to enhance the disciplinary depth and breadth of the individual programmes. (For instance, by subdividing them according to specialized focus areas.) The learning outcomes, especially those for specialisations, reflect this major change – regardless of whether or to what degree the respective curricula correspond to them. This question is to be addressed in section 1.3 of the present report.

The experts are also well aware that the Electrical, Mechanical, and Mechatronics Engineering Master's programmes are structurally embedded in the so-called Melbourne Model, meaning that they are specifically designed to take in a highly diverse spectrum of engineering students with varying educational backgrounds. This is reflected in three- or two-year engineering programmes, depending on the underlying Bachelor's degree or professional (engineering) experience. It is reasonable therefore that the first study year in the mentioned engineering programmes is essentially conceived as a bridging and catch-up year for an overall small student group with an engineering background not adequately linked to the chosen Master's programme. This is reflected in some learning outcomes outlining "fundamental," "basic," or "core" knowledge and skills in certain subject areas, more aligned with Bachelor's rather than Master's qualification levels.

The experts nevertheless gain the impression that the Master's qualification level at the programme and, where applicable, the specialisation level could be formulated more clearly and transparently in some instances. They suggest that FEIT reconsider the intended programme learning outcomes accordingly. However, the panel is generally satisfied with the depiction of discipline-related learning outcomes for all degree programmes, particularly how they include key engineering analysis, engineering design, and engineering practice competences at the advanced Master's level. This also applies to the (new) two-year Industrial Engineering programme (without specialisation), at least in terms of the defined programme learning outcomes.

The expert panel recognises that the professional world is appropriately addressed in the given qualification profiles, which are available for interested stakeholders, especially students and applicants, on the University's website. Key professional competences such as teamwork, communication, and management skills are to be achieved, as well as personal

competences, including professional ethics and an awareness of responsibility and professional integrity.

The experts were pleased to see that their judgment of the given competence profiles of graduates was strongly confirmed by industry representatives, particularly representatives of the Industry Advisory Groups established (IAG) for all Engineering Master's programmes. During the onsite discussions, these representatives concurrently presented their view that the University and FEIT, respectively, provide learning outcomes that clearly distinguish the Master's from the Bachelor's level. They highlighted, for instance, the increased complexity and time commitment at the Master's level, and that the choice of wording generally aligns well with the elevated academic rigor. In specialised fields such as power engineering, there would be a greater emphasis on economic aspects, which were absent from undergraduate electrical engineering programmes. This would also justify the emphasis on the development of basic competences, especially in business contexts, in the formulation of the respective competence profile.

The industry representatives also emphasised the relevance of an internationalization focus within the engineering programmes, as graduates need to be prepared for working in an increasingly globalised work environment. In this perspective, the competitiveness of the graduates, nationally and internationally, depends on the programmes' ability to meet global standards. Achieving this would necessitate the students' strong awareness of the global context, preparing them beyond local boundaries. As this international outlook is not solely the University's responsibility, the experts consider the intended learning outcomes to be indicative for students and other stakeholders, helping to adopt a complementary global mind-set.

In summary, the expert panel considers the programme learning outcomes to adequately address disciplinary and transferable skills and competences at the advanced Master's level. In this respect, they nevertheless see some room for improvement. Being aware of the inherent demands of the Melbourne Model, the discipline-related competences could be more attuned to the expected Master's level in some cases, particularly in the specialisations of the Electrical, Mechanical, and Mechatronics Engineering programmes.

Criterion 1.2 Name of the degree programme

Evidence:

- Respective chapter of the SAR
- Information on the website: https://study.unimelb.edu.au/find/courses/graduate/master-of-electrical-engineering/ (Electrical Engineering);

https://study.unimelb.edu.au/find/courses/graduate/master-of-mechanical-engineering/ (Mechanical Engineering);
https://study.unimelb.edu.au/find/courses/graduate/master-of-mechatronics-engineering/ (Mechatronics Engineering);
https://study.unimelb.edu.au/find/courses/graduate/master-of-industrial-engineering/ (Industrial Engineering) (Access: 31.07.02023)

Preliminary assessment and analysis of the peers:
The expert panel recognises that FEIT has only recently changed its programmes, splitting a formerly unified engineering programme with specialisations in electrical, mechanical, chemical, civil, etc. engineering into a number of separate discipline-based engineering programmes. The experts note that, apart from a fundamental first year curriculum in all four Master's programmes, which deepens core engineering knowledge, the second and third year curricula (generally) include appropriate and discipline-specific subjects at an advanced level. This is particularly true of the elective area of this study period.

This decision has been made with the visibility of the programmes in mind and has thus indirectly contributed to the disciplinary strength and quality level of the Master's programmes in general. The experts have no doubt that the programme names correspond to the intended earning outcomes as well as the curricular content of the programmes, especially where they are complemented by an indication of discipline-integrated specialisations (in the case of the Electrical Engineering, Mechanical, and Mechatronics Engineering programmes).

The experts consequently consider the differentiation of four Engineering Master's programmes

- Master of Electrical Engineering
- Master of Mechatronics Engineering
- Master of Mechanical Engineering
- Master of Industrial Engineering,

including signature specialisation titles, where applicable,

- Master of Electrical Engineering (Autonomous Systems)
- Master of Electrical Engineering (Business)
- Master of Electrical Engineering (Communications and Networks)
- Master of Electrical Engineering (Electronics and Photonics)
- Master of Electrical Engineering (Low-carbon Power Systems)

- Master of Mechatronics Engineering (Manufacturing)
- Master of Mechanical Engineering (Aerospace)
- Master of Mechanical Engineering (Business)
- Master of Mechanical Engineering (Manufacturing)
- Master of Mechanical Engineering (Materials)

is plausbible and in accordance with the overall structure and study objectives of the programmes.

Criterion 1.3 Curriculum

Evidence:

- Relevant chapter of the SAR; Appendix to the report
- Information on the website: https://study.unimelb.edu.au/find/courses/graduate/master-of-electrical-engineering/ (Electrical Engineering); https://study.unimelb.edu.au/find/courses/graduate/master-of-mechanical-engineering/ (Mechanical Engineering); https://study.unimelb.edu.au/find/courses/graduate/master-of-mechatronics-engineering/ (Mechatronics Engineering); https://study.unimelb.edu.au/find/courses/graduate/master-of-industrial-engineering/ (Industrial Engineering) (Access: 31.07.2023)
- Handbooks of the Master degree programmes available on the internet: https://handbook.unimelb.edu.au/2023/courses/mc-eleceng (Electrical Engineering); https://handbook.unimelb.edu.au/2023/courses/mc-mecheng (Mechanical Engineering); https://handbook.unimelb.edu.au/2023/courses/mc-indeng (Industrial Engineering); https://handbook.unimelb.edu.au/2023/courses/mc-mtrneng (Mechatronics Engineering) (Access: 31.07.2023), including: Study plans, subject/course descriptions
- Courses, Subjects, Awards and Programs Policy (MPF1327), Appendix 2.1.3 to the SAR
- Credit, Advanced Standing and Accelerated Entry Policy (MPF1293), Appendix 2.1.4 to the SAR
- Information on study abroad options and student exchange on the website: https://eng.unimelb.edu.au/study/study-abroad; and: https://study.unimelb.edu.au/how-to-apply/international-exchange-and-study-abroad-applications (Access: 31.07.2023)
- Audit discussions

Preliminary assessment and analysis of the peers:
In general, the expert panel praises FEIT for presenting a system of running the programmes that works well, providing the Australian market with engineering graduates who are in high demand. Industry representatives during the audit discussion not only confirmed the close relationship between companies and the University (for instance by way of internships and capstone projects), but also by expressing their high esteem for the engineering graduates of FEIT. Likewise, the students indicated that they are principally very satisfied with their programmes, facilities and training for using the equipment.

The experts understand that the most relevant changes since the last accreditation are twofold:

1) The renaming of the three-year Electrical, Mechanical, and Mechatronics Engineering programmes, which are now provided as separate discipline-oriented programmes instead of being mixed up in one general engineering programme with several discipline-oriented specialisations. This turns out to be not only a change in naming but obviously includes a disciplinary refocusing and subdivision of the disciplinary engineering programmes into relevant specialisations of the field:
    a. Autonomous Systems, Communications and Networks, Electronics and Photonics, and Low-carbon Power Systems, and Business in the Electrical Engineering programme;
    b. Aerospace, Manufacturing, Materials, and Business in the Mechanical Engineering programme;
    c. Manufacturing in the Mechatronics Engineering programme.

2) The development and implementation of a new two-year Industrial Engineering programme.

Curriculum and programme learning outcomes

Given this structural background of the Engineering programmes under consideration, the expert panel states that, overall, the defined programme learning outcomes correspond well to the curricular contents of these programmes. This applies for the general curriculum of the programmes as well as for the specialisations in the case of the Electrical, Mechanical, and Mechatronics Engineering programmes.

Curriculum and structure of Master programmes

The expert panel recognises that the structure of the three-year Electrical, Mechanical, and Mechatronics Engineering programmes are in line with what is called the “Melbourne

Model". This essentially relates to the characteristic feature of consecutive engineering programmes at the University of Melbourne, which leaves the underlying discipline-related Bachelor programmes in the hands of another Faculty, the Faculty of Science. As a result, FEIT has developed three-year Engineering Master programmes with the option of recognising prior academic achievements of up to one year (or 100 Australian credit points) in a so-called "advanced standing" procedure (see sec. 1.4).

The advantage of this model is that it facilitates the recruitment of applicants from a wide range of technical disciplines not necessarily closely related to the chosen engineering programme (either the university's own technical Bachelor of Science graduates or graduates with comparable qualifications from foreign universities). The closer the engineering background of the applicants is to the chosen discipline, the more of the expected learning outcomes of the first year of study could probably be substituted by prior learning, thus shortening the total duration of study by up to one year. The experts understand that, as a result, the two-year programme is the rule, particularly for Bachelor's graduates from the University of Melbourne, leaving the three-year curriculum as the exception to the rule. It is also understandable in this context that the curriculum of the first year of study is largely devoted to teaching the basics and deepening the foundations, thus providing students with the necessary knowledge to enter the actual second and third years of study.

The disadvantage of the "Melbourne model", as was repeatedly pointed out in the audit discussions, is that FEIT has no direct control over the structure and content of the Bachelor's programmes. As a result, the design of Master's programmes cannot be directly coordinated with the design of Bachelor's programmes, forcing programme designers to take into account the framework of Bachelor's programmes and thus to make concessions in terms of content and organisation that might otherwise have been avoided. The panel therefore acknowledges the FEIT's efforts to coordinate, as far as possible, the framework of engineering education.

The new two-year Industrial Engineering programme is said to be the first Master's programme to dispense with these structural requirements and to directly address the desired framework of the programme in terms of content and organisation.

The expert panel reaffirms its initial assessment of the programmes' strengths in producing highly sought-after engineering graduates. The experts acknowledge the successful implementation of a discipline-focused structure and its alignment with the "Melbourne Model," which accommodates diverse technical backgrounds.

In light of this overall assessment, the panel nevertheless identifies the need for certain strategic enhancements to further elevate the programmes' quality, specialisation, and

flexibility, ensuring continued alignment with industry demands and fostering student success.

_*Considering the Electrical Engineering Programme:*

The panel's assessment of the Electrical Engineering programme highlights its effectiveness in producing graduates with strong technical foundations. To build upon this success and to facilitate even more specialised skill development, the panel considers that there is a need for improvement in the following fields:

- *Specialization Tailoring*: The experts appreciate FEIT's approach to design general disciplinary Master programmes with the option to achieve an individual qualification profile in one of the specialisation areas at choice. In the Mechanical Engineering programme, a build-in selection scheme for the electives to be chosen from different catalogues ensures that qualifications of a certain profile will be achieved, irrespective of whether the profile has been chosen deliberately or identified after completing of the mandatory elective subjects. This is likewise the case for the (at present) only one specialisation in Mechatronics Engineering programme. The residual qualification profile in both cases is a general Master in either Mechanical or Mechatronics Engineering.

  By contrast, the elective catalogues in the different specialisations of the electrical engineering programme are only slightly divergent, with no specific rules ensuring an in-depth qualification in the respective specialisation. The panel therefore stresses the importance of optimising the specialisation-oriented structure of the programme. To this end, it recommends that the programme's elective catalogues be carefully tailored to reflect the chosen specialisation. This approach will enable students to acquire in-depth expertise in their specific area of interest.

- *Capstone Project Alignment*: Building upon the close industry collaboration noted in the assessment, the panel recommends further that capstone projects in the Electrical Engineering programme be intrinsically aligned with the chosen specialisation. This alignment ensures that students apply their acquired knowledge to projects directly relevant to their desired career paths, enhancing the practicality and impact of their learning experiences.

- *Enhanced Master's Level Content*: Recognising the evolving demands of the engineering landscape, particularly in the "Electronics and Photonics" specialisation, the panel suggests a revision of core subjects in the second and third years. This revision should be aimed at elevating the content to distinctly reflect the advanced level of qualification associated with a Master's programme. By doing so, the programme

will ensure that graduates possess the depth of knowledge required to excel in their specialised fields.

_*Considering the Industrial Engineering Programme:*

The panel's observation of the Industrial Engineering programme's dynamics and its commitment to industry interaction provides a basis for the following recommendation:

- *Expanded elective options*: The panel understands the decision of the programme coordinators to start this new programme with a very small number of electives (only one Engineering Management elective in the current curriculum), with the aim of increasing this number over time and with experience. In line with this approach, and recognising the importance of individual skill development and adaptability, the panel recommends that the number of electives within the Industrial Engineering programme be increased in the medium term. By broadening the range of electives, the programme can enable students to tailor their educational journey to suit their individual career aspirations and interests.

Practice-orientation

The expert panel greatly values the emphasis on practice orientation, evident in the integration of project-based learning, (elective) internships, and close industry collaboration across the programmes. Observed overlaps in the Industrial Engineering programme, although initially redundant, are seen to serve distinct educational objectives. The panel also acknowledges that the IAGs play a pivotal role in shaping the programme content and ensuring alignment with industry demands. Their contributions extend beyond feedback, actively influencing the curriculum's development.

