ASIIN Seal & European Labels

Accreditation Report

Master's Degree Program

Master of Software Engineering
(including five specialisations)

Provided by the
The University of Melbourne – Australia

Version: 24 September 2024

Table of Content

A About the Accreditation Process

Name of the degree program (in original language)	**(Official) English translation of the names**	**Labels applied for [1]**	**Previous accreditation (issuing agency, validity)**	**Involved Technical Committees (TC)[2]**
Master of Software Engineerig *Previously known as Master of Engineering (Software)*	n/a	ASIIN, EUR-ACE® Label	ASIIN, 30.09.2016 – 30.09.2023	04, 02
Master of Software Engineering (Business) *Previously known as Master of Engineering (Software with Business)*	n/a	ASIIN, EUR-ACE® Label	ASIIN, 30.09.2016 – 30.09.20233	04, 02
Master of Software Engineering (Artificial Intelligence)	n/a	ASIIN, EUR-ACE® Label		04, 02
Master of Software Engineering (Cyber Security)	n/a	ASIIN, EUR-ACE® Label		04, 02
Master of Software Engineering (Distributed Computing)	n/a	ASIIN, EUR-ACE® Label		04, 02
Master of Software Engineering (Human Computer Interaction)	n/a	ASIIN, EUR-ACE® Label		04, 02
Date of the contract: 25.08.2022 **Submission of the final version of the Self-Assessment Report:** 30.05.2023 **Date of the audit:** 12.07. – 13.07.2023 **At:** The University of Melbourne, Melbourne Connect Building, Faculty of Engineering and Information Technology				
Expert Panel:				

[1] ASIIN Seal for degree programs; EUR-ACE® Label: European Label for Engineering Programs.

[2] TC: Technical Committee for the following subject areas: TC 04 – Informatics/ Computer Science; TC 02 Electrical Engineering/Information Technology.

Prof. Dr. Prof. h.c. Bettina Harriehausen-Mühlbauer, Hochschule Darmstadt University of Applied Sciences Prof. Dr.-Ing. Helena Szczerbicka, Leibniz University Hannover Dr. Andrew Lucas, Managing Director, AOS Group Bashini Dewage, student Master's Degree Information Technology, Swinburne University of Technology	
Representative of the ASIIN headquarter: Dr. Emeline Jerez	
Responsible decision-making committee: ASIIN Accreditation Commission for Degree Programs	
Criteria used: European Standards and Guidelines as of 15.05.2015 ASIIN General Criteria as of 28.03.2023 Subject-Specific-Criteria of the Technical Committee 04 – Informatics/ Computer Science as of 29 March 2018; 02 – Electrical Engineering/Information Technology as of 23 September 2022. EUR-ACE® Framework Standards and Guidelines, 2021	

B Characteristics of the Degree Program

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
Master of Software Engineering	Master	• Business • Artificial Intelligence • Cyber Security • Distributed Computing • Human Computer Interaction	EQF Level 7	Full time or part time; on campus	No	3 years or 6 Semesters (full time)	300 Credit Points (12.5 points per subject)	February 2022 (First intake Feb 2014 in the previously known version of Master of Engineering (Software) and Master of Engineering (Software with Business))

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

The experts acknowledge and consider the contextual framework within which the Master's degree program currently being assessed is offered:

The University of Melbourne was founded in 1853. It has 11 faculties and offers over 600 undergraduate and graduate degree programs. The University has a student population of 54,400, out of which 40% are international students. It is ranked as the 34th university globally and holds the top position in Australia according to THE (Times Higher Education) 2023 Ranking.

The Faculty of Engineering and Information Technology (FEIT) is one of the largest faculties at the University of Melbourne, with over 10,000 students enrolled in undergraduate and postgraduate programs, about one-third being international students. The faculty is organised into three schools: the School of Computing and Information Systems (CIS), which houses the ***Master of Software Engineering*** program, the School of Chemical and Biomedical Engineering (CBE), and the School of Electrical, Mechanical, and Infrastructure Engineering (EMI).

Each school offers a range of undergraduate and postgraduate programs in engineering and information technology. The student distribution at FEIT is 48% Bachelor's, 47% Master's, and 5% PhD. 33% of the students are female, reflecting efforts to promote gender diversity and inclusion in engineering and information technology.

According to FEIT's 2025 strategy, the Faculty of Engineering and Information Technology has seen significant growth over the last five years, particularly in its student population, primarily from international students. In continuation of this, FEIT aims to attract a diverse student body. The focus areas for 2025 include AI, data science and robotics, smart and sustainable development, health technologies, and defence technologies.

In 2008, the University of Melbourne introduced a new degree structure called the "Melbourne Model". This model aims to innovate from traditional undergraduate degree structures in Australia by emphasising breadth over depth, allowing students to customise their degrees, transfer between majors, and take subjects from other disciplines. The flexibility of this model is intended to enable students to adapt their studies according to their abilities and goals.

For the Master's degree program in Software Engineering, the University has presented the following profile on the program's website:

"The Master of Software Engineering is an entry-to-practice degree that provides students with the necessary knowledge and skills to enter the international workplace as software engineers. Graduates are skilled in software engineering principles and have the ability to apply these skills to complex, open-ended engineering tasks and problems. The degree provides sequential study in the software engineering discipline, building on a solid foundation in mathematics and programming.

Within the degree, students acquire core skills in the areas of software processes, project management, requirement analysis, design and architecture, implementation, testing, communication and teamwork. Students may also choose to undertake specialisations in business, artificial intelligence, distributed computing, cyber security and human-computer interaction. The degree culminates in a capstone experience in which students will work on a software engineering project involving real-life clients. Students have the opportunity to participate in overseas study, industry-based projects and supervised research."

The University views international accreditation as a strategic approach to upholding European engineering standards while also enhancing the diversity of its student population.

C Accreditation Report for the ASIIN Seal[4]

1. The Degree Program: Concept, content & implementation

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

Evidence:

- Self-Assessment Report
- Webpage Master of Software Engineering: https://study.unimelb.edu.au/find/courses/graduate/master-of-software-engineering/
- Curriculum Review, Graduate Engineering and IT Programs, Teaching and Learning Quality Assurance Committee (TALQAC), University of Melbourne, 2016
- MSE Response to Review Recommendations 2017-2019, Graduate Engineering and IT Programs, University of Melbourne
- Objectives-Module Matrix as part of the Self-Assessment Report (Appendix II)
- Discussion during the audit

Preliminary assessment and analysis of the experts:

The University of Melbourne seeks accreditation for the ***Master of Software Engineering program without specialisation and with specialisations***, namely **Business, Artificial Intelligence, Cyber Security, Distributed Computing and Human Computer Interaction**.

The objectives and learning outcomes of the program were analysed by the experts based on the descriptions in the Self-Assessment Report and several supporting documents, such as module descriptions and course-level mapping. The program profile is also presented on the respective website.

The Master's program under review is available for full-time and part-time study on campus. It is a 2–3 year degree (full-time), depending on the student's prior study, and requires the successful completion of 300 credit points. The intended learning outcomes (CLOs) are developed based on the program objectives and a stakeholder process involving

[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.

teaching and professional staff, current students, alumni, and industry representatives. CLOs align with the Australian Qualification Framework Level 9 and aim to meet and exceed Engineers Australia's Stage 1 Competencies (see Appendix I). The Master of Software Engineering program also meets the accreditation criteria set by the Australian Computer Society.

The Intended Learning Outcomes for the Master of Software Engineering are listed below:

"CLO 1	have gained knowledge and practice in software engineering topics including software processes, project management, requirement analysis, modelling, design, architecture, implementation and testing;
CLO 2	have gained knowledge and practice in advanced software engineering topics which include designing secure and reliable software, high-integrity systems, distributed systems, and advanced software architectures;
CLO 3	be able to apply their knowledge to plan, manage, analyse, design, and implement software products using appropriate processes;
CLO 4	have developed problem-solving and troubleshooting 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	be able to employ the basic principles underlying the management of physical, human, and financial resource;
CLO 7	be able to effectively work in teams to solve complex, open-ended software engineering problems that require significant research and exploration;
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 software engineering, such as the sustainability of resources, the efficient operation of all processes and privacy and security in the age of the internet; and,
CLO 10	develop 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, the program's website contains specific and well-defined learning outcomes for each specialisation.

It is positively noted that the learning outcomes for the Master's program are reviewed regularly along with the curriculum. The most recent curriculum review took place in 2016, resulting in a series of recommendations to improve teaching and learning, industry engagement, professional skills development in the core curriculum, innovative teaching support, and student support services. To address these recommendations, the University developed a comprehensive 3-year action plan (2017-2019), which was attached to the Self-Assessment Report.

In addition, an Industry Advisory Group (IAG) was formed in 2012 for the program, which meets two to four times throughout the year and works to support the School of Computing and Information Systems, providing advice on course content and relevance.

During the on-site visit, the only industry representative present recognises the graduates of the Master of Software Engineering program for their preparedness to enter the job market upon completing their studies. The industry representative expresses satisfaction with the graduates' technical skills.

In addition, the students attending the meeting convey to the experts their overall satisfaction with the program. They highlight the flexibility, the available specialisations, and the prospects it holds for their future careers.

Based on the stakeholder feedback, the expert group gains the impression that the imparted qualification profile meets the expectations of students and industry and allows the students to take up employment corresponding to their qualifications. **However, they acknowledge that this impression draws upon a small sample of three students and one industry representative.** This aspect warrants attention and consideration, as a more extensive and diverse sample, including alumni, would have provided a more robust foundation for this conclusion.