The review of the programmes has underscored the significance of the university-industry relationship, emphasising that the nature of internships (elective/compulsory) is secondary to the quality of collaboration. The proposed approach of highlighting capstone projects to companies in a fare-like event reflects an innovative strategy to bridge academia and real-world application.

Mobility and studies abroad

The expert panel recognises that the curricula of the Master's programmes provide opportunities for studies abroad or at another higher education institution (HEI), particularly in the third year, which consists mainly of electives and the capstone project. Students are encouraged to take advantage of this opportunity and are adequately supported if they do so. Appropriate recognition policies and practices further contribute to a mobility-friendly study environment.

In conclusion, the expert panel aligns its suggestions with the overarching strengths of FEIT's programmes. The proposed enhancements in specialisation tailoring, capstone project alignment, and advanced content delivery in the Electrical Engineering programme, along with the expansion of elective opportunities in the Industrial Engineering programme, are strategically integrated to further elevate the educational experience.

The panel believes that by implementing these tailored interventions FEIT will continue to uphold its reputation for producing engineering graduates who possess both theoretical excellence and practical proficiency. These recommendations are intended to build upon the already impressive foundation and solidify FEIT's position as a leading engineering education provider, with programmes that effectively meet industry needs and empower students for successful careers.

Criterion 1.4 Admission requirements

Evidence:

- Respective chapter of the SAR
- Credit, Advanced Standing and Accelerated Entry Policy (MPF1293), Appendix 2.1.4 to the SAR
- Information about entry requirements on the website: https://study.unimelb.edu.au/find/courses/graduate/master-of-electrical-engineering/entry-requirements/ (EE); https://study.unimelb.edu.au/find/courses/graduate/master-of-mechanical-engineering/entry-requirements/ (ME); https://study.unimelb.edu.au/find/courses/graduate/master-of-mechatronics-engineering/entry-requirements/ (MECHE); https://study.unimelb.edu.au/find/courses/graduate/master-of-industrial-engineering/entry-requirements/ (IE) (Access: 31.07.2023)
- Audit discussions

Preliminary assessment and analysis of the peers:

From the perspective of the expert panel, the engineering programmes offered by Melbourne University are commendable for their comprehensive approach to admissions and curriculum design. The various pathways provided for entry into the Master's programmes demonstrate a nuanced understanding of the diverse educational backgrounds and aspirations of prospective students (own students and foreign students). At the same time, the experts observe a highly competitive admission process, with a substantial number of applicants vying for a limited number of spots (approximately 800 admissions out of 2000-3000 applications). The meticulous selection process, which considers both the applicant's

academic performance and the reputation of their origin institution, reflects the University's commitment to maintaining a high standard of quality within the programmes. Thus, a pass rate of 65% in the bachelor's degree is a mandatory requirement for all applicants.

The emphasis on mobility during the third semester, accompanied by elective course availability, underlines the University's awareness of the importance of flexibility in higher education. This approach aligns with modern educational trends that acknowledge students' need for personalised academic journeys.

The *advanced standing* procedure ("Melbourne Model") is characterised through three distinct pathways:

- 300 credits are required in case of insufficient engineering knowledge;
- 250 credits are required in case of an engineering background whatsoever;
- 200 credits are required for those with mechanical engineering or electrical engineering backgrounds (preferably in a related Melbourne University Bachelor of Science programme).

The *advanced standing* procedure thus underscores the University's recognition of the value of prior educational achievements. This process allows for credit transfer, potentially reducing the number of subjects required for the respective Master's programme. The success rate for the 200-credit pathway is noted to be 80%, which in the eyes of the expert panel indicates FEIT's effectiveness in recognising relevant prior educational achievements.

The insights from students regarding admission criteria, study planning, and communication offer invaluable feedback for the University's continuous improvement efforts. The recognition of the alignment between Bachelor and Master programmes suggests that FEIT's curriculum design strategies are effective in creating a seamless educational transition. Furthermore, FEIT's consideration of applicants from unrelated backgrounds, based on their foundational mathematical skills, indicates a holistic and inclusive approach to admissions.

In conclusion, the engineering programmes at Melbourne University strive to be inclusive and adaptable, catering to a wide array of students while maintaining high academic standards. In the expert panel's view, the programmes exemplify a balanced approach to admissions, curriculum design, and student engagement. The diversity of pathways, commitment to mobility and credit transfer, and incorporation of international experiences collectively contribute to a comprehensive educational experience. Incorporating the valuable feedback from students will further refine and enhance the admission criteria and process, aligning them with the evolving needs of aspiring engineers in today's dynamic world.

Criterion 1.5 Workload and Credits

Evidence:

- Respective chapter in the SAR
- Courses, Subjects, Awards and Programs Policy (MPF1327), Appendix 2.1.3 to the SAR
- Enrolment and Timetabling Policy (MPF1294), Appendix 2.1.5 to the SAR
- Audit discussions

Preliminary assessment and analysis of the peers:

The University of Melbourne adheres to a standard full-time load of 100 credit points annually, split evenly between two semesters (spring and autumn semesters). While most subjects are offered during these semesters, a selection is also available in the summer semester, with enrolment capped at 25 points. Subjects are commonly structured as either 12.5 or 25-point allocations. For instance, students typically engage in four 12.5-point subjects each semester, totalling eight per year. Notably, certain subjects, such as capstone projects, industry-based studies or research-oriented courses, carry a higher 25-point weighting. These specialised subjects may extend over one semester or span the entire calendar year.

In terms of student commitment, each 12.5-point Masters-level subject expects a total dedication of 200 hours. Given that students commonly undertake eight 12.5-point subjects within a standard academic year, the total annual time commitment averages 1600 hours. This commitment comprises attending lectures, tutorials, workshops, and laboratory sessions, along with additional reading, private study, assignment completion, exam preparation, and actual examination participation.

Regarding contact hours, Master subjects generally require 3 to 5 hours of engagement per week, comprising lectures, tutorials, and laboratory sessions. This accumulates to a semester total of 36 to 60 contact hours. The remaining hours within the 200-hour commitment per subject are ascribed to class preparation, private study, assignment fulfilment, and exam readiness.

The academic calendar divides both semesters into 17 weeks. This structure consists of 12 weeks of teaching, a mid-semester break (corresponding with Easter in Semester 1 and late September in Semester 2), a dedicated week for exam preparation, and a three-week period allocated for written examinations. It is emphasized that students should maintain a consistent work pace throughout the entirety of each semester.

The expert panel recognises that FEIT is using a credit point system, which is equivalent to the ECTS system. In particular, this credit system comprises the full student workload, including attendance and self-study hours. One credit thus corresponds to roughly 0.6 ECTS credits, meaning that the regular 12.5-point subjects have an approximate size of 7 ECTS each. In the opinion of the experts, the student workload per subject and semester thus appears to be reasonable and bearable.

The panel heard that the underlying workload allocation was calculated and set once. Although students do not directly and regularly assess the credit allocation in the continuous evaluation process, they are expected to indicate any discrepancies between the actual workload and the credit allocation in the "further comments" sections of the regular evaluations or through available informal communication channels. Students seemed to be broadly in agreement with this, but also reported some specifically time-consuming subjects, which do not correspond to the credits awarded for them. The experts consider that a more precise monitoring mechanism should be developed or integrated into existing survey instruments in order to identify significant discrepancies in a timely manner and to take appropriate countermeasures.

Criterion 1.6 Didactic and Teaching Methodology

Evidence:

- Respective chapter of the SAR
- Audit discussions

Preliminary assessment and analysis of the peers:

The SAR explains that students throughout their study journey are exposed to a range of different teaching styles which are designed to not only address the different learning styles of the cohort but also to develop their nontechnical skills such as teamwork, time management and problem-solving. It also states that the recently established Teaching and Learning Laboratory (TLL) supports the use of a range of didactic tools and methods to promote the achievement of intended learning outcomes, and provides training for staff to facilitate research-based improvements in students' learning experiences and outcomes. In collaboration with academics from across the Faculty, the TLL holds a well-attended series of seminars and workshops to share and develop evidence-based good practice.

Reportedly, the programmes are also designed to allow students to become independent learners. This includes a variety of approaches to teaching and learning such as workshop

and project-based learning and assessment, more traditional lectures accompanied by tutorial sessions, and the targeted alignment of the teaching process with subject-related research activities as in the case of the electrical engineering specialisations.

Programme coordinators especially point out that engineering design thinking is introduced via mini design projects in core subjects and then ramped up in advanced courses. Problem identification and solution strategy development are emphasised in related subjects. According to this, the core objective of the intended engineering design competences is to provide relevant engineering practice exposure through project-based learning and develop professional competencies through targeted team-based activities and authentic assessment that is reflective of industry practices.

Physical laboratories also figure as an essential didactical means in engineering Master programmes, where the intersection between theory, modelling, and computation on the one hand and physical reality on the other hand is taught, practised, and assessed. Additionally, many subjects feature case studies presented by industry speakers to inform students on current practice and industry capstone projects are designed to further enrich the learning experience.

In summary, the expert group considers the teaching methods and instruments to be suitable to support the students in achieving the intended learning outcomes. In addition, the experts commend the variety of delivery modes and confirm that the study concept comprises a variety of teaching and learning forms.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 1:

The expert panel considers that the criterion is not fulfilled in all of its sub-criteria. Some issues need to be addressed in the short term (monitoring of students workload in all degree programmes; strengthening of specialisations in the case of the Electrical Engineering Master's programme). Other areas leave room for improvement in the medium and long term (learning outcomes with respect to all Master's programmes; number of electives in the case of the Master of Industrial Engineering).

Specialisations of the Electrical Engineering Master's programme / crit. 1.3

The experts understand the programme coordinators' argument that "specialisations are designed to provide Masters-level depth in particular specialisation areas". In line with this, they also acknowledge that – according to the programme coordinators' statement – "each specialisation mandates 6 sub-discipline specific subjects that allow an EEE student to specialise in their area of interest." However, any detailed examination of the curricula of the

Electrical Engineering Master's programme shows that this argument obviously includes the "Electrical Engineering Electives", which are to be selected in each specialisation from a corresponding electives catalogue. This catalogue, in turn, consists of a considerable range of electrical engineering subjects, both within and beyond the boundaries of each specialisation. Since this catalogue does not change significantly across the different specialisations, students individual study plans could, at least in theory, converge despite their different specialisations. However, if the process of the selecting electives from the catalogue is guided by course rules that are not specified in the curriculum, these rules need to be made explicit in the specialisation-related curriucula as well.

Furthermore, the experts take note the approach of the Departments to encourage capstone projects that cross departmental boundaries and, with regard to this intention, to avoid being "too prescriptive about the necessity of choosing a capstone project that is aligned with a student's chosen specialisation". Otherwise, they disagree with the argument that mandating the alignment of the capstone project with the chosen specialisation "could prevent students forming multi-disciplinary or even cross-specialisation teams that reflect the complex nature of the projects and the current engineering workplace". Like any project topic not directly related to the chosen specialisation, capstone projects associated with, for example, the Communications and Networks specialisation or the Low-carbon Power Systems specialisation may or may not focus on cross-specialisation issues. Thus, reflecting the multi-faceted nature of electrical engineering projects as a well-recognised issue in the composition of capstone project teams does not appear to be fundamentally more difficult to achieve within a chosen specialisation.

In summary, the experts confirm their preliminary assessment that the elective area of the different specialisations in the Electrical Engineering Master's programme should be more clearly structured and capstone projects be selected in accordance with these specialisations (see below, sec. F, requirement 3).

Specialisation Electronics and Photonics in the Electrical Engineering Master's programme (crit. 1.3)

The experts recognise the Departments' indication that work on consolidating the core subjects of the Electronics and Photonics specialisation has already been started. Until evidence is provided on the completion and concrete substance of the steps taken, the experts confirm their proposed requirement to this end (see below, sec. F, requirement 4).

Monitoring of student workload (crit. 1.5) in all Master's programmes

For the reasons outlined above, the experts consider it necessary for departments to establish a reliable mechanism for monitoring student workload in order to identify and,

where appropriate, remedy discrepancies between the actual workload and allocated credit points in a timely manner (see below, sec. F, requirement 1).

Programme learning outcomes of all Master's programmes

The experts conclude that the different levels of Master's qualifications – as opposed to Bachelor's – could be more clearly described in some cases and that the LOs should be reviewed accordingly (see below, sec. F, recommendation 1).

Enhancement of elective area in the Industrial Engineering Master's programme

As indicated above, the expert team considers the small number of electives in the Industrial Engineering programme reasonable as the programme has become operational only recently. The experts welcome that the Department of Mechanical Engineering has already included additional subjects in the study plans of individual students and re-consider the curriculum generally with respect to the issue of electives. To support this intention, the expert team suggests a recommendation to this end (see below, sec. F, recommendation 6).

2. Exams: System, Concept and Organisation

Criterion 2 Exams: System, concept and organisation

Evidence:

- Respective chapter of the SAR
- Assessment and Results Policy (MPF1326), Appendix 2.1.2 to the SAR
- Academic Progress Review Policy (Coursework) (MPF1291), Appendix 2.1.1 to the SAR
- End-of Semester Examination Schedule for Semester 2, 2022, Appendix C.2.3 to the SAR
- Statistical Data for 2022 Subjects EE, MECHE, ME, IE (Sem 1 + 2), Appendix C2.4 to the SAR
- Audit discussions

Preliminary assessment and analysis of the peers:

In the process of evaluating the examination system within the degree programmes, the expert panel conducts a comprehensive analysis, drawing insights from multiple sources of

information. Through the detailed examination of the available data, several key points emerged within the assessment framework that warrant attention.

The assessment system employs a variety of examination formats, including written examinations, project reports, home assignments, case studies, and oral exams. While these formats aim to evaluate diverse skills and knowledge areas, the analysis indicates a potential area for enhancement in the form of oral examinations. Currently, oral exams appear to be underrepresented in the assessment mix, despite their potential to assess not only theoretical comprehension but also communication skills and the ability to engage in critical discussions. Elective internships, for instance, seem to be widely chosen by students as they are expect them to further enhance their presentation skills.