The experts highlight the program's strong focus on the core competence of Software Engineering. However, there are concerns about the level of industry relations due to the low turnout of industry representatives at the meeting and the absence of a comprehensive list of industry partners, particularly for the capstone project. **The experts believe that a critical aspect for improvement is the establishment of more robust connections with industry partners** (see also Criterion 1.3)**.**

Work in progress is dependable tracer studies keeping track of the success of national and international graduates in the labour market. As this was already an issue in the last accreditation, the experts recommend that the Faculty collects evidence systematically.

Together with the list of intended learning outcomes, the Faculty of Engineering and Information Technology has used the ASIIN Subject-Specific Criteria (SSC) of the Technical Committees 04 – Informatics/ Computer Science and 02 – Electrical Engineering/Information Technology as a point of reference. These field-specific criteria of ASIIN have been instrumental in providing the matrix presented in Appendix II, which lists subject-specific competencies, intended learning outcomes, and corresponding modules for the Master of Software Engineering graduates. Finally, FEIT also presents a matrix matching the intended learning outcomes with the individual subjects' learning outcomes. This has been done by identifying where a given competency is either taught, practised and/or assessed in the subject.

The expert team appreciates that the Faculty has engaged in extensive internal exercises, mapping the intended learning outcomes to the various subjects (in the ASIIN terminology modules) offered in the Master's program.

The University of Melbourne also applied for the EUR-ACE® (European Accredited Engineer) label. The EUR-ACE® label is a quality certificate for engineering programs and is recognised Europe-wide. During the accreditation process, the experts verified whether the Master of Software Engineering program complies with the criteria fixed in the EUR-ACE® Framework Standards. The Subject-Specific Criteria (SSC) of the Technical Committee for Electrical Engineering and Information Technology are closely linked to the EUR-ACE® Framework Standards. Consequently, the analysis of the Subject-Specific Criteria encompasses the EUR-ACE® Framework Standards in its various categories (knowledge and understanding, engineering analysis, engineering design, investigation and assessment, engineering practice, as well as transferable skills).

The category **Knowledge and Understanding** requires that Master graduates at the School of Computing and Information Systems have acquired extensive advanced knowledge of mathematical-scientific and engineering principles as well as a critical awareness of the latest findings in their discipline. Graduates are qualified to analyse and solve problems scientifically that are unusual or incompletely defined and show competing specifications; they abstract and formulate complex problems from new, emerging fields of their discipline and apply innovative methods to problem-solving.

In the area of ***Engineering Design***, Master's graduates are qualified to develop concepts and solutions for fundamentally orientated and partially unusual problems under the broad consideration of other disciplines and use their creativity to develop new and inventive products, processes and methods.

As regards ***Investigations and Assessment***, the Mater graduates are to investigate and assess the application of new and emerging technologies in their disciplines, plan and carry out analytic, model and experimental investigations, critically assess data and draw appropriate conclusions. As far as ***Engineering Practice*** is concerned, graduates are able to classify and systematically combine knowledge of different fields and handle complexity, familiarise themselves with the new and unknown, make an assessment of applicable methods and their limits and reflect on the non-technical effects of the engineering activity. In the area of ***Transferable/Soft Skills,*** graduates have the capacity to function effectively as leaders of a team that may be composed of different disciplines and levels and work and communicate effectively in (inter)national contexts.

In their analysis, the experts find that the subject-specific criteria of ASIIN/ EUR-ACE® criteria are covered in the learning objectives of the Master of Software Engineering program. The presented learning outcomes do correspond to the qualification descriptors relevant to level 7 (Master) of the European Qualifications Framework for Lifelong Learning. **As regards the attainment of "achieved" learning outcomes, the experts reserve their final verdict until they are provided with a representative sample of exams and student work. In connection with the review of the curriculum (under Criterion 1.3), the experts will decide whether the program matches the SSC of the relevant ASIIN Technical Committee in such a manner that they, at the same time, qualify for the EUR-ACE® Engineering label.**

Criterion 1.2 Name of the degree program

Evidence:

- Self-Assessment Report
- Study Handbook on the University Website: https://handbook.unimelb.edu.au/courses/mc-softeng

Preliminary assessment and analysis of the experts:

The title of the Master's program under review is outlined in the University's Self-Assessment Report and the online Handbook.

The award title is ***Master of Software Engineering***. Students can decide to complete their degree either with or without a specialisation. The specialisation names reflect established discipline names as follows:

- Master of Software Engineering (Business)
- Master of Software Engineering (Artificial Intelligence)
- Master of Software Engineering (Cyber Security)
- Master of Software Engineering (Distributed Computing)
- Master of Software Engineering (Human Computer Interaction)

These specialisations are, however, not a formal component of the degree title. The Master of Engineering degrees are awarded "with distinction" to high-achieving students.

Following a review conducted in 2019 and to enhance clarity in communication with potential students, internal stakeholders and employers, the University decided to change

the nomenclature of the standalone Master's programs from "Master of Engineering (Discipline)" to "Master of Discipline Engineering" from 2022 onward.

In light of the provided documentation, the experts confirm that the name of the Master program under review is appropriate and corresponds to the program's intended objectives and learning outcomes.

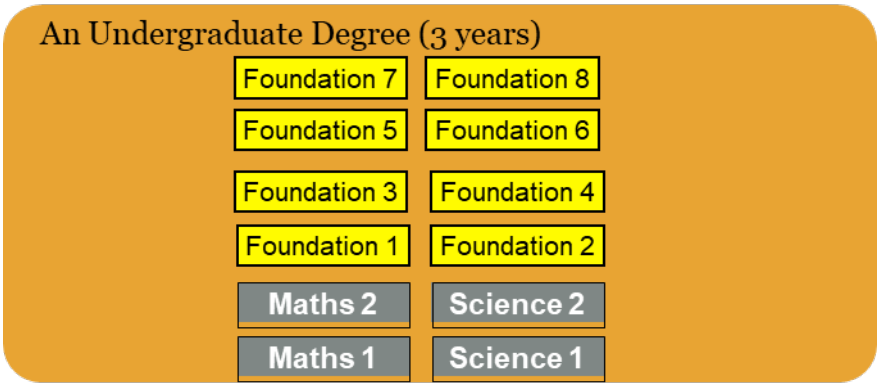
Criterion 1.3 Curriculum

Evidence:

- Self-Assessment Report
- Curricular overview of the study program under review
- Study Handbook on the University Website: https://handbook.unimelb.edu.au/courses/mc-softeng
- FEIT Study Abroad and Exchange data
- Curriculum Review, Graduate Engineering and IT Programs, Teaching and Learning Quality Assurance Committee (TALQAC), University of Melbourne, 2016
- ENGR90033 Internship – Review, Faculty of Engineering and Information Technology, 2022
- Discussion during the audit

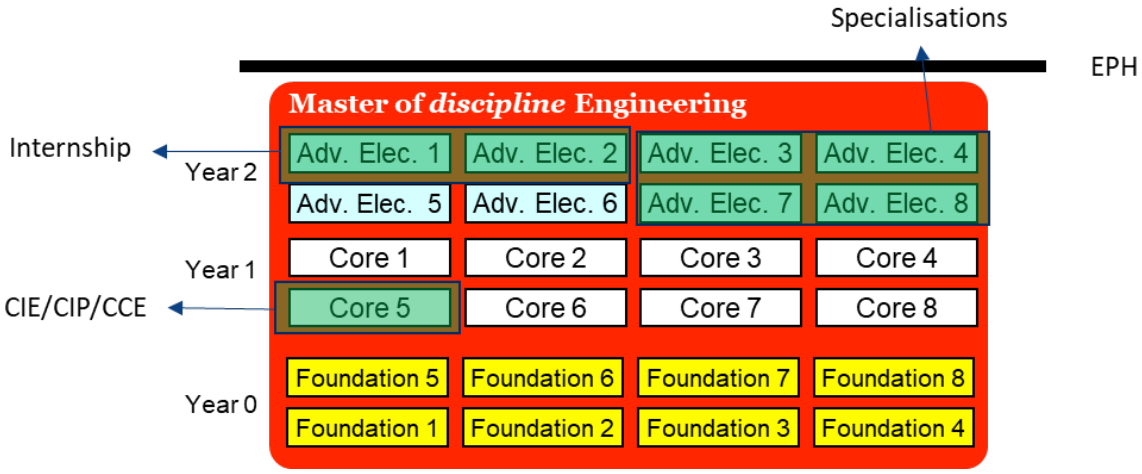
Preliminary assessment and analysis of the experts:
The expert team examines the structure of the Master's degree program and discusses the reception of the "Melbourne Model" among stakeholders.

The Melbourne Model
Students at the University of Melbourne begin their academic journey by pursuing either an undergraduate (bachelor's) degree or a combination of undergraduate and postgraduate programs. As depicted in the figure below, an undergraduate degree is three years, a year shorter than the standard four-year duration in other Australian universities. During this period, students focus on gaining an in-depth knowledge of their chosen field of study (major) while also studying subjects from other disciplines (breadth).



Source: Presentation, FEIT, University of Melbourne

After completing an undergraduate degree, students can enter the workforce or progress to a specialised graduate master's degree. The Master of Discipline Engineering programs are three-year courses that aim to impart the discipline's fundamental principles in the first year, consolidate the core discipline-based concepts in the second year, and conclude with a capstone project and electives in the third year. The overall structure of the Master's programs' curricula is presented by the University as follows:



Source: Presentation, FEIT, University of Melbourne

The Master of Software Engineering program

The Master's degree program under review is designed for 36 months full-time or 72 months part-time. However, the duration of the study varies according to the various entry pathways. For instance, the standard program duration is two years, represented by Year 1 and Year 2 in the visualisation above, for Bachelor's graduates majoring in Computing and Software Systems who follow the Melbourne curriculum. In addition, "lateral entry students" who completed their undergraduate studies in a different university may need an additional foundational year, represented by Year 0 in the visualisation, depending on the undergraduate courses they attended.

Each semester consists of 17 weeks, including twelve weeks of lectures, one mid-semester break week, one exam preparation week and three weeks of exams.

For "lateral entry students" needing to attend the preceding foundational Year 0, the first two semesters include Bachelor's level courses to ensure the foundational competencies required. Students extend their algorithmic thinking, programming, and database skills in the first semester. Across the year, they also study other software engineering-focused subjects and select subjects from the areas of science, engineering, and computer science:

YEAR 0 (Master of Software Engineering program with no specialisation as an example)						
Semester 1				***Semester 2***		
COMP20003	Algorithms and Data Structures	12.5		SWEN30006	Software Modelling and Design	12.5
SWEN20003	Object Oriented Software Development	12.5		COMP30026	Models of Computation	12.5
INFO20003	Database Systems	12.5		COMP30023	Computer Systems	12.5
	Soft Eng Group A Selective	12.5			Soft Eng Group B Selective	12.5

Source: Self-Assessment Report, FEIT, University of Melbourne.

In Year 1 of the actual Master's curriculum, students deepen their subject matter understanding on a Master's level by completing four core subjects in Software Engineering. Students also undertake the Engineering Selective, which is standard across all Master of Discipline Engineering degrees to introduce students to the engineering profession and engineering problem-solving:

YEAR 1 (Master of Software Engineering program with no specialisation as an example)						
Semester 1				***Semester 2***		
SWEN90009	Software Requirements Analysis	12.5		SWEN90006	Security & Software Testing	12.5
SWEN90016	Software Processes & Management	12.5		SWEN90014	Masters Software Engineering Project	12.5
	Engineering Selective	12.5			Software Engineering Elective	12.5
	Software Engineering Elective	12.5			Software Engineering Elective	12.5

Source: Self-Assessment Report, FEIT, University of Melbourne.

In Year 2 of the actual Master's curriculum, students complete five core subjects. The Masters Advanced Software Project Part 1 and Masters Advanced Software Project Part 2 are components of a 25-point (approx. 13-16 ECTS) capstone experience. In addition, students will choose two more Software Engineering electives, and one approved elective outside of IT and Computer Science domains to gain transferable skills:

YEAR 2 (Master of Software Engineering program with no specialisation as an example)						
Semester 1				***Semester 2***		
SWEN90017	Masters Advanced Software Project Pt 1	12.5		SWEN90018	Masters Advanced Software Project Pt 2	12.5
SWEN90004	Modelling Complex Software Systems	12.5		SWEN90007	Software Design and Architecture	12.5
SWEN90010	High Integrity Systems Engineering	12.5			Software Engineering Elective	12.5
	Software Engineering Elective	12.5			Approved Elective	12.5

Source: Self-Assessment Report, FEIT, University of Melbourne.

Students specialising in **Business** (refer to Appendix III) are required to take the following specialisation subjects: The World of Engineering Management, Economic Analysis for

Engineers, Engineering Contracts and Procurement, Marketing Management for Engineers, and Strategy Execution for Engineers.

Students specialising in **Artificial Intelligence** must take Introduction to Machine Learning and AI Planning for Autonomy.

The mandatory specialisation subjects for students specialising in **Cyber Security** are Distributed Systems, Introduction to Machine Learning, and Cryptography and Security.

If students specialise in **Distributed Computing**, the compulsory specialisation subject is Distributed Systems.

Finally, those specialising in **Human Computer Interaction** must take Designing Novel Interactions and Evaluating the User Experience.

In discussion with the teaching staff about the capstone project, the experts learn that the capstone experience is not intended to compare to an academic project. It aims to equip students with the necessary knowledge and skills to undertake real-life software engineering projects. During the audit, current degree students confirm that the capstone is a technical/practical-based experience that meets their expectations. They work in large teams of up to 10 -12 and use agile software engineering methods to develop a non-trivial software system for an external client.

Internship

In Year 2 of the actual Master's curriculum, one approved elective subject is a 320-hour internship that represents 25 credits (ENGR90033). This subject involves students undertaking professional work experience at a host organisation. A member of the academic staff and an external supervisor from the host organisation supervise the students. The experience allows students to become familiar with the workplace culture and enhance employability skills. Students are evaluated based on their engagement reports, which require them to reflect on their work environment, relationships with colleagues and supervisors, feedback received, and professional growth.

The experts inquire why the internship is currently offered as an elective subject. In response, the program coordinators clarify that students already have ample opportunities to engage with industry partners throughout the program. For instance, there is substantial interaction with real-life companies during the capstone project, and industry partners actively contribute to these projects. Moreover, the subject "Creating Innovative Engineering" (ENGR90034) is seen as an "externship" where students work on industry problems but from an external, off-site perspective.

Regarding the internship, the experts welcome the comprehensive SWOT analysis of the Internship subject undertaken by the University in late 2022. They also commend the Faculty of Engineering and Information Technology's efforts in promoting internships as a safe and insightful experience for students and industry partners.

In their assessment of the curricular structure of the program under review, the experts confirm that the Master's degree program is well-structured. There is evidence that the Melbourne Model has been successfully implemented and has brought benefits to the students. During the interviews, students express their overall satisfaction with the educational experience at the University of Melbourne. They receive good information about the program and acknowledge the benefits of the Melbourne Model as some of them are undertaking the three-year Master's program. The experts gain the impression that the program delivers on its promises.

However, as highlighted under Criterion 1.1, **there is a need to expand the network of industry partners collaborating with the program. In light of this, the experts recommend strengthening the relationship with the industry partners to enable internship options and capstone projects.**

The expert team also assesses whether the program fulfils the engineering-specific competences as per the SSC and qualifies for the EUR-ACE® label. They conclude that the Master of Software Engineering program (plus their five specialisations) is designed in a way to develop the competences as exemplified in the Subject-Specific Criteria of ASIIN and the requirements of the EUR-ACE® seal. **However, the experts see room for the inclusion of a research component in the curriculum. In the experts' eyes, moreover, not every aspect of managing the engineering process for capstone projects is adequately covered, as measured by EQF Level 7 standards.** More on this is outlined under Criterion 2.

International student mobility

The Faculty encourages its students to pursue international study experiences by participating in exchange programs at institutions abroad. Data from 2018 to 2022 reflects the number of Master of Engineering students engaged in these exchange opportunities. The FEIT statistics indicate that the leading destinations for short-term and semester-long programs include Asia, the USA and Europe. The COVID-19 pandemic understandably resulted in a slowdown in student mobility between 2020 and 2022. **The experts appreciate the available data but would have preferred access to more specific outbound and inbound student mobility information related to the Software in Engineering program for their assessment. The expert team kindly asks the Faculty to provide a list of international exchange partners and to provide an overview of how many students in the Master's program under review have actually engaged in international exchange.**

Although the Faculty provides support through Education Abroad Advisers at the dedicated Study Overseas office, **some students worry that studying abroad might lead to degree delays. The experts highly value the Faculty's efforts to foster student mobility. However, they believe there is still room for improvement in this aspect of the program. The experts recommend taking further steps to encourage academic mobility among students by establishing clear guidelines for crediting external courses taken abroad to avoid extension of the study period.**

Review of the Curriculum

The Teaching and Learning Quality Assurance Committee (TALQAC) at the University regularly reviews all curricula offered by FEIT. In 2016, TALQAC, alongside the Provost, the President of the Academic Board, and the Dean, commissioned a comprehensive review of the Engineering and IT programs. A thorough review of the Master of Discipline Engineering courses is scheduled towards the end of 2023.

On a course level, feedback is collected through standardised end-of-semester student surveys for every subject, including a free text form for students to provide additional comments. As per the program coordinators, student course feedback is regularly commented on, made available online, and discussed with students of the next class.

Overall, the experts are satisfied with the information provided regarding the curricular review procedures of the program.

Criterion 1.4 Admission requirements

Evidence:

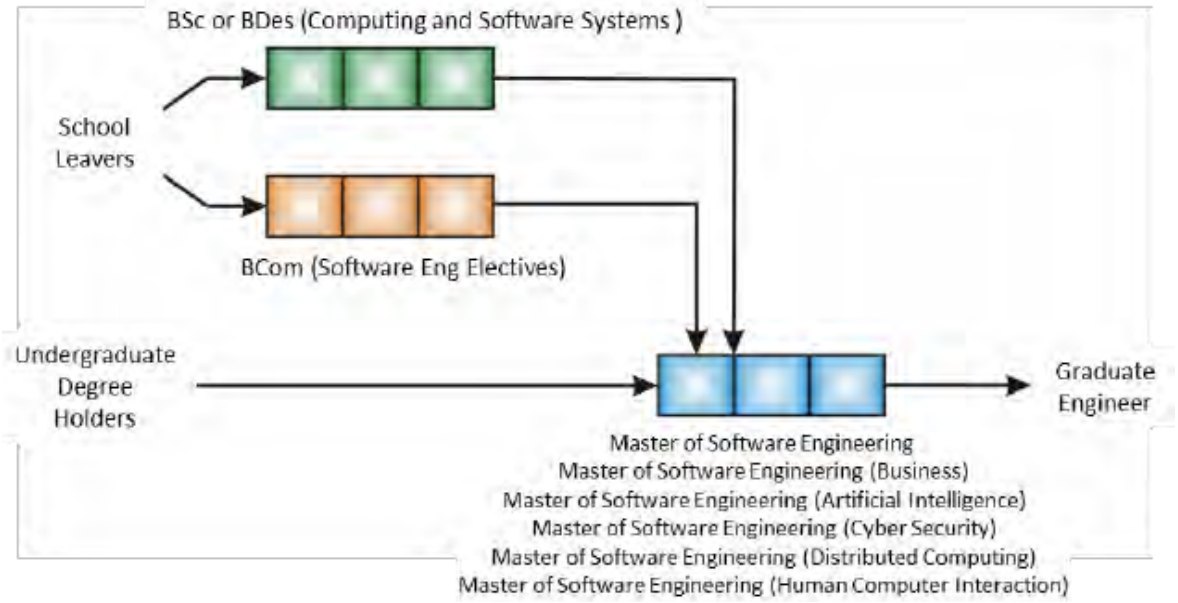
- Self-Assessment Report
- Selection and Admission Policy (MPF1295): https://policy.unimelb.edu.au/MPF1295/
- University web page: https://study.unimelb.edu.au/
- Discussions during the audit

Preliminary assessment and analysis of the experts:

Admission and selection of prospective students are clearly regulated at the University of Melbourne. The admission system is based on the University's Selection and Admission Policy. The entry requirements, application closing dates, and directions on how to apply are available on the University webpage and thus accessible to all stakeholders. The decision on admitting applicants is made at the department level.