In light of the analysis, the experts suggest considering an increased incorporation of oral examinations into the assessment strategy where appropriate. This strategic inclusion aligns with the objective of fostering effective communication skills and the ability to articulate complex engineering concepts. By incorporating more oral exams, FEIT can holistically evaluate the students' ability to convey their understanding, engage in discourse, and showcase their analytical thinking – qualities that are essential for professional engineers.

The examination system in the degree programmes currently employs group-based capstone projects. The programme coordinators presented this as a direct result of the accreditation requirements of Engineers Australia. Capstone projects are intended to provide students with hands-on experience in tackling complex engineering challenges, fostering teamwork, and displaying their problem-solving abilities, both collectively and individually within a team. However, it is evident that while group projects encourage collaborative skills, they may dilute the development of individual autonomy and proficiency. This aligns with the need for graduates to excel in autonomous problem-solving and to demonstrate competence in real-world engineering tasks using scientific methods.

Although teaching staff and students consistently noted that the capstone projects are performed in groups but assessed individually, it might be worth exploring the integration of individual-based capstone projects in order to address the observed limitations in cultivating individual competence and autonomy. By providing students the opportunity to undertake projects on an individual basis, the assessment system can better promote independent thinking, self-guided research, and the application of scientific methodologies to real-world engineering scenarios. This shift is anchored in the analysis of the existing assessment approach and seeks to address the need for more autonomous skill development.

From an evaluation of a sample of capstone projects across the range of the grading scale, the experts conclude that these works generally reflect the Master's level expectations,

despite the fact that they are at the bottom of comparable European Master Thesis projects in the EHEA in terms of size and volume.

Concerning the organization and transparency of the examination procedure, the expert panel observes that the rules, dates, and processes of examination are communicated to the students in due time and that, overall, the students feel well informed about the examination procedure. Students confirmed, for instance, that exam schedules and conditions are communicated promptly to them, and that they receive exemplary tasks and reports for reference. Similarly, the students detailed the procedures for addressing complaints regarding examinations.

In summary, the assessment of the examination system in the degree programmes has revealed a considerable strength regarding the learning outcome orientation of the assessments, but also some areas of potential improvement. The recommendations put forth are not only grounded in the analysis of the current system but also aimed at aligning FEIT's assessment approach with the overarching goal of producing proficient and independent engineers. By considering individual-based capstone projects and increasing the utilisation of oral examinations the degree programmes can take meaningful strides towards ensuring that graduates are equipped with a diverse skill set that prepares them for success in the evolving landscape of engineering practice.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 2:

Overall, the experts consider this standard to be met by all the Master's programmes considered.

Nevertheless, for reasons pointed out above, the programmes could be further developed by considering capstone projects undertaken on an individual basis (see below, sec. F, recommendation 2) and by integrating more oral exams where appropriate (see below, sec. F, recommendation 3).

3. Resources

Criterion 3.1 Staff and Development

Evidence:

- Respective chapter of the SAR
- Staff CVs, Appendix 3 to the SAR

- Information about the Melbourne Teaching Certificate (MTC) on the website: https://melbourne-cshe.unimelb.edu.au/professional-development/teaching-learning-and-assessment/melbourne-teaching-certificate (Access: 31.07.2023)
- Information about the Graduate Certificate in University Teaching (GCUT) on the website: https://melbourne-cshe.unimelb.edu.au/pd/teaching-learning-and-assessment/graduate-certificate-in-university-teaching (Access: 31.07.2023)
- Audit discussions

Preliminary assessment and analysis of the peers:
The SAR clarifies that the teaching staff at Melbourne University and FEIT, respectively, is divided up into five categories: Tutors and Senior Tutors (Level A), Lecturers (Level B), Senior Lecturers (Level C), Associate Professor and Reader (Level D), and Professor (Level E). Experts are also informed that there was a total of 270 Teaching and Research (T&R) and Education Specialist continuing staff and 266 fixed term staff within FEIT as of 1 January 2023. Reportedly, these numbers have grown from 180 and 250 respectively in 2018. Programme coordinators stated that the continuing staff carry out most of the teaching in FEIT but that there are also many fixed term appointments contributing to the teaching of many subjects as well. The share of female teaching staff is the highest at the levels of Lecturers and Senior Lecturers (roughly 30, respectively) and relatively lower at Associate Professor's and Professor's ranks (around 10 each).

The experts learned that within the FEIT the School of Computing and Information has the highest number of teaching staff (ca. 80), while the Electrical and Electronic Department and the Mechanical Engineering Department each rely on a teaching staff less than half that size (ca. 30). As indicated in the SAR, the actual staff – student ratio across the entire FEIT, defined in terms of equivalent full-time students and full time equivalent staff, is 23.2, which means a decrease from 27.3 sine the last accreditation visit. The expert panel was told that this decrease is only partially due to the fact that student numbers also dropped during the COVID pandemic. As student numbers are not anticipated to raise much beyond pre-COVID level, FEIT highlights the significant net increase of its staff since then.

In summary, the experts consider the personal (teaching staff) resources to be adequate in terms of both quantity and quality of qualification. Although the employment of casual staff in the case of large classes could bear the risk of potential disruption in continuity, the expert panel does not consider this an imminent threat. The experts have met highly qualified and enthusiastic programme coordinators and teaching staff, demonstrating a visible dedication to their roles as educators and a performative commitment to constantly improving the degree programmes.

The experts learned of two major programmes at offer for eligible teaching staff to advance their pedagogical and higher education teaching competences: the Melbourne Teaching Certificate (MTC) and the Graduate Certificate in University Teaching (GCUT). Whilst the MTC is a professional development programme for University of Melbourne staff with teaching related responsibilities, the GCUT is run by the University's Centre for the Study of Higher Education (CSHE) and is designed for university staff seeking to develop their expertise, scholarship, and leadership skills in university teaching.

The Lecturers confirm the availability of open and accessible opportunities to enhance their teaching and subject-specific competencies clarifying that these opportunities are available for teaching staff, academic fellows, and students. In addition, the faculty also has established a formal mentoring scheme to identify potential demand for enhancing individual teaching competences.

During the audit meetings, the experts were told that a sabbatical programme for six months is offered every three years to the staff. The sabbatical involves both research and teaching activities. Fixed-term appointments are possible, and compensation through other teaching staff should be arranged beforehand and is required.

The experts note that early career researchers are supported by the department. In particular, with regard to the teaching obligations of this group, departmental management has a role to play in striking an appropriate balance between teaching larger undergraduate classes and smaller classes geared to research interests. In addition, most lecturers agree that overseas postgraduate students are an important driver of research activity. The University's strategic partnerships with a number of overseas institutions, such as partner universities in Canada, the UK and Europe, play an important role in this regard.

Reports indicate that the University's PhD candidates often find employment with international companies. As the experts were told, the University, supported by government initiatives, also fosters start-ups and transfer activities. There is a dedicated department within the University administration for this purpose. IAGs, featuring experienced professionals including managers from McKinsey, play a significant role in facilitating transfer activities within the departments.

The expert panel appreciates the University and FEIT's commitment to improving the pedagogical and research skills of its staff and the overall research capacity of FEIT. Particularly noteworthy are the measures taken to support early career researchers and to facilitate related transfer activities. The panel emphasises the importance of the strong link between the university and the industry in this regard, as it clearly demonstrates significant improvements in the relevance of the University's higher education provision to the professional world.

Criterion 3.2 Student Support and Student Services

Evidence:

- Respective chapter of the SAR
- Information about the FEIT Teaching and Learning Laboratory on the website: https://eng.unimelb.edu.au/tll (Access: 31.07.2023)
- Resources for international students provided on the University's website: https://study.unimelb.edu.au/student-life/international-students (Access: 31.07.2023)
- Audit discussions

Preliminary assessment and analysis of the peers:

The panel recognises that there is a considerable number of supporting staff in areas such as "Operations Managers", "Academic Support Coordinators", "Student Enrichment personnel", "Future Students", "Facilities and OH&S", "Human Resources", "Marketing and Communications", "Advancement", "Research Services", and "IT Services". For reasons of effectivity and efficiency, some of these services have recently been centralised at university level, while others are shared across faculties.

When discussing part-time study options, the panel has the impression that part-time students are supported by two pillars: Initially, the University provides general assistance, followed by department-specific support. In general, the experts recognise that care is taken to ensure that no issues arise for these students.

Furthermore, the expert panel commends FEIT's proactive approach in supporting international students. The initiation of mentoring programmes and other tailored initiatives demonstrates the faculty's commitment to creating an inclusive and enriching educational environment. The panel is pleased to note that departments are cognisant of the unique requirements of international students, fostering an environment that values diversity and promotes cross-cultural learning experiences.

As regards the learning process, in particular, FEIT has recently established the Teaching and Learning Laboratory (TLL) – a significant initiative focused on enhancing student support and educational advancement. The TLL's strategic initiatives underscore a commitment to enhancing both student learning experiences and the professional development of academic staff.

Noteworthy observations include:

1. *Research-Informed Strategies*: The TLL's focus on research-informed enhancements, encompassing areas such as assessment reliability, academic integrity, and project-based learning, reflects a dedication to evidence-based educational practices. This approach is well-aligned with contemporary pedagogical trends.
2. *Professional Development*: The TLL's comprehensive training programmes for new coordinators, tutors and demonstrators exemplify FEIT's proactive approach to preparing academic staff for their roles. The provision of ongoing support throughout the term demonstrates a commitment to continuous growth and collaboration.
3. *TADD Programme*: The introduction of the Tutor and Demonstrator Development (TADD) programme, with its emphasis on effective communication and promotion of inclusive learning environments, is indicative of FEIT's response to the diverse needs of sessional staff. This initiative aligns well with current educational priorities.

In summary, the expert panel finds that FEIT's teaching and learning support initiatives indicate a comprehensive and strategically structured framework. The integration of research-informed strategies, the emphasis on professional development, and the inclusion of the TADD programme collectively contribute to a student-centered approach that aligns with FEIT's educational goals. The ongoing support for international students and departmental responsiveness further reflect FEIT's dedication to a comprehensive and inclusive educational ecosystem.

Criterion 3.3 Funds and equipment

Evidence:

- Respective chapter of the SAR
- FEIT Industry Advisory Groups, Appendix 5.2 to the SAR
- Information about Industry Avisory Groups on the website: https://eng.unimelb.edu.au/about/advisory-groups (Access: 31.07.2023)
- Audit discussions

Preliminary assessment and analysis of the peers:

Infrastructure Investment and Facilities

The expert panel acknowledges FEIT's significant investment in infrastructure as outlined in the FEIT 2025 strategy. The newly developed laboratories, including dry, wet, and computer labs, stand as tangible evidence of the faculty's commitment to augmenting practical learning experiences. Of noteworthy mention is the Telstra Creator Space @ Melbourne Connect, which expert panel members found to be a strategic space fostering innovation,

collaboration, and interaction with industry. These cutting-edge facilities, when integrated with the academic curriculum, create an environment conducive to pioneering research and experiential education.

Funding and Resource Allocation

In response to the SAR, the expert panel would like to underscore the pivotal role that funding plays in sustaining and enriching the academic landscape. The allocated budget of $335 million for 2022, composed of $215 million from teaching and learning activities, $107 million from research, and $13 million from other sources, demonstrates a comprehensive financial framework that supports diverse academic endeavours. The expert panel recognises the evolving financial decision-making structure within the faculty, transitioning toward decentralized allocation, a noteworthy shift that empowers departments to strategically invest in their initiatives.

Industry Engagement and Departmental Collaboration

The expert panel lauds FEIT's robust emphasis on industry engagement. The close relationship between academia and industry, as validated by industry feedback, underlines a dynamic interplay that benefits students, faculty, and industry partners alike. The innovative integration of industry professionals as educators in the foundational year courses aligns with the expert panel's vision of a practical, real-world curriculum that prepares students for the challenges of the professional landscape.

The expert panel highlights the pivotal role of the IAGs in nurturing a mutually beneficial relationship between FEIT and industry stakeholders. The boards' proactive involvement with individual departments exemplifies an effective mechanism for knowledge exchange and collaboration. This practice contributes to the ongoing alignment of educational offerings with industry demands, fostering an adaptable and responsive faculty that remains attuned to the evolving needs of the field.

From the expert panel's perspective, FEIT's resource allocation efforts have garnered recognition within the industry. The advancements in laboratory equipment noted by the expert panel members during the on-site visit are commendable. While acknowledging these achievements, the panel also concurs that there is room for further enhancement in certain areas, particularly in addressing the needs related to Computer Numerical Control (CNC). This constructive feedback provides valuable guidance for future refinements, to which the experts expect it to contribute.

Overall, the assessment reveals FEIT's proactive commitment to academic excellence and innovation. While evaluating infrastructure investments and facility developments, the

panel also acknowledges the significance of funding as a foundational pillar supporting diverse academic pursuits. FEIT's collaboration with industry partners through advisory boards, internships, and externships resonates with the panel's vision of a dynamic and industry-aligned educational landscape. The panel acknowledges the industry's recognition of FEIT's financing efforts, with particular commendation for laboratory enhancements.

In summary, the resource situation at FEIT is consistent with the expert panel's assessment of a synergistic mix of academic aspirations, industry imperatives, and student-centred innovation.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 3:

Overall, the experts consider this standard to be met by all the Master's programmes considered.

The expert team supports the Faculty's planning with respect to the modernisation of its facilities and laboratories, and recommends accordingly (see below, sec. F, recommendation 4).

4. Transparency and documentation

Criterion 4.1 Module descriptions

Evidence:

- Handbooks of the Master degree programmes available on the internet: https://handbook.unimelb.edu.au/2023/courses/mc-eleceng (Electrical Engineering); https://handbook.unimelb.edu.au/2023/courses/mc-mecheng (Mechanical Engineering); https://handbook.unimelb.edu.au/2023/courses/mc-indeng (Industrial Engineering); https://handbook.unimelb.edu.au/2023/courses/mc-mtrneng (Mechatronics Engineering) (Access: 31.07.2023), including: Study plans, subject/course descriptions
- Audit discussions

Preliminary assessment and analysis of the peers:

The experts take note that comprehensive module/subject descriptions are easily accessible in the so-called handbooks on the faculty's website. It is explicitly welcomed that updated handbooks are made available each October for the following academic year.

These descriptions provide students with all relevant information about their subjects. Starting with a general overview of the subject, they present the intended learning outcomes of the course, including generic skills, the prerequisite knowledge required for admission to the course, the forms of assessment, the dates and times relevant to the course, and, under the heading “Further information”, e.g. recommended literature, teaching and learning methods and related handbook entries. When examining the individual entries, the experts found that teaching and learning methods in particular were not always indicated and that literature recommendations were often missing.

As the experts are highly satisfied with the transparent and easily searchable presentation of the handbooks (including archived versions), they are inclined to recommend that lecturers and programme coordinators substantiate and supplement the handbooks accordingly where necessary.

Criterion 4.2 Diploma and Diploma Supplement

Evidence:

- Respective chapter of the SAR
- Exemplary issues of the AHEGS, Appendix C4 to the SAR
- Audit discussions

Preliminary assessment and analysis of the peers:

The expert panel recognises that the University of Melbourne and FEIT have in place a document, which is delivered with the Certificate on completion of the programme, that is substantially equivalent to the Diploma Supplement in the EHEA.

The aim of this Australian Higher Education Graduation Statement (AHEGS) is to describe a higher education qualification in a way that is easy to understand, and that briefly explains the type and level of study undertaken, together with information about the awarding institution and the education system under which the qualification has been awarded. Its intention is to provide graduates with an official document that can be used in Australia and internationally to provide employers or other stakeholders with a better understanding of Australian qualifications, and to enable graduates to be more mobile internationally. The experts learned that all students graduating from the University of Melbourne receive an AHEGS for their degree.

The available examples of the AHEGS – with the exception of the (new) Industrial Engineering programme – refer to the previous, now revised, structure of the Engineering programme and therefore do not reflect the characteristics of the actual Master’s programmes

in Electrical, Mechatronics, and Mechanical Engineering. An updated sample of the AHEGS for each programme (including specialisations where applicable) will therefore need to be provided as part of the further accreditation process.

Criterion 4.3 Relevant rules

Evidence:

- Respective chapter of the SAR
- All relevant rules and regulations available on the University's website: https://policy.unimelb.edu.au/; most relevant to the teaching and learning processes are: https://policy.unimelb.edu.au/category/Teaching%20and%20Learning/ (Access: 31.07.2023)

Preliminary assessment and analysis of the peers:

The expert panel acknowledges that all rules and regulations relating to the study course, the admission, assessment, progression and completion of studies are accessible to all stakeholders on the University's website.

The arrangement of statutes, by-laws, regulations and guidelines on a central platform is considered very helpful and the structure of these documents intuitive. Similarly, the clear and transparent version history – added to each document – helps to clarify which rules apply in case of uncertainty.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 4:

The experts believe that the standard is not yet fully met.

Diploma Supplement / all Master's programmes (crit. 4.2)

The experts welcome the AHEGS as an additional document, similar in many aspects respects to the European Diploma Supplement, providing additional information beyond the final grade of the engineering degree awarded. However, in order to reflect the new structure of the programmes, the AHEGS needs to be revised in the course of the accreditation procedure (see below, sec. F, requirement 2).

Module descriptions / all Master's programmes (crit. 4.1)

For the reasons explained in their preliminary assessment, the experts suggest that the module descriptions be improved accordingly (see below, sec. F, recommendation 5).

5. Quality management: quality assessment and development

Criterion 5 Quality management: quality assessment and development

Evidence:

- Respective chapter of the SAR
- University of Melbourne Graduate Engineering and its Programs Review, 2016, Appendix 5.1 to the SAR
- Audit discussions

Preliminary assessment and analysis of the peers:

The University of Melbourne exhibits a robust quality assurance (QA) system, integrating insights gleaned from interviews with key stakeholder groups. This system, functioning across different tiers, assures programme excellence through an intricate interplay of internal and external mechanisms.

The university's QA framework is a cohesive blend of multiple tiers of oversight. The Academic Programs Committee (APC) ensures that modifications to courses align with academic standards. The Teaching and Learning Quality Assurance Committee (TALQAC) evaluates teaching performance against national and international benchmarks. Student feedback is systematically gathered through the "End of Subject Survey (ESS)", allowing timely interventions for improvement.

Lecturers' comments unveil a comprehensive strategy to integrate students into evaluations. This involves formal processes and collaborative university events, confirming a constructive approach to addressing issues. The pivotal Master's Mentoring program supplements this by ensuring continuous programme enhancement, as substantiated by the university's allocation of funds for improvements. Students express satisfaction with their ability to contribute through evaluations, particularly the end-of-semester surveys. This underscores the university's commitment to providing a platform for their voices to shape programme development.

Stakeholder engagement extends beyond the classroom. Staff-Student Liaison Committees (SSLCs) foster open dialogue, facilitating dynamic adjustments during the semester. As already mentioned, IAGs contribute insights for relevant programmes to bridge academia and industry. These collaborations not only enhance curriculum design but also reinforce industry relevance.

The expert panel notes that external validation amplifies the university's commitment. Recognition under the EUR-ACE® system and the Washington Accord demonstrates the alignment of programmes with international standards. The commitment to excellence is evident in the proactive pursuit of accreditations and certifications. Students also highlight the value of external quality assurance (EQA) processes such as the ongoing accreditation in shaping their career trajectories. Their aspirations for studying abroad in the EU underscore the significance of smooth transitions facilitated by the combined efforts of IQA and EQA.

The expert panel's positive assessment resonates with stakeholders' perspectives. The faculty's proactive approach to curriculum enhancement is commended. Stakeholder engagement mechanisms, like SSLCs and IAGs, highlight inclusivity in decision-making. The integration of stakeholder feedback contributes to the continuous improvement of the university's programmes.

To sum up, the University's comprehensive QA system, informed by stakeholder insights, is a testament to its commitment to academic excellence. This multifaceted approach amalgamates internal processes, student engagement, industry collaboration, and external validations. In effect, the university not only ensures programmes quality but also nurtures a culture of continuous growth and development.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 5:

The expert team considers that the standard is substantially met.

D Additional Documents

No additional documents needed.

E Comment of the Higher Education Institution (10.09.2023)

The institution provided a statement to the report of the experts on the audit report, which is taken note of in the final assessment of the experts with regard to each criterion.

F Summary: Expert recommendations (14.09.2023)

Taking into account the additional information and the comments given by the Faculty of Engineering and Information Technology the peers summarize their analysis and **final assessment** for the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ma Mechanical Engineering	Accreditation for one year	EUR-ACE®	30.09.2030
Ma Mechatronics Engineering	Accreditation for one year	EUR-ACE®	30.09.2030
Ma Electrical Engineering	Accreditation for one year	EUR-ACE®	30.09.2030
Ma Industrial Engineering	Accreditation for one year	EUR-ACE®	30.09.2029

Requirements

For all degree programmes

A 1. (ASIIN 1.5) Establish a mechanism for the monitoring of the students' workload in order to identify significant discrepancies timely and take appropriate remedying measures.

A 2. (ASIIN 4.2) Revise the AHEGS in a programme-specific manner in order to reflect the new structure of the programme (including specializations, if applicable), and the individual performance in addition to the information about the national Australian higher education system.

For the Electrical Engineering Programme

A 3. (ASIIN 1.3) If the structure of the programme with specializations is to be maintained, the elective catalogues must be clearly tailored towards the specialization area and the capstone project mandatorily be chosen from the field of the specialization.

A 4. (ASIIN 1.3) If the specialization "Electronics and Photonics" is to be maintained, the core subjects of the second and third year must be revised to clearly reflect the Master's level of qualification.

Recommendations

For all degree programmes

E 1. (ASIIN 1.1) It is recommended that the programme learning outcomes be reviewed with particular attention to the gap between bachelor and master levels.

E 2. (ASIIN 2) It is recommended that, as an alternative, consideration be given to offering capstone projects on an individual basis to develop students' competence to work autonomously on real-world engineering problems using scientific engineering methods.

E 3. (ASIIN 2) It is recommended to consider raising the number of oral exams, where appropriate, and in accordance with the intended learning outcomes.

E 4. (ASIIN 3.3) It is recommended that the FEIT should follow the indicated modernisation path, for example in terms of specific laboratory equipment related to CNC.

E 5. (ASIIN 4.1) It is recommended to substantiate module/course descriptions by including teaching and learning methods, where necessary, as well as relevant literature from the respective subject-related field.

For the Industrial Engineering programme

E 6. (ASIIN 1.3) It is recommended to increase the number of electives in the programme in order to enhance opportunities for building an individual profile.

G Comment of the Technical Committees

Technical Committee 02 – Electrical Engineering/Information Technology (circulation procedure September 2023)

Assessment and analysis for the award of the ASIIN seal:

The technical committee discusses the case and follows the decision of the experts.

Assessment and analysis for the award of the EUR-ACE® Label:

The Technical Committee deems that the intended learning outcomes of the degree programmes do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committees 02.

The Technical Committee 02 – Electrical Engineering/Information Technology recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ma Mechatronics Engineering	Accreditation for one year	EUR-ACE®	30.09.2030
Ma Electrical Engineering	Accreditation for one year	EUR-ACE®	30.09.2030

Technical Committee 01 – Mechanical Engineering/Process Engineering (circulation procedure September 2023)

Assessment and analysis for the award of the ASIIN seal:

The technical committee discusses the case and follows the decision of the experts.

Assessment and analysis for the award of the EUR-ACE® Label:

The Technical Committee deems that the intended learning outcomes of the degree programmes do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committees 01.

The Technical Committee 01 – Mechanical Engineering/Process Engineering recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ma Mechanical Engineering	Accreditation for one year	EUR-ACE®	30.09.2030
Ma Mechatronics Engineering	Accreditation for one year	EUR-ACE®	30.09.2030

Technical Committee 06 – Engineering and Management, Economics (circulation procedure September 2023)

Assessment and analysis for the award of the ASIIN seal:

The technical committee discusses the case and follows the decision of the experts.

Assessment and analysis for the award of the EUR-ACE® Label:

The Technical Committee deems that the intended learning outcomes of the degree programmes do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committee 06.

The Technical Committee 06 – Engineering and Management, Economics recommends the award of the seals as follows:

Degree Programme	ASIIN-seal	Subject-specific label	Maximum duration of accreditation
Ma Industrial Engineering	Accreditation for one year	EUR-ACE®	30.09.2029

H Decision of the Accreditation Commission (22.09.2023)

Assessment and analysis for the award of the ASIIN seal:

The accreditation commission discusses the procedure and follows the vote of the experts and technical committees. They only recommend to add the term “group projects” to recommendation E2 to underline the issue of the recommendation.

Assessment and analysis for the award of the EUR-ACE® Label:

The Accreditation Commission deems that the intended learning outcomes of the degree programmes do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committees 01, 02 and 06.

The Accreditation Commission decides to award the following seals:

Degree Programme	ASIIN-seal	Subject-specific label*	Maximum duration of accreditation	Maximum duration of accreditation
Ma Mechanical Engineering	Accreditation for one year	EUR-ACE®	30.09.2030	Subject to the approval of the ENAEE Administrative Council
Ma Mechatronics Engineering	Accreditation for one year	EUR-ACE®	30.09.2030	Subject to the approval of the ENAEE Administrative Council
Ma Electrical Engineering	Accreditation for one year	EUR-ACE®	30.09.2030	Subject to the approval of the ENAEE Administrative Council
Ma Industrial Engineering	Accreditation for one year	EUR-ACE®	30.09.2029	Subject to the approval of the ENAEE Administrative Council

Requirements

For all degree programmes

A 1. (ASIIN 1.5) Establish a mechanism for the monitoring of the students' workload in order to identify significant discrepancies timely and take appropriate remedying measures.

A 2. (ASIIN 4.2) Revise the AHEGS in a programme-specific manner in order to reflect the new structure of the programme (including specializations, if applicable), and the individual performance in addition to the information about the national Australian higher education system.

For the Electrical Engineering Programme

A 3. (ASIIN 1.3) If the structure of the programme with specializations is to be maintained, the elective catalogues must be clearly tailored towards the specialization area and the capstone project mandatorily be chosen from the field of the specialization.

A 4. (ASIIN 1.3) If the specialization "Electronics and Photonics" is to be maintained, the core subjects of the second and third year must be revised to clearly reflect the Master's level of qualification.

Recommendations

For all degree programmes

E 1. (ASIIN 1.1) It is recommended that the programme learning outcomes be reviewed with particular attention to the gap between bachelor and master levels.

E 2. (ASIIN 2) It is recommended that, as an alternative to group projects, consideration be given to offering capstone projects on an individual basis to develop students' competence to work autonomously on real-world engineering problems using scientific engineering methods.

E 3. (ASIIN 2) It is recommended to consider raising the number of oral exams, where appropriate, and in accordance with the intended learning outcomes.

E 4. (ASIIN 3.3) It is recommended that the FEIT should follow the indicated modernisation path, for example in terms of specific laboratory equipment related to CNC.

E 5. (ASIIN 4.1) It is recommended to substantiate module/course descriptions by including teaching and learning methods, where necessary, as well as relevant literature from the respective subject-related field.

For the Industrial Engineering programme

E 6. (ASIIN 1.3) It is recommended to increase the number of electives in the programme in order to enhance opportunities for building an individual profile.

I Fulfilment of Requirements (24.09.2024)

Analysis of the experts and the Technical Committees (11.09.2024)

Requirements

For all degree programmes

A 1. (ASIIN 1.5) Establish a mechanism for the monitoring of the students' workload in order to identify significant discrepancies timely and take appropriate remedying measures.