As represented in the figure below, admission for the Master's program is organised through various pathways:

1. High school leavers must complete at least three years of full-time undergraduate study. If they seek entry into the Master of Software Engineering program, one option for meeting the requirements is pursuing the Computing and Software Systems Major in the Bachelor of Science or Bachelor of Design degree. Alternatively, students can complete a set of Software Engineering electives in the Bachelor of Commerce program.
2. Students who achieve a 65 average in the Bachelor of Science degree with a Computing and Software Systems major receive 100 points credit towards the 3-year Master's program. Those who complete the software engineering subjects in the Bachelor of Commerce degree usually receive around 50 points credit, allowing them to finish the Master's program in less than three years.
3. Students with a Bachelor's degree of at least three years can apply for the Master's program. If applying from another institution, they need a grade equivalent to 65 at the University of Melbourne and must have completed half a year of study in first-year mathematics and first-year computer science.



Source: Self-Assessment Report, FEIT, University of Melbourne. Each rectangle represents one year of studies.

Students applying to the Master of Software Engineering program from courses in languages other than English must meet the English language requirements through tests like IELTS, TOEFL, Pearson Test of English (Academic), or Cambridge English: Advanced/Certificate of Advanced English (CAE).

According to the Self-Assessment Report, senior and experienced academics are responsible for evaluating all applications for admission to the Master of Software

Engineering. The assessment considers the grading system used at the applicant's university, the institution's standing, and the institution's quality, particularly in the case of Chinese institutions, which are classified into three categories based on their performance and international standing (the lower the ranking, the higher the score must be).

Based on the enrolment data for 2022, 74% of the 120 admitted students were international, with 53% coming from China. The enrolment figures for the reviewed program decreased by approximately 20% in 2021. This was mainly due to a decrease in international students caused by the COVID-19 pandemic. In the discussions held during the audit, the experts learn that, in general, approximately 2000 students apply to the Master of Engineering programs. Out of these, 800 are admitted, resulting in an admission rate of 40%. Furthermore, about 75-80% of students admitted to the Master of Engineering programs are pathway students (follow the two-year track), while only 20-25% are “lateral entry students” (follow the three-year path).

In their assessment, the experts find that (prospective) students are informed in detail about the requirements and the necessary steps to apply for admission into the program. The corresponding rules and regulations are binding, transparent, and based on the University’s written regulations.

Students, during the interview, testify that they are informed in detail about the requirements and the necessary steps to apply for admission into the program. They are also convinced that the University of Melbourne is the place for qualifying and graduating.

The experts are being told that the University is keeping track of the performance record of its Master students so that an instrument is in place to monitor the performance records of students with various enrolment backgrounds. **In order to substantiate this claim, the experts request a detailed overview regarding the progression and dropout rates of recent student cohorts.**

Criterion 1.5 Workload and Credits

Evidence:

- Self-Assessment Report
- Study Handbook on the University Website: https://handbook.unimelb.edu.au/courses/mc-softeng
- Statistical Data on Study Subjects, 2022
- Discussions during the audit

Preliminary assessment and analysis of the experts:
The University of Melbourne uses a credit system to track student progress and achievement. Excluding the foundational year (Year 0 as specified in Criterion 1.3), the Master's program under review comprises 200.0 credit points.

The University maintains a standard of subjects (modules) awarding 12.5 credit points. Students usually enrol in four 12.5-point subjects each semester, making a standard load of eight 12.5-point subjects over a year. The larger subjects, like the capstone project, carry 25-point weighting and may be completed within a year.

Each 12.5-point Masters-level subject requires a total commitment of 200 hours (approx. 6-8 ECTS) from every student, which equates to 800 hours of workload (approx. 30 ECTS) for a whole semester. This includes:

- Attending all classes, such as lectures, tutorials, workshops, and laboratory classes.
- Undertaking any additional reading or viewing tasks.
- Private study revising and reviewing all notes, including reviewing lecture recordings.
- Completing all assessment items during the semester, such as reports, assignments, and projects.
- Preparing for mid-semester and/or end-of-semester examinations.
- Undertaking all examinations.

FEIT uses end-of-subject surveys to keep track of students' course workload. The Staff-Student Liaison Committee (SSLC) also plays a crucial role in this monitoring process, meeting once or twice per semester to provide academic staff with feedback on both subject- and program-level issues. This allows for more detailed adjustments throughout the semester than the official end-of-subject survey.

While the experts acknowledge that **it would have been essential to gain access to detailed data on student outcomes for the Master's program under review, such as average length of study, progression rates and number of dropout**s, they appreciated the positive aspect highlighted during the exchanges with the program coordinators. They learn that most students successfully complete their degree within the standard study period.

Overall, the experts are satisfied with the way the system of academic credits is administered by the University and the Faculty of Engineering and Information Technology for the Master of Software Engineering program and specialisations. In their discussions with students and staff alike, they learn of no complaints, students are generally satisfied with the workload and the distribution of credits between the semesters. The Module

Handbook for the program is available on the University website. It clearly details the time commitment and distinguishes between credits given for various forms of supervised studies and self-study time.

Criterion 1.6 Didactic and Teaching Methodology

Evidence:

- Self-Assessment Report
- Study Handbook on the University Website: https://handbook.unimelb.edu.au/courses/mc-softeng
- Discussion during the audit

Preliminary assessment and analysis of the experts:
In its Self-Assessment Report, the Faculty of Engineering and Information Technology records that appropriate didactical instruments and methods are implemented for the Master's degree program under review and that the variations in learning methods and tools are adjusted to the level of knowledge, skills, and competencies set in each module.

The university's approach to learning is student-centred and involves teaching methods that prioritise the student's involvement in the learning process. As students encounter various teaching methods that cater to different learning styles, these approaches seek to enhance non-technical abilities, including teamwork, time management, problem-solving skills, and self-direction. The primary teaching methods described in the online Handbook encompass lectures involving in-class discussions and case studies by academic staff and industry professionals, tutorials with problem-solving exercises, interactive workshops, individual/group work in a computer lab, presentations, and project-based work.

The delivery mode for the Master's program is on campus – with the exception of the special framework conditions during the Corona crisis -, but for some subjects, online, blended synchronous learning (BSL), or dual-delivery modes are also available. Blended Synchronous Learning (BSL) is a class format that lets students participate in class together, whether they are on campus or online. Equipped rooms allow seamless interaction between all attendees.

Subject delivery modes are published in the online Handbook. The availability of a particular class format is indicated in the University's online course timetable. Tutorials and other classes may be recorded and uploaded to the LMS so students can use the recordings to revise their subject material for assessments and exams.

In the discussions with staff, the experts learn that the Faculty has a number of mechanisms in place to upgrade the teaching capabilities of its lecturers. It is mandatory and fixed in the contracts for all new staff to enrol in courses for further developing skills in teaching, for all others, this I optional. These teacher-training courses for teachers are offered by different units, including the Teaching Learning Laboratory (TLL), the Learning Environment Centre, as well as the Melbourne Centre of Study for Higher Education. More details can be found under Criterion 3 in this report. The experts appreciate that courses for newly hired staff are peered by experienced staff participating in selected sessions. Colleagues continuously receiving less positive records from evaluations are required to participate in appropriate courses for improving their didactical skills.

The program coordinators inform the experts that industry experts are incorporated into mandatory and elective subjects as guest lecturers. Additionally, most faculty members maintain connections with the industry and relevant professional associations.

The experts confirm that a variety of learning methods are used, aligned with the intended learning outcomes. In the discussions with students, the experts learn that they are generally satisfied with the quality of teaching and learning in the program under review.

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

The experts thank the Faculty for the detailed statement and additional documents as exams and projects provided as well as for the statistical data provided.

Level of Qualification and Alignment with EUR-ACE® Criteria

Upon scrutiny of the abovementioned additional information, the experts conclude that the learning outcomes of the programmes under review correspond to level 7 (Master) of the European Qualification Framework (EQF), and suffice the respective Subject-Specific Criteria of the ASIIN Technical Committees 02 and 04. Furthermore, based on the Faculty's provided documentation, the discussions during the audit, as well as the additional statements and evidence provided, the experts conclude that the degree programme is aligned with the EUR-ACE® Framework Standards and Guidelines (EAFSG) for engineering programmes. Therefore, the experts conclude that the learning outcomes meet EQF-Level 7 and satisfy the subject-specific criteria for (SSC) determined by ASIIN's Technical Committees, and align with the requirements of the EUR-ACE® label

In summary, the experts consider criterion 1 to be fulfilled.