Initial Treatment	
Peers	not (completely) fulfilled Justification: The HEI states that they do not see the need for further mechanisms to monitor student workload, as students already have various opportunities to provide feedback (including mid-semester staff-student liaison meetings, end-of-semester surveys, direct emails to the coordinator). The university indicates that it will remind all staff of the feedback policy and encourage students to use the existing feedback opportunities. The experts appreciate the existing feedback opportunities for students, but as these do not replace a precise monitoring mechanism of student workload, the experts consider that this requirement is not met. They also point out that the current feedback options appear to be insufficient, as students in the audit reported on time-consuming subjects that did not correspond to the credits awarded for them.
TC 01	Not fulfilled Vote: unanimous Justification: The TC follows the vote of the experts.
TC 02	Not fulfilled Vote: unanimous Justification: The TC follows the vote of the experts.
TC 06	fulfilled Vote: unanimous Justification: The technical committee discusses the fulfilment of the condition and comes to the decision that it considers condition A1 to be fulfilled, contrary to the vote of the reviewers. The

	condition related to establishing a mechanism to check the workload of the students and was based on the opinion of the students that there are discrepancies between the actual workload and the credit points awarded in some modules. However, it is also clear from the report that this is not a structural problem, i.e. neither the ability to study is jeopardised nor are there conspicuous failure and drop-out rates. The expert committee notes that the University of Melbourne has already established a range of feedback and monitoring options (end-of-semester survey, mid-semester staff-student liaison meetings, etc.). The university should simply be informed in the cover letter that a question on workload could be included in the end-of-semester survey. In conclusion, as there is no structural workload discrepancy, the TC considers the already established mechanisms to be sufficient.
AC	not fulfilled Vote: unanimous Justification: The Commission follows the vote of the experts and TC 01 and TC 02, as the actual requirement to establish specific monitoring of student workload has not yet been met.

A 2. Revise the AHEGS in a programme-specific manner in order to reflect the new structure of the programme (including specializations, if applicable), and the individual performance in addition to the information about the national Australian higher education system.

Initial Treatment	
Peers	Fulfilled Justification: The HEI provides revised AHEGS for each Master's programme. The new documents reflect the new structure of the programmes, the graduates' qualification profile as well as final grade/performance, and provide information about the national Australian higher education system.
TC 01	fulfilled Vote: unanimous Justification: The TC follows the vote of the experts.
TC 02	fulfilled Vote: unanimous Justification: The TC follows the vote of the experts.
TC 06	fulfilled Vote: unanimous Justification: The TC follows the vote of the experts.
AC	fulfilled

	Vote: unanimous Justification: The commission follows the vote of the experts.

For the Master's programme Electrical Engineering Programme

A 3. (ASIIN 1.3) If the structure of the programme with specializations is to be maintained, the elective catalogues must be clearly tailored towards the specialization area and the capstone project mandatorily be chosen from the field of the specialization.

Initial Treatment	
Peers	fulfilled Justification: The university states that the programme in Electrical Engineering has been redesigned based on the experts' suggestions: The first 2/3 of the curriculum now consists of masters-level core electrical and electronic engineering content that spans the discipline. The remaining 1/3 consists of advanced courses (electives). Specialisations are now defined by a four-subject sequence of advanced level electives. The experts find that the requirement has been adequately implemented by the institution. They note that there is no official regulation regarding the completion of the capstone project in the field of specialisation. However, they consider this to be fulfilled in terms of programme redesign and alignment with other engineering programmes.
TC 02	fulfilled Vote: unanimous Justification: The TC follows the vote of the experts.
AC	fulfilled Vote: unanimous Justification: The commission follows the vote of the experts.

A 4. (ASIIN 1.3) If the specialization "Electronics and Photonics" is to be maintained, the core subjects of the second and third year must be revised to clearly reflect the Master's level of qualification.

Initial Treatment	
Peers	Fulfilled Justification: The HEI explains that the specialisation has been renamed 'Electronics and Embedded Systems' to better reflect the content of the specialisation. In addition, several revisions have been made to the subjects in the specialisation. The experts welcome the

	changes and believe that the content of the core subjects now clearly reflects the Master's level.
TC 02	fulfilled Vote: unanimous Justification: The TC follows the vote of the experts.
AC	fulfilled Vote: unanimous Justification: The commission follows the vote of the experts.

Decision of the Accreditation Commission (24.09.2024)

Degree programme	ASIIN-label	Subject-specific label	Accreditation until max.
Ma Electrical Engineering	Requirement 1 not fulfilled	EUR-ACE®	6 months prolongation
Ma Mechatronics Engineering	Requirement 1 not fulfilled	EUR-ACE®	6 months prolongation
Ma Mechanical Engineering	Requirement 1 not fulfilled	EUR-ACE®	6 months prolongation
Ma Industrial Engineering	Requirement 1 not fulfilled	EUR-ACE®	6 months prolongation

J Fulfilment of Requirements (25.03.2025)

Analysis of the experts and the Technical Committees (10.03.2025)

Requirements

For all degree programmes

A 1. (ASIIN 1.5) Establish a mechanism for the monitoring of the students' workload in order to identify significant discrepancies timely and take appropriate remedying measures.

Initial Treatment	
Peers	not (completely) fulfilled Justification: The HEI states that they do not see the need for further mechanisms to monitor student workload, as students already have various opportunities to provide feedback (including mid-semester staff-student liaison meetings, end-of-semester surveys, direct emails to the coordinator). The university indicates that it will remind all staff of the feedback policy and encourage students to use the existing feedback opportunities. The experts appreciate the existing feedback opportunities for students, but as these do not replace a precise monitoring mechanism of student workload, the experts consider that this requirement is not met. They also point out that the current feedback options appear to be insufficient, as students in the audit reported on time-consuming subjects that did not correspond to the credits awarded for them.
TC 01	Not fulfilled Justification: The TC follows the vote of the experts.
TC 02	Not fulfilled Justification: The TC follows the vote of the experts.
TC 06	fulfilled Justification: The technical committee discusses the fulfilment of the condition and comes to the decision that it considers condition A1 to be fulfilled, contrary to the vote of the reviewers. The condition related to establishing a mechanism to check the workload of the students and was based on the opinion of the students that there are discrepancies between the actual workload and the credit points awarded in some modules. However, it is also clear

	from the report that this is not a structural problem, i.e. neither the ability to study is jeopardised nor are there conspicuous failure and drop-out rates. The expert committee notes that the University of Melbourne has already established a range of feedback and monitoring options (end-of-semester survey, mid-semester staff-student liaison meetings, etc.). The university should simply be informed in the cover letter that a question on workload could be included in the end-of-semester survey. In conclusion, as there is no structural workload discrepancy, the TC considers the already established mechanisms to be sufficient.
AC	not fulfilled Justification: The commission follows the vote of the experts and TC 01 and TC 02.
Secondary Treatment	
Peers	Fulfilled Justification: The HEI states that it has revised the student survey, which now includes a specific question on the verification of the workload and whether it is in line with the information provided in the module handbook. The experts consider this tool to be sufficient for monitoring student workload.
TC 01	Fulfilled Justification: The TC follows the vote of the experts.
TC 02	Fulfilled Justification: The TC follows the vote of the experts.
TC 06	Fulfilled Justification: The TC follows the vote of the experts.
AC	fulfilled Justification: The commission follows the vote of the experts.

Decision of the Accreditation Commission (25.03.2025)

Degree programme	ASIIN-label	Accreditation until max.	Subject-specific label	Accreditation until max.
Ma Electrical Engineering	All Requirements fulfilled	30.09.2030	EUR-ACE®	30.09.2029
Ma Mechatronics Engineering	All Requirements fulfilled	30.09.2030	EUR-ACE®	30.09.2029

Degree programme	ASIIN-label	Accreditation until max.	Subject-specific label	Accreditation until max.
Ma Mechanical Engineering	All Requirements fulfilled	30.09.2030	EUR-ACE®	30.09.2029
Ma Industrial Engineering	All Requirements fulfilled	30.09.2029	EUR-ACE®	30.09.2029

Appendix: Programme Learning Outcomes and Curricula

According to SAR (and respective website entry), the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master degree programme Electrical Engineering:

Master of Electrical Engineering

The Intended Learning Outcomes for the Master of Electrical Engineering are:

CLO 1. have gained fundamental knowledge in electrical engineering principles including the modelling, analysis and design of electrical and electronic circuits and complex engineering systems; techniques for test and measurement; and the interpretation of experimental data;

CLO 2. have gained core knowledge and practice in advanced electrical engineering topics including electronic system design; embedded computing; signal processing; automatic control; electric power systems; and telecommunications;

CLO 3. be able to apply fundamental electrical engineering knowledge to analyse and devise solutions for complex open-ended problems;

CLO 4. be conversant with important issues relevant to sectors influenced by electrical engineering, such as the sustainability of power, water and other resource distribution networks and the efficient operation of all infrastructure, the rise of automation, and privacy and security in the age of the internet;

CLO 5. understand how engineering-based industry functions and the business and ethical framework in which it operates;

CLO 6. have effective verbal and written communication skills that enable them to make a meaningful contribution to the changes facing society;

CLO 7. know and epitomise professional ethical behaviour and responsibilities towards their profession and the community, including having positive and responsible approaches to sustainable development, equipment and personal safety, management of information and professional integrity.

CLO 8. be able to execute a whole systems design cycle approach to a complex electrical engineering project including tasks such as prototyping/implementing the design solution, verifying performance against specification, and documenting, commissioning and reporting the design outcome.

In addition to the learning outcomes of the Master of Electrical Engineering, on completion of the Autonomous Systems specialisation, graduates will:

CLO A1. Be able to apply fundamental knowledge of automatic control, signal processing,

estimation and learning theory in the design and implementation of autonomous systems that can perceive situations, plan, and make decisions

CLO A2. Be able to apply fundamental knowledge of robust estimation, control, and optimisation in the design and implementation of decision-making systems for uncertain, dynamic environments using first principles and data-informed modelling techniques

CLO A3. Have developed the ability to create systems that can collaborate safely, reliably, and predictably across cyber, physical, and societal layers based on practical experience within the context of small-scale problems involving hardware, software, and human components

CLO A4. Be able to apply systematic and design-oriented (system) engineering approaches to the conduct and management of autonomous system design projects and communicate the outcomes.

In addition to the learning outcomes of the Master of Electrical Engineering, on completion of the Communications and Networks specialisation, graduates will:

CLO C1. Have gained fundamental knowledge in the principles that underpin communication systems and communication networks, including the modelling, analysis and design of digital communication systems and the workings of layered network architecture and network protocols

CLO C2. Have gained core knowledge and practice in advanced electrical engineering topics including embedded system design; embedded computing; signal processing; and telecommunications

CLO C3. Be able to apply fundamental knowledge of communication systems and communication networks to analyse and devise solutions to complex open-ended communication systems and network design problems

CLO C4. Have gained awareness of the broader context, implications and applications of digital communication systems and communication networks in society as well as an ability to behave ethically and communicate effectively with professionals across different disciplines.

In addition to the learning outcomes of the Master of Electrical Engineering, on completion of the Electronics and Photonics specialisation, graduates will:

CLO E1. Have developed advanced knowledge in the practice of electronic engineering and photonics including the modelling, analysis and design, testing and troubleshooting of complex devices, and systems

CLO E2. Be able apply knowledge in advanced electronic engineering and design skills to develop creative, innovative and sustainable solutions and systems to open-ended problems across diverse fields of engineering

CLO E3. Be able to utilise modern design and analysis tools for the analysis and design of electronic engineering systems

CLO E4. Have developed capacity to learn and absorb research to stay up to date with the progress

of electronic engineering field

CLO E5. Be able understand complex problems and diverse perspectives by drawing on a breadth of knowledge across electrical engineering and deep expertise in electronic engineering

CLO E6. Be able to extend application of the knowledge in advanced electronic engineering to broader challenges across the society

CLO E7. Be able to demonstrate the appreciation of implications of design, manufacturing, embedded information processing and automated decision making of electronic systems and solutions to the broader issues of preservation of privacy and ethical principles and sustainability.

In addition to the learning outcomes of the Master of Electrical Engineering, on completion of the Low-carbon Power Systems specialisation, graduates will:

CLO L1. Be able to apply physical principles, fundamental abstractions, and modelling techniques in the analysis of electrical power and energy components, systems, networks, and markets, also including renewable and low-carbon technologies

CLO L2. Have developed and demonstrated electrical engineering laboratory skills through simulation of electrical power systems using software tools as well as through real-life experiments on power system components and systems

CLO L3. Be able to demonstrate mastery of fundamental knowledge of mathematical and engineering techniques and basic optimisation tools for electrical power system and energy market applications

CLO L4. Be conversant with, and able to discuss broad issues influenced by electrical power system engineering, such as the energy trilemma of affordability, reliability and sustainability, internet-related privacy and security matters, and functioning and ethical aspects of the electricity sectors and relevant businesses and stakeholders

CLO L5. Have developed and mastered effective verbal and written communication skills, including for public presentations and professional technical reports, in power and energy systems and the broader electrical engineering domain.

In addition to the learning outcomes of the Master of Electrical Engineering, on completion of the Business specialisation, graduates will:

CLO B1. Have gained knowledge and practice in the business of engineering including contracts and procurement, entrepreneurship in engineering markets, operations management and economic analysis.

The following 2 tables have been completed in consultation with academic staff involved in the teaching of the Master of Electrical Engineering and its specialisations.

The following **curriculum** is presented:

Master of Electrical Engineering

Students graduating with an average University of Melbourne equivalent score of 65 from any 3-year degree program who have completed the equivalent of 25 points of tertiary level mathematics (equivalent to MAST10006 Calculus 2 and MAST10007 Linear Algebra) and 25 points of tertiary level physics (equivalent to PHYC10003 Physics 1 and PHYC10004 Physics 2) may be admitted to the 300 point, 3-year Master of Electrical Engineering program. This program has accreditation from ASIIN for EUR-ACE until 30 Sept 2023.

YEAR 1					
Semester 1			*Semester 2*		
ELEN20005	Foundations of Electrical Networks	12.5	ELEN30009	Electrical Network Analysis & Design	12.5
COMP20005	Intro to Numerical Computation in C	12.5	ELEN30011	Electrical Device Modelling	12.5
ELEN20006	Digital Systems	12.5	ELEN30012	Signals and Systems	12.5
MAST20029	Engineering Mathematics	12.5	ELEN30013	Electronic System Implementation	12.5
YEAR 2					
Semester 3			*Semester 4*		
ELEN90056	Electronic Circuit Design	12.5	ELEN90055	Control Systems	12.5
ELEN90054	Probability and Random Models	12.5	ELEN90066	Embedded System Design	12.5
ELEN90074	Introduction to Power Engineering	12.5	ELEN90057	Communication Systems	12.5
	Engineering Selective	12.5	ELEN90058	Signal Processing	12.5
YEAR 3					
Semester 5			*Semester 6*		
ENGR90037	Engineering Capstone Project Part 1	12.5	ENGR90038	Engineering Capstone Project Part 2	12.5
	Electrical Engineering Elective	12.5		Electrical Engineering Elective	12.5
	Electrical Engineering Elective	12.5		Electrical Engineering Elective	12.5
	Approved Elective†	12.5		Approved Elective†	12.5

† An approved elective is either (i) any postgraduate level subject or (ii) any technical third-year undergraduate subject. Students are encouraged to consider management/business subjects, such as Engineering Entrepreneurship, as well as to consider subjects from other engineering disciplines to broaden their study.

Electrical Engineering Electives					
ELEN90011	Directed Studies	12.5	ELEN90064	Advanced Control Systems	12.5
ELEN90026	Introduction to Optimisation	12.5	ELEN90075	Power Electronics	12.5
ENGR90033	Internship	25	ELEN90077	Grid Integration of Renewables	12.5
ELEN90051	Advanced Communication Systems	12.5	ELEN90088	System Optimisation & Machine Learning	12.5
ELEN90052	Advanced Signal Processing	12.5	ELEN90089	Communication Design Clinic	12.5
ELEN90053	Electronic System Design	12.5	ELEN90090	Autonomous Systems Clinic	12.5
ELEN90059	Lightwave Systems	12.5	ELEN90091	Semiconductor Devices	12.5
ELEN90060	Power System Analysis	12.5	ELEN90092	Low-carbon Grids: Operation & Economics	12.5
ELEN90061	Communication Networks	12.5	ELEN90093	Microprocessor Design Clinic	12.5
ELEN90062	High Speed Electronics	12.5	ELEN90094	Large Data Methods & Applications	12.5
Engineering Selective					
ENGR90021	Critical Communication for Engineers	12.5			
ENGR90034	Creating Innovative Engineering	12.5			
ENGR90039	Creating Innovative Professionals	12.5			

Master of Electrical Engineering (Autonomous Systems)

Students graduating with an average University of Melbourne equivalent score of 65 from any 3-year degree program who have completed the equivalent of 25 points of tertiary level mathematics (equivalent to MAST10006 Calculus 2 and MAST10007 Linear Algebra) and 25 points of tertiary level physics (equivalent to PHYC10003 Physics 1 and PHYC10004 Physics 2) may be admitted to the 300 point, 3-year Master of Electrical Engineering (Autonomous Systems) program.

YEAR 1						
Semester 1				*Semester 2*		
ELEN20005	Foundations of Electrical Networks	12.5		ELEN30009	Electrical Network Analysis & Design	12.5
COMP20005	Intro to Numerical Computation in C	12.5		ELEN30011	Electrical Device Modelling	12.5
ELEN20006	Digital Systems	12.5		ELEN30012	Signals and Systems	12.5
MAST20029	Engineering Mathematics	12.5		ELEN30013	Electronic System Implementation	12.5
YEAR 2						
Semester 3				*Semester 4*		
ELEN90054	Probability and Random Models	12.5		ELEN90058	Signal Processing	12.5
ELEN90055	Control Systems	12.5		ELEN90064	Advanced Control Systems	12.5
	Electrical Engineering Elective	12.5		ELEN90066	Embedded System Design	12.5
	Engineering Selective	12.5			Electrical Engineering Elective	12.5
YEAR 3						
Semester 5				*Semester 6*		
ENGR90037	Engineering Capstone Project Part 1	12.5		ENGR90038	Engineering Capstone Project Part 2	12.5
ELEN90052	Advanced Signal Processing	12.5			Electrical Engineering Elective	12.5
ELEN90090	Autonomous Systems Clinic	12.5			Electrical Engineering Elective	12.5
	Approved Elective†	12.5			Approved Elective†	12.5

† An approved elective is either (i) any postgraduate level subject or (ii) any technical third-year undergraduate subject. Students are encouraged to consider management/business subjects, such as Engineering Entrepreneurship, as well as to consider subjects from other engineering disciplines to broaden their study.

Electrical Engineering Electives						
ELEN90011	Directed Studies	12.5		ELEN90062	High Speed Electronics	12.5
ELEN90026	Introduction to Optimisation	12.5		ELEN90074	Introduction to Power Engineering	12.5
ENGR90033	Internship	25		ELEN90075	Power Electronics	12.5
ELEN90051	Advanced Communication Systems	12.5		ELEN90077	Grid Integration of Renewables	12.5
ELEN90053	Electronic System Design	12.5		ELEN90088	System Optimisation & Machine Learning	12.5
ELEN90056	Electronic Circuit Design	12.5		ELEN90089	Communication Design Clinic	12.5
ELEN90057	Communication Systems	12.5		ELEN90091	Semiconductor Devices	12.5
ELEN90059	Lightwave Systems	12.5		ELEN90092	Low-carbon Grids: Operation & Economics	12.5
ELEN90060	Power System Analysis	12.5		ELEN90093	Microprocessor Design Clinic	12.5
ELEN90061	Communication Networks	12.5		ELEN90094	Large Data Methods & Applications	12.5
Engineering Selective						
ENGR90021	Critical Communication for Engineers	12.5				
ENGR90034	Creating Innovative Engineering	12.5				
ENGR90039	Creating Innovative Professionals	12.5				

Master of Electrical Engineering (Business)

Students graduating with an average University of Melbourne equivalent score of 65 from any 3-year degree program who have completed the equivalent of 25 points of tertiary level mathematics (equivalent to MAST10006 Calculus 2 and MAST10007 Linear Algebra) and 25 points of tertiary level physics (equivalent to PHYC10003 Physics 1 and PHYC10004 Physics 2) may be admitted to the 300 point, 3-year Master of Electrical Engineering (Business) program. This program has accreditation from ASIIN for EUR-ACE until 30 Sept 2023.

YEAR 1					
Semester 1			*Semester 2*		
ELEN20005	Foundations of Electrical Networks	12.5	ELEN30009	Electrical Network Analysis & Design	12.5
COMP20005	Intro to Numerical Computation in C	12.5	ELEN30011	Electrical Device Modelling	12.5
ELEN20006	Digital Systems	12.5	ELEN30012	Signals and Systems	12.5
MAST20029	Engineering Mathematics	12.5	ELEN30013	Electronic System Implementation	12.5
YEAR 2					
Semester 3			*Semester 4*		
ELEN90056	Electronic Circuit Design	12.5	ELEN90055	Control Systems	12.5
ELEN90054	Probability and Random Models	12.5	ELEN90066	Embedded System Design	12.5
ELEN90074	Introduction to Power Engineering	12.5	ELEN90057	Communication Systems	12.5
	Engineering Selective	12.5	ELEN90058	Signal Processing	12.5
YEAR 3					
Semester 5			*Semester 6*		
ENGR90037	Engineering Capstone Project Part 1	12.5	ENGR90038	Engineering Capstone Project Part 2	12.5
	Business Selective	12.5		Business Selective	12.5
	Business Selective	12.5		Business Selective	12.5
	Electrical Engineering Elective	12.5		Approved Elective†	12.5

† An approved elective is either (i) any postgraduate level subject or (ii) any technical third-year undergraduate subject. Students are encouraged to consider management/business subjects, such as Engineering Entrepreneurship, as well as to consider subjects from other engineering disciplines to broaden their study.

Electrical Engineering Electives					
ELEN90011	Directed Studies	12.5	ELEN90064	Advanced Control Systems	12.5
ELEN90026	Introduction to Optimisation	12.5	ELEN90075	Power Electronics	12.5
ENGR90033	Internship	25	ELEN90077	Grid Integration of Renewables	12.5
ELEN90051	Advanced Communication Systems	12.5	ELEN90088	System Optimisation & Machine Learning	12.5
ELEN90052	Advanced Signal Processing	12.5	ELEN90089	Communication Design Clinic	12.5
ELEN90053	Electronic System Design	12.5	ELEN90090	Autonomous Systems Clinic	12.5
ELEN90059	Lightwave Systems	12.5	ELEN90091	Semiconductor Devices	12.5
ELEN90060	Power System Analysis	12.5	ELEN90092	Low-carbon Grids: Operation & Economics	12.5
ELEN90061	Communication Networks	12.5	ELEN90093	Microprocessor Design Clinic	12.5
ELEN90062	High Speed Electronics	12.5	ELEN90094	Large Data Methods & Applications	12.5
Engineering Selective			**Business Selective**		
ENGR90021	Critical Communication for Engineers	12.5	ENGM90006	Engineering Contracts and Procurement	12.5
ENGR90034	Creating Innovative Engineering	12.5	ENGM90014	The World of Engineering Management	12.5
ENGR90039	Creating Innovative Professionals	12.5	ENGM90012	Marketing Management for Engineers	12.5
			ENGM90011	Economic Analysis for Engineers	12.5
			ENGM90013	Strategy Execution for Engineers	12.5

Master of Electrical Engineering (Communications and Networks)

Students graduating with an average University of Melbourne equivalent score of 65 from any 3-year degree program who have completed the equivalent of 25 points of tertiary level mathematics (equivalent to MAST10006 Calculus 2 and MAST10007 Linear Algebra) and 25 points of tertiary level physics (equivalent to PHYC10003 Physics 1 and PHYC10004 Physics 2) may be admitted to the 300 point, 3-year Master of Electrical Engineering (Communications and Networks) program.

YEAR 1					
Semester 1			*Semester 2*		
ELEN20005	Foundations of Electrical Networks	12.5	ELEN30009	Electrical Network Analysis & Design	12.5
COMP20005	Intro to Numerical Computation in C	12.5	ELEN30011	Electrical Device Modelling	12.5
ELEN20006	Digital Systems	12.5	ELEN30012	Signals and Systems	12.5
MAST20029	Engineering Mathematics	12.5	ELEN30013	Electronic System Implementation	12.5
YEAR 2					
Semester 3			*Semester 4*		
ELEN90054	Probability and Random Models	12.5	ELEN90057	Communication Systems	12.5
ELEN90066	Embedded System Design	12.5	ELEN90061	Communication Networks	12.5
	Electrical Engineering Elective	12.5	ELEN90058	Signal Processing	12.5
	Engineering Selective	12.5		Electrical Engineering Elective	12.5
YEAR 3					
Semester 5			*Semester 6*		
ENGR90037	Engineering Capstone Project Part 1	12.5	ENGR90038	Engineering Capstone Project Part 2	12.5
ELEN90051	Advanced Communication Systems	12.5		Electrical Engineering Elective	12.5
ELEN90089	Communication Design Clinic	12.5		Electrical Engineering Elective	12.5
	Approved Elective†	12.5		Approved Elective†	12.5

† An approved elective is either (i) any postgraduate level subject or (ii) any technical third-year undergraduate subject. Students are encouraged to consider management/business subjects, such as Engineering Entrepreneurship, as well as to consider subjects from other engineering disciplines to broaden their study.

Electrical Engineering Electives					
ELEN90011	Directed Studies	12.5	ELEN90064	Advanced Control Systems	12.5
ELEN90026	Introduction to Optimisation	12.5	ELEN90074	Introduction to Power Engineering	
ENGR90033	Internship	25	ELEN90075	Power Electronics	12.5
ELEN90052	Advanced Signal Processing	12.5	ELEN90077	Grid Integration of Renewables	12.5
ELEN90053	Electronic System Design	12.5	ELEN90088	System Optimisation & Machine Learning	12.5
ELEN90055	Control Systems	12.5	ELEN90090	Autonomous Systems Clinic	12.5
ELEN90056	Electronic Circuit Design	12.5	ELEN90091	Semiconductor Devices	12.5
ELEN90059	Lightwave Systems	12.5	ELEN90092	Low-carbon Grids: Operation & Economics	12.5
ELEN90060	Power System Analysis	12.5	ELEN90093	Microprocessor Design Clinic	12.5
ELEN90062	High Speed Electronics	12.5	ELEN90094	Large Data Methods & Applications	12.5
Engineering Selective					
ENGR90021	Critical Communication for Engineers	12.5			
ENGR90034	Creating Innovative Engineering	12.5			
ENGR90039	Creating Innovative Professionals	12.5			

Master of Electrical Engineering (Electronics and Photonics)

Students graduating with an average University of Melbourne equivalent score of 65 from any 3-year degree program who have completed the equivalent of 25 points of tertiary level mathematics (equivalent to MAST10006 Calculus 2 and MAST10007 Linear Algebra) and 25 points of tertiary level physics (equivalent to PHYC10003 Physics 1 and PHYC10004 Physics 2) may be admitted to the 300 point, 3-year Master of Electrical Engineering (Electronics and Photonics) program.

YEAR 1					
Semester 1			*Semester 2*		
ELEN20005	Foundations of Electrical Networks	12.5	ELEN30009	Electrical Network Analysis & Design	12.5
COMP20005	Intro to Numerical Computation in C	12.5	ELEN30011	Electrical Device Modelling	12.5
ELEN20006	Digital Systems	12.5	ELEN30012	Signals and Systems	12.5
MAST20029	Engineering Mathematics	12.5	ELEN30013	Electronic System Implementation	12.5
YEAR 2					
Semester 3			*Semester 4*		
ELEN90056	Electronic Circuit Design	12.5	ELEN90053	Electronic System Design	12.5
ELEN90059	Lightwave Systems	12.5	ELEN90066	Embedded System Design	12.5
	Electrical Engineering Elective	12.5	ELEN90062	High Speed Electronics	12.5
	Engineering Selective	12.5	ELEN90091	Semiconductor Devices	12.5
YEAR 3					
Semester 5			*Semester 6*		
ENGR90037	Engineering Capstone Project Part 1	12.5	ENGR90038	Engineering Capstone Project Part 2	12.5
ELEN90093	Microprocessor Design Clinic	12.5		Electrical Engineering Elective	12.5
	Electrical Engineering Elective	12.5		Electrical Engineering Elective	12.5
	Approved Elective†	12.5		Approved Elective†	12.5

† An approved elective is either (i) any postgraduate level subject or (ii) any technical third-year undergraduate subject. Students are encouraged to consider management/business subjects, such as Engineering Entrepreneurship, as well as to consider subjects from other engineering disciplines to broaden their study.