2. Exams: System, Concept and Organization

Criterion 2 Exams: System, concept and organization

Evidence:

- Self-Assessment Report
- Study Handbook on the University website: https://handbook.unimelb.edu.au/2023/courses/mc-softeng
- Assessment and Results Policy (MPF1326), University of Melbourne: https://policy.unimelb.edu.au/MPF1326/
- Academic Progress Review Policy (MPF1291), University of Melbourne: https://policy.unimelb.edu.au/MPF1291/
- Samples of student's work (Capstone projects on the University platform)
- The University's academic calendar: https://www.unimelb.edu.au/dates

Preliminary assessment and analysis of the experts:
The Faculty of Engineering and Information Technology presents the general rules for the examination and assessment systems applicable to the program under review. Exams in the Master of Software Engineering and specialisations follow detailed policies by the University.

Exams and the corresponding assessment rubrics measure students' learning outcomes according to a predefined grading scale reference. FEIT policy requires continuous assessment in each subject, preventing single-item evaluations and enabling student progress tracking and risk identification by staff. There are generally two modes of course evaluation:

1. Completion of assignments, projects, or laboratory work. Feedback is provided within three weeks of submission, and plagiarism is monitored using Turnitin and code similarity tools like Moss for assignments that involve code.
2. End-of-semester exam, as well as either a written assignment or a mid-semester test. These assessments provide students with feedback on their progress throughout the semester.

Each course's types of examinations and relevant expectations are publicly specified in the online Handbook, along with their weighting towards the final grade, expected timing during the semester, and the learning outcomes to be evaluated by the respective examination. Types of examination may not be changed after the course has commenced.

The form and length of each exam are also specified in the module descriptions available to the students via the University´s learning management system (LMS). The students also learn about mid-term and final exams via the University's academic calendar.

The final grade of each module is a combination of the scores of the individual types of assessment. The exact formula and the final grade required to pass the module are given in the module Handbook. Students receive a numerical grade on a scale of 0 to 100 for every subject. The student may receive a Pass or Honours result depending on the numerical grade. After the final assignments and exams for the semester, subject results are published through the University's electronic system (my.unimelb) by the dates specified on the institutional website.

At the end of each semester, the School of Computing and Information Systems conducts Examiners' Meetings before releasing the final results to the students. These meetings are usually attended by all academic staff who teach within the discipline. During the meetings, each subject is reviewed separately, and various aspects such as subject results, assessment components, student performance, and areas for improvement are discussed in detail for the next time the subject is taught.

Should a student fail, the assessment is re-marked by a second examiner. Students who fail a core subject must retake the subject. Re-sits or second examinations are only permitted under exceptional circumstances, such as sudden severe illness or family bereavement. A maximum of three attempts to pass an exam per subject is possible.

Special provisions may be made for students with an ongoing medical condition, such as additional reading/writing time. End-of-semester examinations are scheduled centrally by the University over a 13-day period. The exam schedules are adjusted to limit each student to a maximum of two written exams per day and no more than three exams in a 48-hour span.

The experts confirm that there is a form of assessment for each course and that all students are well-informed about the type of evaluation and the details of what is required to pass each module. The rules for re-sits are written down in the academic guidelines and, therefore, transparent to all stakeholders.

As stated in the University Handbook, the final assignment for the last year of the Master of Software Engineering and all specialisations is a Capstone Project. It encompasses 400 hours of workload (25 credits, approx. 13-16 ECTS) in the student's final year (see SWEN90017 and SWEN90018 subjects in Appendix III). The Capstone project intends to demonstrate students' abilities to design, analyse, implement, test, and deliver real-world

software systems. It also tests the ability to design appropriate software engineering processes for a specific problem or non-functional requirements, research and apply advanced computing technology to solve complex software engineering problems, efficiently manage large teams using various software engineering processes, and collaborate with external stakeholders to develop high-quality requirement specifications.

Individual and team components are assessed and given different weights to evaluate the Capstone project. The individual component is assigned 30% and involves a written assignment that focuses on the student's contribution to the team submission and professional development. The team component is given 70% and comprises a group assessment/project that includes performance assessments for four sprints (team submissions using software tools) during the year, team presentations, and the overall product.

During their exchanges with the program coordinators, the experts were explained that these projects, being specific to the profession-oriented Master of Engineering degrees, are not intended to compare to publication-oriented Master's theses found in Master of Science degrees at the University of Melbourne. In their discussion with the experts, the students express general satisfaction with the discipline-oriented nature of the program. They highlight the practical skills and competencies gained through the Capstone project.

In their assessment of this criterion, the expert group finds that appropriate rules and regulations, which govern the examination systems university-wide, are in place. The rules for re-sits are equally written down in the academic guidelines. These rules and regulations are adequately communicated and transparently published.

The experts also confirm that there are adequate forms and rubrics of assessment for each course in place and that students are generally well-informed about the type of evaluation and the details of what is required to pass each module in the Student Handbooks for each program. Lecturers in the discussion report that a variety of exam forms are used to check the attainment of the respective learning outcomes, including a mix of oral and written exams.

In the course of their perusal of a few Capstone projects via an online source and based on the stated intended learning outcomes for the project, **the experts see a heightened need for students to practically demonstrate their software development skills. The program's core focus on Software Engineering demands that each student is afforded the opportunity to actively participate in the role of developer. Additionally, they remark upon the recommendation mentioned in previous sections that the program would benefit from more industry partners. Practical work and industry experience are crucial components of the program.**

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

The experts thank the Faculty for the detailed statement. The university's explanation of the didactic concept is acceptable to the expert group. The concept of a group of students working together on a project that covers all aspects of software engineering and where all roles are distributed among the participants corresponds to a real situation, according to the experts. Nevertheless, students learn all the necessary steps of the project, even if they are not practically involved in all steps. In addition, a complete project report must be prepared. Moreover, individual reports and assessments of the individual contributions to the projects are made. Therefore, the experts are in favour of changing the requirement into a recommendation.

In summary, the experts consider criterion 2 to be fulfilled.

3. Resources

Criterion 3.1 HR Resources, Staff Development and Student Support

Evidence:

- Self-Assessment Report
- Staff CVs
- Academic Appointment, Performance and Promotion Policy (MPF1299), University of Melbourne: https://policy.unimelb.edu.au/MPF1299/
- Staff Development, Education and Training Procedure (MPF1149), University of Melbourne: https://policy.unimelb.edu.au/MPF1149/
- Special Studies Program (SSP) Guidelines and Process, Faculty of Engineering and Information Technology
- Student Equity and Disability Services: http://www.services.unimelb.edu.au/disability/
- Discussion during the audit

Preliminary assessment and analysis of the experts:

HR Resources

The University of Melbourne's teaching staff are categorised as professor, associate professor, reader, senior lecturer, lecturer, and tutors (or senior tutors). Typically, academics are appointed as lecturers directly from a post-doctoral position at another

institution. Advancement to higher levels requires a case to be argued by the applicant and supported by the respective Department or School.

Within FEIT, the number of Teaching and Research (T&R) and Education Specialist continuing staff has increased by 50%, going from 180 in 2018 to 270 in 2023. During the same period, the number of fixed-term staff has grown by 6.4%, rising from 250 to 266. Teaching and Research staff are expected to teach 2 to 2½ subjects per year, while Education Specialist staff are expected to teach up to 4 subjects per year and focus particularly on project subjects. Permanent staff (T&R and Education Specialists) account for the bulk of FEIT's teaching activities, although a considerable amount is also fulfilled by fixed-term and casual staff. According to the Self-Assessment Report, with over 80 continuing staff, the School of Computing and Information Systems has the highest number in this category.

Currently, the School's staff-student ratio, measured in terms of equivalent full-time students and full-time equivalent staff, is currently 23.2. This represents an improvement from the ratio of 27.3 observed during the last accreditation visit, which is explained due to the increase in staff as well as the post-COVID decrease in enrolments.

The professional staff has recently undergone a restructuring, resulting in the centralisation of some services such as IT. The staff members supporting FEIT's teaching and research activities include Operations Management, Academic Programs support, Student Enrichment (mobility, industry placements), Future Students (student recruitment and admissions handling), Facilities and Occupational Health and Safety, Human Resources, Marketing and Communications, Advancement, Research Services, and IT services. FEIT has more than 80 employees working in these areas.

Additionally, the Master's program often invites guest lecturers from industry who provide insights into specific scenarios and contexts that industry practitioners face. This supplements the more general content taught in other lectures.

Job Conditions and Performance Review of Staff

The University of Melbourne has established evaluation methods based on several mechanisms to gather students' perceptions of satisfaction with teaching and learning. More on this is outlined under Criterion 5.

Another critical component is the University's Academic Performance Framework (APF), which guides the planning, feedback, and reporting of academic performance for all academic positions. The APF focuses on three core dimensions: Activity (range and volume of academic activities), Engagement (nature and role of engagement with communities and industry), and Quality and Impact (academic excellence, originality, and influence).

The Academic Career Benchmarks and Indicators (ACBI) provide illustrative indicators of academic performance indicators. The university establishes confirmation criteria, probation criteria, and performance expectations for academic staff assessments, considering the core dimensions, as well as domains of Teaching and Learning, Research and Research Training, and Leadership and Service.

Worth noticing is that the University/Faculty has introduced the possibility to adapt the relative weight of the components mentioned above to the individual talents and interests of its staff members, with some lecturers emphasising the teaching and others their research record. The general scheme in place foresees a 40% weight for research and teaching each. This balance on request can be shifted to a maximum of 60% for either research or teaching, while the fraction for administration remains stable at 20%. The person in charge of promoting teaching staff is the head of the department. Meetings for this purpose are conducted annually with all teaching staff members. A lack of research funding is considered a serious drawback to being promoted.

HR Development

FEIT encourages its academic staff to develop their teaching skills and enrol in professional programs facilitated by the University's Centre for the Study of Higher Education, such as the Melbourne Teaching Certificate (MTC) and Graduate Certificate in University Teaching (GCUT).

The MTC is a semester-long program that provides a unique understanding of teaching at the University of Melbourne and Australian higher education. Participants collaborate with colleagues, develop an understanding of effective teaching, learning, and assessment principles in higher education, reflect on their teaching practices, and propose practical solutions for teachers across the university.

The GCUT is a part-time course designed to provide a critical understanding of effective teaching principles in higher education. Participants learn appropriate teaching approaches for different environments, large and small group teaching, assessment design, curriculum design, innovative procedures, and the use of educational technologies. The course emphasises reflection and continuous improvement of teaching practice.

In addition, FEIT established a Teaching and Learning Laboratory (TLL) in 2021. This laboratory intends to assist the professional development of the academic staff by providing training on various topics, including curriculum design, education technology, AI in education, project-based learning, and gender inclusion. The training program includes seminars and workshops that promote evidence-based best practices. TLL also supports the training and professional development of sessional staff through the Tutor and Demonstrator Development (TADD) program. Participation in these training courses is

usually mandatory for newly hired staff, for other staff categories, it is offered on a voluntary basis.

During the audit, the expert group was impressed to learn about the Faculty's Special Studies Program (SSP) from their discussions with FEIT staff. The program grants academic staff a paid six-month leave and additional financial support if they meet certain requirements. Its purpose is to advance individual and strategic objectives relating to research, teaching, innovation, or collaboration within the Faculty.

Support and assistance for students
The University of Melbourne and the Faculty for Engineering and Information Technology offers a broad range of support services for its student population. “Stop 1” is the University’s first contact point for student support by phone, email or live chat. Dedicated Stop 1 advisers help students in a wide range of areas, from administration and enrolments to health and wellbeing support and academic skills and career opportunities.

In addition, FEIT and the School of Computing and Information Systems have established various measures to aid students in their academic journey and track their progress in achieving the intended learning outcomes of the Master's program. The program coordinators inform the experts that, for example, academic assistance is available through weekly consultation sessions for each subject. These sessions offer students the chance to receive individualised feedback from their tutors and lecturers.

FEIT monitors students' academic progress and checks academic achievement to identify students “at risk” and possible remedial actions. A student is considered to be "at risk" of making unsatisfactory progress if they fail 50% or more of the enrolled credit points during a progress review period; fail a compulsory or core subject during their first attempt; have a "good standing" but fail a specific elective subject for the second time, or withdraw from all subjects during a progress review period.

In their appreciation of this criterion, the experts come to the following conclusions:
The teaching staff's composition, scientific orientation and qualifications, as specified in the Staff CVs, are suitable for successfully implementing and sustaining the program under review.

In the discussions with the expert team, the teaching staff confirm that a range of professional development options are available. The experts acknowledge that the University of Melbourne offers sufficient support mechanisms and opportunities for teaching staff members who wish to strengthen their professional and teaching skills. They also recognise the University's support for sabbaticals. This is usually done via a swap of teaching with colleagues. During the interviews, the teaching staff express high satisfaction

with their working conditions and professional development opportunities. Their enthusiasm, motivation, and commitment to their students is evident throughout the discussion. As regards the students, they are equally satisfied with the teaching staff as well as with the learning environment.

As regards students with disabilities, the experts can confirm that there are rules and regulations in place as well as institutional support on the level of the relevant Subject Coordinator and the Student Equity and Disability Services.

There is a good relationship between the students and the teaching staff; enough resources are available to provide individual assistance, advice and support for all students. The support system helps students achieve the intended learning outcomes and complete their studies successfully and without delay. The students are well-informed about the services available to them.

Criterion 3.2 Funds and equipment

Evidence:

- Self-Assessment Report
- Webpage Master of Software Engineering: https://study.unimelb.edu.au/find/courses/graduate/master-of-software-engineering/
- Discussion during the audit

Preliminary assessment and analysis of the experts:

As part of the Self-Assessment Report, the Faculty of Engineering and Information Technology describes its primary sources of income: 64% from its teaching and learning activities, including tuition fees, 32% from research and 4% from other sources. FEIT's income is allocated towards paying staff and university charges such as space, library, IT, property and buildings. Additional funds are available for FEIT-based activities such as student services, advancement, business analysis, finance support, marketing, recruitment and admissions, and research services. The single tuition fee for the Master of Software Engineering ranges from 38,700 (Australian full fee) to 50,000 (international full fee) AUD$/year (23,200 to 30,000 Euro/year). The University’s website outlines the specific tuition fee rates applicable to different groups.

As part of the FEIT 2025 strategy, there has been significant investment in infrastructure to support teaching and research activities. This encompasses laboratories and, notably, the Melbourne Connect Hub, where the audit was conducted. The School of Computer Information Systems (CIS) is well represented in this building. Students have various ways to utilise the building, such as open project spaces in active zones, seminar rooms for research and project meetings, and a collaborative area dedicated to academic, innovation, and industry interaction. Additionally, the Faculty has a presence at several other locations and plans to establish a new campus in 2025.

Melbourne Connect. Source: University of Melbourne.

Melbourne Connect includes the Telstra Creator Space and the Science Gallery. The creator space, which opened in 2021 as an accessible fabrication lab, is open to both FEIT staff and students. Following mandatory training, students can access a multitude of tools, laser cutters, and 3D printers to encourage innovative thinking and entrepreneurial thinking, as well as to provide a space for industry collaboration. The Science Gallery offers students opportunities to engage and showcase their innovations through curated themed exhibitions.

FEIT's lecture halls across different buildings and spaces come with modern audio-visual equipment that permits blended synchronous learning, as well as the automated recording and uploading of lectures. Collaborative learning spaces feature tables that are designed for group and collaborative learning. Additionally, FIET has created multiple informal learning spaces in the engineering precinct to promote a sense of community.

Students have full access to the University's library system, where they can find over 47,000 books and 14,100 volumes of international engineering journals. Moreover, the library subscribes to 377 international engineering journals, and students can access additional engineering journals online through its electronic resource system, Supersearch. This system allows students to access databases like SciFinder Scholar, ScienceDirect, Web of Science, ENGINE, Proquest, Compendex Web, SAI Global, Kluwer Online Journals, and Knovel.

FEIT provides students with access to 725 computers in its teaching spaces. These computers are available seven days a week from 6 am to midnight, except during scheduled classes. The availability of each computer can be checked in real-time through a web-based application. One-quarter of the computers are replaced every year on a rolling basis. FEIT

invests significantly in teaching software and hardware, with approximately 200 software packages available for student use.

The experts find no bottlenecks due to missing equipment or a lack of infrastructure. During the discussion with the expert group, the students confirm that they are generally satisfied with the available equipment, software packages and general support. The basic technical equipment for teaching students at the Master's level is available in sufficient numbers.

In light of the mentioned above, the experts judge the available funds, the technical equipment, and the infrastructure (laboratories, library, formal teaching spaces, etc.) to comply with the requirements for sustaining the degree program. They, moreover, commend the University for the innovative, future-oriented facilities available to the students and the excellent environment for teaching and other academic activities.

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

The experts consider criterion 3 to be fulfilled.

4. Transparency and documentation

Criterion 4.1 Module descriptions

Evidence:

- Self-Assessment Report
- Study Handbook on the University website: https://handbook.unimelb.edu.au/2023/courses/mc-softeng

Preliminary assessment and analysis of the experts:
The module Handbook for the Master's program under review is available through the University of Melbourne's website. It is thus accessible to the students as well as to all stakeholders.

The experts observe that the handbook entries contain the necessary information and are presented in a visually clear format. The information available includes the persons responsible for each module (coordinators), the workload, the credit points awarded, the intended learning outcomes, the examination requirements, the forms of assessment and details explaining how the final grade is calculated.

However, a number of module descriptions do not outline the "Learning and Teaching Methods" (under "Further Information" / "Subject Notes" in the individual course entries within the online handbook):

ENGR90033, ENGR90034, ENGR90036, ENGR90039, SWEN90016, SWEN90017, SWEN90018, COMP90016, COMP90057, COMP90073, COMP90074, COMP90077, COMP90083, COMP90084, COMP90085, COMP90086, COMP90087, COMP90089, COMP90090, INFO90003, INFO90004, INFO90005, INFO90006, INFO90007, ENGM90011, ENGM90012, ELEN90095, ELEN90096

The experts recommend reviewing this in order to ensure that the teaching methods for the mentioned modules are publicly accessible.

The experts in the interview learn, that students value the handbooks as a valuable information source: all students present considered the handbook as a useful source of information.

Criterion 4.2 Diploma and Diploma Supplement

Evidence:

- Self-Assessment Report
- Sample Australian Higher Education Graduation Statement (AHEGS) for the degree program under review

Preliminary assessment and analysis of the experts:
The auditors confirm that the students of the Master's degree program under review are awarded a Diploma ("testamur"), a Transcript of Records, as well as a Diploma Supplement upon graduation. The Diploma Supplement is embedded within the Australian Higher Education Graduation Statement (AHEGS), issued once a student has graduated.