Electrical Engineering Electives					
ELEN90011	Directed Studies	12.5	ELEN90061	Communication Networks	12.5
ELEN90026	Introduction to Optimisation	12.5	ELEN90064	Advanced Control Systems	12.5
ENGR90033	Internship	25	ELEN90074	Introduction to Power Engineering	12.5
ELEN90051	Advanced Communication Systems	12.5	ELEN90075	Power Electronics	12.5
ELEN90052	Advanced Signal Processing	12.5	ELEN90077	Grid Integration of Renewables	12.5
ELEN90054	Probability and Random Models	12.5	ELEN90088	System Optimisation & Machine Learning	12.5
ELEN90055	Control Systems	12.5	ELEN90089	Communication Design Clinic	12.5
ELEN90057	Communication Systems	12.5	ELEN90090	Autonomous Systems Clinic	12.5
ELEN90058	Signal Processing	12.5	ELEN90092	Low-carbon Grids: Operation & Economics	12.5
ELEN90060	Power System Analysis	12.5	ELEN90094	Large Data Methods & Applications	12.5
Engineering Selective					
ENGR90021	Critical Communication for Engineers	12.5			
ENGR90034	Creating Innovative Engineering	12.5			
ENGR90039	Creating Innovative Professionals	12.5			

Master of Electrical Engineering (Low-carbon Power Systems)

Students graduating with an average University of Melbourne equivalent score of 65 from any 3-year degree program who have completed the equivalent of 25 points of tertiary level mathematics (equivalent to MAST10006 Calculus 2 and MAST10007 Linear Algebra) and 25 points of tertiary level physics (equivalent to PHYC10003 Physics 1 and PHYC10004 Physics 2) may be admitted to the 300 point, 3-year Master of Electrical Engineering (Low-carbon Power Systems) program.

YEAR 1						
Semester 1				*Semester 2*		
ELEN20005	Foundations of Electrical Networks	12.5		ELEN30009	Electrical Network Analysis & Design	12.5
COMP20005	Intro to Numerical Computation in C	12.5		ELEN30011	Electrical Device Modelling	12.5
ELEN20006	Digital Systems	12.5		ELEN30012	Signals and Systems	12.5
MAST20029	Engineering Mathematics	12.5		ELEN30013	Electronic System Implementation	12.5
YEAR 2						
Semester 3				*Semester 4*		
ELEN90055	Control Systems	12.5		ELEN90066	Embedded System Design	12.5
ELEN90074	Introduction to Power Engineering	12.5		ELEN90060	Power System Analysis	12.5
	Electrical Engineering Elective	12.5		ELEN90075	Power Electronics	12.5
	Engineering Selective	12.5		ELEN90092	Low-Carbon Grids: Operation & Economics	12.5
YEAR 3						
Semester 5				*Semester 6*		
ENGR90037	Engineering Capstone Project Part 1	12.5		ENGR90038	Engineering Capstone Project Part 2	12.5
ELEN90077	Grid Integration of Renewables	12.5			Electrical Engineering Elective	12.5
	Electrical Engineering Elective	12.5			Electrical Engineering Elective	12.5
	Approved Elective†	12.5			Approved Elective†	12.5

† An approved elective is either (i) any postgraduate level subject or (ii) any technical third-year undergraduate subject. Students are encouraged to consider management/business subjects, such as Engineering Entrepreneurship, as well as to consider subjects from other engineering disciplines to broaden their study.

Electrical Engineering Electives						
ELEN90011	Directed Studies	12.5		ELEN90059	Lightwave Systems	12.5
ELEN90026	Introduction to Optimisation	12.5		ELEN90061	Communication Networks	12.5
ENGR90033	Internship	25		ELEN90062	High Speed Electronics	12.5
ELEN90051	Advanced Communication Systems	12.5		ELEN90064	Advanced Control Systems	12.5
ELEN90052	Advanced Signal Processing	12.5		ELEN90088	System Optimisation & Machine Learning	12.5
ELEN90053	Electronic System Design	12.5		ELEN90089	Communication Design Clinic	12.5
ELEN90054	Probability and Random Models	12.5		ELEN90090	Autonomous Systems Clinic	12.5
ELEN90056	Electronic Circuit Design	12.5		ELEN90091	Semiconductor Devices	12.5
ELEN90057	Communication Systems	12.5		ELEN90093	Microprocessor Design Clinic	12.5
ELEN90058	Signal Processing	12.5		ELEN90094	Large Data Methods & Applications	12.5
Engineering Selective						
ENGR90021	Critical Communication for Engineers	12.5				
ENGR90034	Creating Innovative Engineering	12.5				
ENGR90039	Creating Innovative Professionals	12.5				

According to SAR (and/or the respective website entry), the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master degree programme Mechatronics Engineering:

Master of Mechatronics Engineering

The Intended Learning Outcomes for the Master of Mechatronics Engineering are:

CLO 1. have gained knowledge and practice in mechatronics engineering fields of system dynamics and control, mechatronics systems design and integration, intelligent engineering solution, based upon the interconnection of mechanical, electrical and computing systems.

CLO 2. have gained knowledge and practice in advanced mechatronics engineering topics which might include applications in various industrial sectors and interdisciplinary engineering domains;

CLO 3. be able to apply their knowledge to analyse and design mechatronics systems and processes;

CLO 4. have developed problem solving and trouble shooting skills that may be applied in professional practice;

CLO 5. be able to demonstrate proficiency over established and emerging engineering methods and tools to solve practical engineering problems;

CLO 6. understand the basic principles underlying the management of physical, human and financial resources;

CLO 7. be able to undertake a piece of original research either within an industrial setting or in a laboratory, involving the collection of data, its objective analysis and interpretation;

CLO 8. have effective verbal and written communication skills that enable them to make a meaningful contribution to the changes facing society;

CLO 9. be conversant with important issues relevant to sectors influenced by mechatronics engineering, such as the sustainability of resources, the efficient operation of all processes, the rise of automation and intelligent processes, and privacy and security in the age of the internet; and,

CLO 10. know and epitomize professional ethical behaviour and responsibilities towards their profession and the community, including having positive and responsible approaches to sustainable development, process and personal safety, management of information and professional integrity.

In addition to the learning outcomes of the Master Mechatronics, on completion of the Manufacturing specialisation, graduates will[5]

- ✔ have gained knowledge and practice in mechatronics engineering with specialisation in manufacturing engineering, with a strong foundation in system dynamics and control, mechatronics systems design and integration, intelligent engineering solution, based upon the interconnection of mechanical, electrical and computing systems.
- ✔ have gained knowledge and practice in advanced mechatronics and manufacturing engineering topics which might include applications in various industrial sectors and interdisciplinary engineering domains;
- ✔ be able to apply their knowledge to analyse and design mechatronics systems and processes;
- ✔ have developed problem solving and trouble shooting skills that may be applied in professional practice;
- ✔ be able to demonstrate proficiency over established and emerging engineering methods and tools to solve practical engineering problems;
- ✔ understand the basic principles underlying the management of physical, human and financial resource;
- ✔ be able to undertake a piece of original research either within an industrial setting or in a laboratory, involving the collection of data, its objective analysis and interpretation;
- ✔ have effective verbal and written communication skills that enable them to make a meaningful contribution to the changes facing society;
- ✔ be conversant with important issues relevant to sectors influenced by mechatronics engineering, such as the sustainability of resources, the efficient operation of all processes, the rise of automation and intelligent processes,
- ✔ know and epitomize professional ethical behaviour and responsibilities towards their profession and the community, including having positive and responsible approaches to sustainable development, process and personal safety, management of information and professional integrity.

[5] https://handbook.unimelb.edu.au/2023/components/mc-mtrneng-spec-01/print (Access: 31.07.2023)

The following **curriculum** is presented:

Master of Mechatronics Engineering

Students graduating with an average University of Melbourne equivalent score of 65 from any 3-year degree program who have completed the equivalent of 25 points of tertiary level mathematics and 25 points of tertiary level physics may be admitted to the 300 point, 3-year Master of Mechatronics Engineering program.

YEAR 1					
Semester 1			*Semester 2*		
MAST20029	Engineering Mathematics	12.5	MCEN30021	Mechanical Systems Design	12.5
ENGR20004	Engineering Mechanics	12.5	MCEN30020	Systems Modelling and Analysis	12.5
ELEN20005	Foundations of Electrical Networks	12.5	ELEN30014	Analog and Digital Electronics Concepts	12.5
COMP20005	Intro. to Numerical Computation in C	12.5	ENGR30004	Numerical Algorithms in Engineering	12.5
YEAR 2					
Semester 3			*Semester 4*		
COMP90041	Programming and Software Development	12.5	ELEN90055	Control Systems	12.5
MCEN90032	Sensor Systems	12.5	ELEN90066	Embedded System Design	12.5
MCEN90038	Dynamics	12.5	MCEN90061	Mechatronics Systems Design	12.5
COMP90049	Introduction to Machine Learning	12.5		Engineering Selective	12.5
YEAR 3					
Semester 5			*Semester 6*		
ENGR90037	Engineering Capstone Project Part 1	12.5	ENGR90038	Engineering Capstone Project Part 2	12.5
	Elective Group A or Manuf. Specialisation	12.5		Elective Group A or Manuf. Specialisation	12.5
	Elective Group A or Manuf. Specialisation	12.5		Elective Group A or Manuf. Specialisation	12.5
	Elective Group A or Group B	12.5		Elective Group A or Group B	12.5

Group A Electives		
ELEN90064	Advanced Control Systems	12.5
ENGR90041	Engineering Research Project Part 1	12.5
ENGR90042	Engineering Research Project Part 2	12.5
ENGR90043	MechEng Summer Research Project	12.5
MCEN90017	Advanced Motion Control	12.5
MCEN90028	Robotics Systems	12.5
MCEN90041	Advanced Dynamics	12.5
MCEN90045	Aerospace Dynamics and Control	12.5
MCEN90048	Artificial Intelligence for Engineers	12.5

Engineering Selective		
ENGR90021	Critical Communication for Engineers	12.5
ENGR90034	Creating Innovative Engineering	12.5
ENGR90039	Creating Innovative Professionals	12.5

Manufacturing Specialisation Electives		
MCEN90055	Manufacturing Processes and Technology	12.5
MCEN90058	Industrial Engineering	12.5
MCEN90059	Probability, Reliability and Quality	12.5
MCEN90057	Manufacturing Automation and IT	12.5

Group B Electives		
BMEN90022	Computational Biomechanics	12.5
BMEN90034	Movement Neurorehabilitation Technology	12.5
COMP90015	Distributed Systems	12.5
COMP90018	Mobile Computing Systems Programming	12.5
ELEN30011	Electrical Device Modelling	12.5
ELEN90056	Electronic Circuit Design	12.5
ELEN90088	System Optimisation & Machine Learning	12.5
ELEN90090	Autonomous Systems Clinic	12.5
ELEN90094	Large Data Methods & Applications	12.5
ELEN90095	AI for Robotics	12.5
ENGR90026	Engineering Entrepreneurship	12.5
ENGR90033	Internship	25
MCEN90045	Aerospace Dynamics and Control	12.5
MCEN90046	Vibrations and Aeroelasticity	12.5
MCEN90050	Human Centred Mechanical Design	12.5
MCEN90053	Industrial Systems and Simulation	12.5
MCEN90054	Design and Manufacturing Practice	12.5
MCEN90055	Manufacturing Processes and Technology	12.5
MCEN90056	Industry Digital Transformation	12.5
MCEN90057	Manufacturing Automation and IT	12.5
MCEN90058	Industrial Engineering	12.5
MCEN90059	Probability, Reliability and Quality	12.5
MCEN90060	Sustainable and Life Cycle Engineering	12.5

According to SAR (and/or the respective website entry), the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master degree programme Mechanical Engineering:

Master of Mechanical Engineering

The Intended Learning Outcomes for the Master of Mechanical Engineering are:

CLO 1. have gained knowledge and practice in mechanical engineering fields of thermodynamics, fluid mechanics, solid mechanics, engineering materials, rigid body dynamics, system dynamics and control and engineering design;

CLO 2. have gained knowledge and practice in advanced mechanical engineering topics which might include applications in various industry sectors and interdisciplinary engineering domains;

CLO 3. be able to apply their knowledge to analyse and design mechanical systems and processes;

CLO 4. have developed problem solving and trouble shooting skills that may be applied in professional practice;

CLO 5. be able to demonstrate proficiency over established and emerging engineering methods and tools to solve practical engineering problems;

CLO 6. understand the basic principles underlying the management of physical, human and financial resource;

CLO 7. be able to undertake a piece of original research either within an industrial setting or in a laboratory, involving the collection of data, its objective analysis and interpretation;

CLO 8. have effective verbal and written communication skills that enable them to make a meaningful contribution to the changes facing society;

CLO 9. be conversant with important issues relevant to sectors influenced by mechatronics engineering, such as the sustainability of resources, the efficient operation of all processes, the rise of automation and intelligent processes, and privacy and security in the age of the internet; and,

CLO 10. know and epitomize professional ethical behaviour and responsibilities towards their profession and the community, including having positive and responsible approaches to sustainable development, process and personal safety, management of information and professional integrity.