Each AHEGS conforms to nationally agreed specifications approved by the Australian Department of Education. It contains five sections with all the necessary information about the degree program: the graduate; the award; awarding institution; graduate's academic achievements; and description of the Australian higher education system, including the Australian Qualifications Framework.

The academic transcript is an official record of the full academic history. It lists all the courses the graduate has completed, the achieved credit points, marks, grades, and cumulative GPA, and mentions the seminar titles.

The experts note that it would be desirable to include more extensive information concerning the graduates' profiles and achieved learning outcomes in the Diploma Supplement (the AHEGS). However, they understand that Australian Government regulation determines the document's content, and it cannot be altered arbitrarily, as already established in the previous accreditation report. **Before that background, the experts recommend issuing an additional Diploma Supplement according to the Bologna regulations.**

Criterion 4.3 Relevant rules

Evidence:

- Self-Assessment Report
- All relevant regulations as published in the University of Melbourne's Policy Library: https://policy.unimelb.edu.au/

Preliminary assessment and analysis of the experts:
As the Self-Assessment Report states, the University of Melbourne has a comprehensive repository that serves as a central hub for documenting its various policies and regulations. Some of these documents are listed below:

- Academic Freedom of Expression Policy (MPF1224)
- Academic Progress Review Policy (Coursework) (MPF1291)
- Assessment and Results Policy (MPF1326)
- Courses, Subjects, Awards and Programs Policy (MPF1327)
- Credit, Advanced Standing and Accelerated Entry Policy (MPF1293)
- Enrolment and Timetabling Policy (MPF1294)
- Revocation of Awards Policy (MPF1316)
- Establishment and Award of Student Awards Policy (MPF1062)
- Selection and Admission Policy (MPF1295)
- Student Academic Integrity Policy (MPF1310)
- Student Appeals Policy (MPF1323)
- Student Complaints and Grievances Policy (MPF1066)
- Student Conduct Policy (MPF1324)
- Student Fitness to Practice Policy (MPF1345)
- Student Fitness to Study Policy (MPF1349)

- Student Loans, Fees, and Charges Policy (MPF1325)
- Supervisor Eligibility and Registration Policy (MPF1322)

In view of the above, the auditors confirm that the rights and duties of both the University and the students are defined clearly and bindingly. All rules and regulations are published on the University's website and, therefore, available to all relevant stakeholders.

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

The experts consider criterion 4 to be fulfilled.

5. Quality management: quality assessment and development

Criterion 5 Quality management: quality assessment and development

Evidence:

- Self-Assessment Report
- The university's Academic Board webpage: https://about.unimelb.edu.au/strategy/governance/peak-bodies-structures/academic-board
- FEIT Industry Advisory Groups: Master of Software Engineering
- Discussion during the audit

Preliminary assessment and analysis of the experts:

The University of Melbourne presents a comprehensive external and internal quality assurance (QA) system, which operates at the University, Faculty, School, and Subject levels

Concerning the processes related to updating and modernising the course/program content, delivery and related QA matters, it is the Teaching and Learning Quality Assurance Committee (TALQAC), a committee of the Academic Board, which is in charge. It advises on quality assurance policies for courses, assessments, learning support, and student progress. It evaluates teaching and learning performance using national and international practices, including TEQSA's quality framework. TALQAC regularly review all programs. As indicated in Criterion 1.3, the last comprehensive curriculum review of the Master of Software Engineering and specialisations was undertaken in 2016. The following review of the curriculum is planned for late 2023.

At the university level, any substantial modifications to a course or subject, such as learning outcomes, assessment statements, or offering schedules, must be approved by the Academic Programs Committee (APC), a segment of the Academic Board. No changes may be made to a subject once the semester has commenced.

As regards other quality instruments in place, students are regularly asked to provide feedback on each of their attended courses through a standardised course evaluation survey ("End of Subject Survey (ESS)"). The survey results are distributed to Deans, Heads of Departments, and academic staff for each subject. If a subject scores lower than expected (3.5 and below on a 1-5 scale), the Head of Department will meet with the subject coordinator to create a performance improvement plan. The Teaching and Learning Laboratory may also assist with understanding student feedback and suggest improvements. As explained to the experts during the discussion with the program coordinators, lecturers are asked to discuss the received feedback and any action taken as a result with students of the next class.

Apart from the surveys, each discipline or department has a Staff-Student Liaison Committee (SSLC) that meets once or twice a semester to provide feedback on subject- and program-level issues. SSLCs allow for specific adjustments during the semester and contribute to improving program quality by monitoring subject delivery, discussing curriculum relevance, identifying duplicated material, highlighting good practices, and monitoring student workloads. Committees include student representatives from all year levels and teaching staff, who collect confidential information on student opinions.

Students can also provide feedback directly to the Head of Department/School and through their student club leaders who attend the Student Wellbeing Committee meetings.

To foster the integration of industry perspectives, FEIT has established Industry Advisory Groups (IAGs) for all Master of Engineering degrees. The School of Computing and Information Systems IAG was formed in 2012 with members from various industries and the university. They provide valuable insights to aid strategic planning, teaching, and research programs. The group meets 2 to 4 times a year to increase industry participation in the school's activities. They have contributed to the curriculum design of the Master of Software Engineering through guest lectures, real-world case studies, industry-based projects, site visits, and preparation for employment.

In addition to these internal QA mechanisms, external accreditations/certifications are pursued through pertinent national and international subject-relevant agencies and labels. The Master of Software Engineering is professionally recognised under EUR-Inf® and the Washington Accord through Engineers Australia. The Australian Computer Society also recognises the program.

Overall, the expert panel has a positive impression of the quality assurance system for the program under review. They commend the teaching staff for their commitment to the continuous improvement of the study program curriculum. Quality management has a high priority within the University, and a variety of functioning structures have been created, which feed into continuous improvement cycles for the program under review.

They consider the University of Melbourne and the Faculty of Engineering and Information Technology to conduct a sufficient number of evaluations to survey the opinion of students, stakeholders, and staff on a regular basis. The results of these processes are incorporated into the continuous development of the program.

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

The experts consider criterion 5 to be fulfilled.

D Additional Documents

Before preparing their final assessment, the panel asks that the following missing or unclear information be provided together with the comment of the Higher Education Institution on the previous chapters of this report:

- The experts kindly ask that a representative sample of exams and student work be made available to make an informed decision on whether the achieved student learning outcomes are consistently aligned to a Master's level qualification.
- The expert team kindly asks the Faculty to provide a list of international exchange partners and to provide an overview of how many students in the Master's program under review have actually engaged in international exchange.
- The Faculty is kindly asked to provide statistical data regarding the program under review for admission, progression, drop-out rates and standard periods of studies for the past three student intakes/cohorts.

E Comment of the Higher Education Institution (31.08.2023)

The institution provided a detailed statement as well as the following additional documents:

- Sample of exams
- Project reports
- Samples of source code submissions
- Project evaluation criteria and samples of the assessments
- List of mobility-related agreements
- List of partners (from industry)
- Statistical data on drop-out rates, distribution of grades, standard periods of studies for the past three student cohorts

The University provided the following detailed statement:
The experts kindly ask that a representative sample of exams and student work be made available to make an informed decision on whether the achieved student learning outcomes are consistently aligned to a Master's level qualification.

We would like to point out that all our programs (including the Master of Software Engineering) have been accredited by ASIIN with the EUR-ACE ("European Accredited Engineer") professional quality label since 2011. Our curriculum have been assessed by two independent ASIIN panels -- Engineer Australia (EA) and Australian Computer Society (ACS) to be at AQF (Australian Qualifying Framework) level 9 (which is equivalent to EQF (European Qualifications Framework) level 7 according to the Industry Qualifications Accreditation International) since 2011. The level of difficulty, academic competency and depth of all our subjects/modules have pretty much remain the same. Granted, some content has been updated following feedback from our Industry Advisory Groups, but these changes were made with rigor and care that maintains our subjects/modules to deliver knowledge consistent with AQF level 9.

The samples of exams and student work in all subjects are provided in the shared folder. For the capstone projects (the pairs of subjects SWEN9001 and SWEN90018), students were required to use industry-standard tools as part of their project development, such as GitHub, BitBucket, Jira, Trello, Slack and Confluence, as part of their project development. The students were required to create and manage accounts for these tools themselves and

add the project supervisors as users to observe and assess the student works and contributions. In most cases, we do not have the capability to add other users (e.g., ASIIN) to these software development tools as the students own the accounts and could not provide all the artefacts that the students produced (e.g., source code, deployed software systems). The complete project reports we have provided (see in the Capstone folder) should show all the key information and artefacts that the students produced in the projects.

Nevertheless, we provide the samples of source code submissions (see Source Code Submission - Team C.zip and Source code Submission - Team T.zip), project evaluation criteria and samples of the assessments (see Project Evaluation Team C and T.xlsx and Project Rubric Teams b and D.xlsx) to complement the project reports that we have provided. Note that the source code contains the industry partners' intellectual property, thus the source code should be publicly shared. These evaluation criteria show that the student projects were assessed in all aspects of software engineering, including team management, communication, requirement engineering, software design, coding/development, deployment, testing. This assessment is well aligned with the EQF level 7 where students need to demonstrate that they are able to apply their knowledge to plan, manage, analyse, design and implement software products using appropriate processes, demonstrate proficiency over established and emerging engineering methods and tools to solve practical engineering problems, effectively work in teams to solve complex, open-ended software engineering problems that require significant research and exploration.