In addition to the learning outcomes of the Master of Mechanical Engineering, on the completion of the Aeorospace specialization, graduates will[6]

- ✔ have gained knowledge and practice in mechanical engineering, with specialisation in aerospace engineering, with a strong foundation in the fields of thermodynamics, fluid mechanics, solid mechanics, engineering materials, rigid body dynamics, system dynamics and control and engineering design;
- ✔ have gained knowledge and practice in advanced mechanical and aerospace engineering topics which might include applications in various industry sectors and interdisciplinary engineering domains;
- ✔ be able to apply their knowledge to analyse and design mechanical and aerospace systems and processes;
- ✔ have developed problem solving and trouble shooting skills that may be applied in professional practice;
- ✔ be able to demonstrate proficiency over established and emerging engineering methods and tools to solve practical engineering problems;
- ✔ understand the basic principles underlying the management of physical, human and financial resource;
- ✔ be able to undertake a piece of original research either within an industrial setting or in a laboratory, involving the collection of data, its objective analysis and interpretation;
- ✔ have effective verbal and written communication skills that enable them to make a meaningful contribution to the changes facing society;
- ✔ be conversant with important issues relevant to sectors influenced by mechatronics engineering, such as the sustainability of resources, the efficient operation of all processes, the rise of automation and intelligent processes, and privacy and security in the age of the internet; and,
- ✔ know and epitomize professional ethical behaviour and responsibilities towards their profession and the community, including having positive and responsible approaches to sustainable development, process and personal safety, management of information and professional integrity.

[6] https://handbook.unimelb.edu.au/2023/components/mc-mecheng-spec-02/print (Access: 31.07.2023)

In addition to the learning outcomes of the Master of Mechanical Engineering, on the completion of the Business specialization, graduates will[7]

- ✔ have gained knowledge and practice in mechanical engineering, with specialisation in the business and management aspects of engineering, with a strong foundation in the fields of thermodynamics, fluid mechanics, solid mechanics, engineering materials, rigid body dynamics, system dynamics and control and engineering design;
- ✔ have gained knowledge and practice in advanced mechanical engineering topics and business principles which might include applications in various industry sectors and interdisciplinary engineering domains;
- ✔ be able to apply their knowledge to analyse and design mechanical and business systems and processes;
- ✔ have developed problem solving and trouble shooting skills that may be applied in professional practice;
- ✔ be able to demonstrate proficiency over established and emerging engineering methods and tools to solve practical engineering problems;
- ✔ understand the basic principles underlying the management of physical, human and financial resource;
- ✔ be able to undertake a piece of original research either within an industrial setting or in a laboratory, involving the collection of data, its objective analysis and interpretation;
- ✔ have effective verbal and written communication skills that enable them to make a meaningful contribution to the changes facing society;
- ✔ be conversant with important issues relevant to sectors influenced by mechanical engineering and engineering business systems, such as the sustainability of resources, the efficient operation of all processes, the rise of automation and intelligent processes, and privacy and security in the age of the internet; and,
- ✔ know and epitomize professional ethical behaviour and responsibilities towards their profession and the community, including having positive and responsible approaches to sustainable development, process and personal safety, management of information and professional integrity.

[7] https://handbook.unimelb.edu.au/2023/components/mc-mecheng-spec-04/print (Access: 31.07.2023)

In addition to the learning outcomes of the Master of Mechanical Engineering, on the completion of the Manufacturing specialization, graduates will[8]

- ✔ have gained knowledge and practice in mechanical engineering, with specialisation in manufacturing engineering, with a strong foundation in the fields of thermodynamics, fluid mechanics, solid mechanics, engineering materials, rigid body dynamics, system dynamics and control and engineering design;
- ✔ have gained knowledge and practice in advanced mechanical and manufacturing engineering topics which might include applications in various industry sectors and interdisciplinary engineering domains;
- ✔ be able to apply their knowledge to analyse and design mechanical and manufacturing systems and processes;
- ✔ have developed problem solving and trouble shooting skills that may be applied in professional practice;
- ✔ be able to demonstrate proficiency over established and emerging engineering methods and tools to solve practical engineering problems;
- ✔ understand the basic principles underlying the management of physical, human and financial resource;
- ✔ be able to undertake a piece of original research either within an industrial setting or in a laboratory, involving the collection of data, its objective analysis and interpretation;
- ✔ have effective verbal and written communication skills that enable them to make a meaningful contribution to the changes facing society;
- ✔ be conversant with important issues relevant to sectors influenced by mechatronics engineering, such as the sustainability of resources, the efficient operation of all processes, the rise of automation and intelligent processes, and privacy and security in the age of the internet; and,
- ✔ know and epitomize professional ethical behaviour and responsibilities towards their profession and the community, including having positive and responsible approaches to sustainable development, process and personal safety, management of information and professional integrity.

[8] https://handbook.unimelb.edu.au/2023/components/mc-mecheng-spec-01/print (Access: 31.07.2023)

In addition to the learning outcomes of the Master of Mechanical Engineering, on the completion of the Materials specialization, graduates will[9]

- have gained knowledge and practice in mechanical engineering, with specialisation in materials engineering, with a strong foundation in the fields of thermodynamics, fluid mechanics, solid mechanics, engineering materials, rigid body dynamics, system dynamics and control and engineering design;
- have gained knowledge and practice in advanced mechanical and materials engineering topics which might include applications in various industry sectors and interdisciplinary engineering domains;
- be able to apply their knowledge to analyse and design mechanical and materials systems and processes;
- have developed problem solving and trouble shooting skills that may be applied in professional
- be able to demonstrate proficiency over established and emerging engineering methods and tools to solve practical engineering problems;
- understand the basic principles underlying the management of physical, human and financial resource;
- be able to undertake a piece of original research either within an industrial setting or in a laboratory, involving the collection of data, its objective analysis and interpretation;
- have effective verbal and written communication skills that enable them to make a meaningful contribution to the changes facing society;
- be conversant with important issues relevant to sectors influenced by mechatronics engineering, such as the sustainability of resources, the efficient operation of all processes, the rise of automation and intelligent processes, and privacy and security in the age of the internet; and,
- know and epitomize professional ethical behaviour and responsibilities towards their profession and the community, including having positive and responsible approaches to sustainable development, process and personal safety, management of information and professional integrity.

[9] https://handbook.unimelb.edu.au/2023/components/mc-mecheng-spec-03/print (Access: 31.07.2023)

The following **curriculum** is presented:

Master of Mechanical Engineering

Students graduating with an average University of Melbourne equivalent score of 65 from any 3-year degree program who have completed the equivalent of 25 points of tertiary level mathematics and 25 points of tertiary level physics may be admitted to the 300 point, 3-year Master of Mechanical Engineering program.

YEAR 1						
Semester 1				*Semester 2*		
ENGR20004	Engineering Mechanics	12.5		MCEN30017	Mechanics and Materials	12.5
ENGR20005	Numerical Methods in Engineering	12.5		MCEN30018	Thermodynamics and Fluid Mechanics	12.5
ELEN20005	Foundations of Electrical Networks	12.5		MCEN30020	Systems Modelling and Analysis	12.5
MAST20029	Engineering Mathematics	12.5		MCEN30021	Mechanical Systems Design	12.5
YEAR 2						
Semester 3				*Semester 4*		
MCEN90014	Materials	12.5		MCEN90008	Fluid Dynamics	12.5
MCEN90015	Thermodynamics	12.5		MCEN90026	Solid Mechanics	12.5
MCEN90038	Dynamics	12.5		ELEN90055	Control Systems	12.5
MCEN90054	Design and Manufacturing Practice	12.5			Engineering Selective	12.5
YEAR 3						
Semester 5				*Semester 6*		
ENGR90037	Engineering Capstone Project Part 1	12.5		ENGR90038	Engineering Capstone Project Part 2	12.5
	Mechanical / Specialisation Electives*	12.5			Mechanical / Specialisation Electives	12.5
	Mechanical / Specialisation Electives	12.5			Mechanical / Specialisation Electives	12.5
	Mechanical Electives	12.5			Mechanical Electives	12.5

* Students undertaking no specialisation undertake 6 electives, at least 4 from group A and no more than 2 from group B. Students undertaking a specialisation undertake at least 4 specialisation subjects and up to 2 electives from group A or B

Note: In the below table specialisation subjects are notated in brackets after the subject name as per: Aerospace (Ae), Business (Bus), Manufacturing (Man), Materials (Mat).

Group A Electives			Group B Electives		
CHEN90043	High Performance Materials (Mat)	12.5	BMEN90022	Computational Biomechanics	12.5
ELEN90064	Advanced Control Systems	12.5	BMEN90029	Soft Tissue and Cellular Biomechanics	12.5
ENGM90006	Engineering Contracts and Procurement (Bus)	12.5	BMEN90034	Movement Neurorehabilitation Technology	12.5
ENGM90011	Economic Analysis for Engineers (Bus)	12.5	BUSA90473	Business Practicum	12.5
ENGM90012	Marketing Management for Engineers (Bus)	12.5	BUSA90485	Global Business Practicum	12.5
ENGM90013	Strategy Execution for Engineers (Bus)	12.5	ELEN90088	System Optimisation and Machine Learning	12.5
ENGM90014	The World of Engineering Management (Bus)	12.5	ELEN90094	Large Data Methods and Applications	12.5
ENGR90026	Engineering Entrepreneurship (Bus)	12.5	ENGR90024	Computational Fluid Dynamics	12.5
ENGR90033	Internship	25.0	ENGR90028	Introduction to Energy Systems	12.5
ENGR90041	Engineering Research Project Part 1	25.0	MCEN90017	Advanced Motion Control	12.5
ENGR90042	Engineering Research Project Part 2	25.0	MCEN90028	Robotics Systems	12.5
ENGR90043	MechEng Summer Research Project	12.5	MCEN90031	Applied High Performance Computing	12.5
MCEN90018	Advanced Fluid Dynamics (Ae)	12.5	MCEN90032	Sensor Systems	12.5
MCEN90019	Advanced Thermodynamics	12.5	MCEN90048	Artificial Intelligence for Engineers	12.5
MCEN90020	Additive Manufacturing of Metals (Mat)	12.5	MCEN90049	Helicopter Design	12.5
MCEN90029	Advanced Solid Mechanics	12.5	MCEN90050	Human Centred Mechanical Design	12.5
MCEN90041	Advanced Dynamics	12.5	MCEN90053	Industrial Systems and Simulation	12.5
MCEN90045	Aerospace Dynamics and Control (Ae)	12.5	MCEN90056	Industry Digital Transformation	12.5
MCEN90046	Vibrations and Aeroelasticity (Ae)	12.5	MCEN90060	Sustainable and Life Cycle Engineering	12.5
MCEN90047	Aerospace Propulsion (Ae)	12.5	MCEN90061	Mechatronics Systems Design	12.5
MCEN90052	Advanced Materials (Mat)	12.5	**Engineering Selective**		
MCEN90055	Manufacturing Processes and Technology (Man, Mat)	12.5	ENGR90021	Critical Communication for Engineers	12.5
MCEN90057	Manufacturing Automation and IT (Man)	12.5	ENGR90034	Creating Innovative Engineering	12.5
MCEN90058	Industrial Engineering (Man)	12.5	ENGR90039	Creating Innovative Professionals	12.5
MCEN90059	Probability, Reliability and Quality (Man)	12.5			
MCEN90062	Materials Modelling and Characterisation (Mat)	12.5			

According to SAR, the following **objectives** and **learning outcomes (intended qualifications profile)** shall be achieved by the Master degree programme Industrial Engineering:

Master of Industrial Engineering

The Intended Learning Outcomes for the Master of Industrial Engineering are:

CLO 1. Have a sound robust understanding of the fundamental scientific and engineering principles underlying the field of industrial engineering;

CLO 2. Have acquired the mathematical and computational skills necessary for the solution of theoretical and practical engineering problems;

CLO 3. Possess the ability for critical and systematic thinking in solving complex engineering problems and applying research skills in the engineering discipline;

CLO 4. Possess a proficiency over systematic engineering design for complex and practical problems, with the understanding of application context and contributing factors, such as resource and project management, and sustainability;

CLO 5. Possess a robust knowledge base of manufacturing and industrial engineering, operation and business management, and of other disciplines, to provide an integrated view of engineering problems and solutions;

CLO 6. Demonstrate proficiency over established engineering methods and tools to solve practical engineering problems;

CLO 7. Be professionally proud of the creativity, functionality, efficacy and the social benefits of their work;

CLO 8. Know and epitomize professional ethical behaviour and responsibilities towards their profession and the community, including having positive and responsible approaches to safety, management of information and professional integrity;

CLO 9. Have effective verbal and written communication skills that enable them to make a meaningful contribution to the changes facing our society;

CLO 10. Possess the ability to conduct oneself as a professional, effective and proactive team member and an understanding of team leadership; as well as building a creative and innovative attitude.

The following **curriculum** is presented:

Master of Industrial Engineering

Students graduating with an average University of Melbourne equivalent score of 65 from any 3-year degree program who have completed the equivalent of a major in engineering scoring an average weighted mark of at least 65% or have completed a 4-year Bachelor of Engineering with an average weighted mark of at least 65% may be admitted to the 200 point, 2-year Master of Industrial Engineering

YEAR 1					
Semester 1			*Semester 2*		
	Engineering Selective	12.5	MCEN90053	Industrial Systems and Simulation	12.5
MCEN90058	Industrial Engineering	12.5	MCEN90057	Manufacturing Automation and IT	12.5
MCEN90054	Design and Manufacturing Practice	12.5	MCEN90059	Probability, Reliability and Quality	12.5
MCEN90055	Manufacturing Processes and Technology	12.5	MGMT90032	Operations and Process Management	12.5
YEAR 2					
Semester 3			*Semester 4*		
ENGR90037	Engineering Capstone Projects Part 1	12.5	ENGR90038	Engineering Capstone Projects Part 2	12.5
MAST90014	Optimisation for Industry	12.5	MCEN90056	Industry Digital Transformation	12.5
MGMT90026	Supply Chain Management	12.5	MCEN90060	Sustainable and Life Cycle Engineering	12.5
ENGM90011	Economic Analysis for Engineers	12.5		Engineering Management Selective	12.5

Engineering Selective		
ENGR90021	Critical Communication for Engineers	12.5
ENGR90034	Creating Innovative Engineering	12.5

Engineering Management Selective		
ENGM90006	Engineering Contracts and Procurement	12.5
ENGM90013	Strategy Execution for Engineers	12.5
ENGM90014	The World of Engineering Management	12.5