In addition, we provide samples of individual reports (see in the Individual Contribution Reports folder) and assessments of the individual contributions (see Individual – Team C and Individual – Team T tabs in Individual Evaluation Team C and T .xlsx) which include screenshots of contribution summary and supervisors' comments. Note that the individual contribution was assessed based on the individual reports together with the artefacts and activities recorded in the software tools. These samples and assessment highlight that each student was required to practically demonstrate their software engineering skills. The requirement of individual participation was also enforced with the hurdle requirement where students must obtain at least 50% of the individual marks to pass the subject.

The expert team kindly asks the Faculty to provide a list of international exchange partners and to provide an overview of how many students in the Master's program under review have actually engaged in international exchange.

Please find below the mobility-related agreements that are FEIT and FEIT-plus-other-faculties specific, as well as our larger AOTULE (13 members) and GE3 (65 members) partnerships. There is occasionally crossover (e.g. Technion, Twente) between our partners and our group partnership members. What we have not included are the University of Melbourne general uni-wide exchange partnerships. The list of 200-ish partners can be seen here, many of which also cover FEIT but are not solely FEIT-specific.

Country	Agreement: Agreement Name	Agreement Type
Belgium	Catholic University of Louvain - Erasmus+ - FEIT	Mobility - Erasmus+
	Catholic University of Louvain - SEA - FEIT	Mobility - Postgraduate exchange
Canada	University of New Brunswick - SEA - FEIT	Mobility - UG & PG Exchange
China	Shandong University - LOI - FEIT Science	Broad Academic Collaboration - MOU
	Peking University - SEA - FEIT	Mobility - UG & PG Exchange
	Shandong University - MOU - FEIT Science	Broad Academic Collaboration - MOU
Denmark	Aalborg University - MOU - ABP FEIT	Broad Academic Collaboration - MOU
	Aalborg University - SEA - ABP FEIT	Mobility - UG & PG Exchange
Germany	University of Stuttgart - MOU Internship - ABP FEIT Science	Broad Academic Collaboration - MOU; Mobility - Internship/Placement
	University of Stuttgart - SEA Internship - ABP FEIT Science	Mobility - Internship/Placement; Mobility - UG & PG Exchange
India	Indian Institute of Technology Madras - MOU - FEIT Science	Broad Academic Collaboration - MOU
Israel	Technion – Israel Institute of Technology - MOU - ABP FEIT Science	Broad Academic Collaboration - MOU
	Technion – Israel Institute of Technology - SEA - ABP FEIT Science	Mobility - UG & PG Exchange
Japan	Asia-Oceania Top University League of Engineering - MOU - FEIT	Mobility - UG & PG Exchange - see below for membership details
Netherlands	University of Twente - MOU - FEIT Science	Broad Academic Collaboration - MOU
	Delft University of Technology - SEA - ABP FEIT Science	Mobility - UG & PG Exchange
	University of Twente - SEA - FEIT	Mobility - Postgraduate exchange
	University of Twente - Erasmus+ - FEIT	Mobility - Erasmus+
Singapore	Singapore Management University - Credit Articulation - FEIT	Teaching & Learning Partnership - Articulation
Sweden	Royal Institute of Technology - SEA - ABP FEIT Science	Mobility - UG & PG Exchange
Switzerland	Global Engineering Education Exchange Consortium - MOU - FEIT	Mobility - Postgraduate exchange - see below for membership details
United Kingdom	Imperial College London - SEA - FEIT	Mobility - UG & PG Exchange
Total	22	

Asia-Oceania Top University League of Engineering - MOU - FEIT (13 partners including UniMelb)		
Indonesia	Bandung Institute of Technology	Asia-Oceania Top University League of Engineering - MOU - FEIT
Thailand	Chulalongkorn University	Asia-Oceania Top University League of Engineering - MOU - FEIT
Vietnam	Hanoi University of Science and Technology	Asia-Oceania Top University League of Engineering - MOU - FEIT
Hong Kong	Hong Kong University of Science and Technology	Asia-Oceania Top University League of Engineering - MOU - FEIT
India		Asia-Oceania Top University League of Engineering - MOU - FEIT
Republic of Korea	Korea Advanced Institute of Science and Technology	Asia-Oceania Top University League of Engineering - MOU - FEIT
Singapore		Asia-Oceania Top University League of Engineering - MOU - FEIT
Taiwan	National Taiwan University	Asia-Oceania Top University League of Engineering - MOU - FEIT
Japan	Tokyo Institute of Technology	Asia-Oceania Top University League of Engineering - MOU - FEIT
China	Tsinghua University	Asia-Oceania Top University League of Engineering - MOU - FEIT
Malaysia	University of Malaya	Asia-Oceania Top University League of Engineering - MOU - FEIT
Sri Lanka	University of Moratuwa	Asia-Oceania Top University League of Engineering - MOU - FEIT

Global Engineering Education Exchange Consortium - MOU - FEIT		
Argentina	Instituto Tecnológico de Buenos Aires	Global Engineering Education Exchange Consortium - MOU - FEIT
Belgium	KU Leuven	Global Engineering Education Exchange Consortium - MOU - FEIT
China	University of Michigan - Shanghai Jiao Tong University Joint Institute	Global Engineering Education Exchange Consortium - MOU - FEIT
China	Xiamen University	Global Engineering Education Exchange Consortium - MOU - FEIT
Colombia	Universidad de los Andes	Global Engineering Education Exchange Consortium - MOU - FEIT
Denmark	DTU: Technical University of Denmark	Global Engineering Education Exchange Consortium - MOU - FEIT
Egypt	American University in Cairo	Global Engineering Education Exchange Consortium - MOU - FEIT
France	ENSEA: Ecole Nationale Supérieure de l'Electronique et de ses Applications	Global Engineering Education Exchange Consortium - MOU - FEIT
France	INSA Lyon: Institut National des Sciences Appliquées, Lyon	Global Engineering Education Exchange Consortium - MOU - FEIT
France	UTT: Université de Technologie de Troyes	Global Engineering Education Exchange Consortium - MOU - FEIT
Germany	Hamburg University of Applied Sciences	Global Engineering Education Exchange Consortium - MOU - FEIT

The number of students from the Master of Software Engineering who went on exchange are listed in the table below. In reading the table below, note that

- Coursework (Semester or longer) means that our students go on exchange and enrol in subjects at our partner institutions for one semester or longer.
- Coursework (short-term) are intensives run over the July or January holidays. Our biggest partners for these are
    a. Peking University's Globex Program – a suite of about 16 – 18 subjects run over our winter break, some options of which are approved each year as a 12.5 point elective for various disciplines
    b. Nanyang Technological University's Trailblazer Program – their Entrepreneurship and Innovation Asia has been approved for a number of years as a 12.5 point elective for various disciplines (usually IT/IS)

Research (short-term) is when students go overseas for 10 – 12 weeks over our summer break to take research placements at partner institutions. They complete 3 months of research, then return to the University of Melbourne to complete the assessment components of the research-related subject for their discipline, thus receiving a grade/mark from the University of Melbourne. This summer we have students going to KAIST in Korea to take part in their Visiting Student Researcher program.

Count of Software	Year				
Row Labels	2018	2019	2020	2022	Grand Total
Canada	**2**		**1**	**1**	**4**
Semester or longer	**2**		**1**	**1**	**4**
Coursework	2		1	1	4
Denmark	**1**				**1**
Semester or longer	**1**				**1**
Coursework	1				1
Japan		**1**			**1**
Short-Term		**1**			**1**
Research		1			1
Latvia	**1**				**1**
Short-Term	**1**				**1**
Coursework	1				1
Sweden		**1**			**1**
Semester or longer		**1**			**1**
Coursework		1			1
UK		**1**			**1**
Short-Term		**1**			**1**
Coursework		1			1
USA		**1**			**1**
Short-Term		**1**			**1**
Coursework		1			1
Grand Total	**4**	**4**	**1**	**1**	**10**

Germany	HM Hochschule München University of Applied Sciences	Global Engineering Education Exchange Consortium - MOU - FEIT
Germany	RWTH Aachen University	Global Engineering Education Exchange Consortium - MOU - FEIT
Hong Kong	City University of Hong Kong	Global Engineering Education Exchange Consortium - MOU - FEIT
Hong Kong	Hong Kong Polytechnic University	Global Engineering Education Exchange Consortium - MOU - FEIT
Indonesia	Institut Teknologi Bandung	Global Engineering Education Exchange Consortium - MOU - FEIT
Israel	Technion – Israel Institute of Technology	Global Engineering Education Exchange Consortium - MOU - FEIT
Italy	Politecnico di Milano	Global Engineering Education Exchange Consortium - MOU - FEIT
Japan	Tohoku University	Global Engineering Education Exchange Consortium - MOU - FEIT
Malaysia	Universiti Teknologi PETRONAS	Global Engineering Education Exchange Consortium - MOU - FEIT
Mexico	Tecnológico de Monterrey	Global Engineering Education Exchange Consortium - MOU - FEIT
The Netherlands	University of Twente	Global Engineering Education Exchange Consortium - MOU - FEIT
New Zealand	University of Canterbury	Global Engineering Education Exchange Consortium - MOU - FEIT
Singapore	Nanyang Technological University	Global Engineering Education Exchange Consortium - MOU - FEIT
South Korea	Hanyang University	Global Engineering Education Exchange Consortium - MOU - FEIT
South Korea	KAIST: Korea Advanced Institute of Science & Technology	Global Engineering Education Exchange Consortium - MOU - FEIT
Spain	Universidad del País Vasco	Global Engineering Education Exchange Consortium - MOU - FEIT
Spain	Universidad Politécnica de Madrid	Global Engineering Education Exchange Consortium - MOU - FEIT
Spain	Universidad Pontificia Comillas	Global Engineering Education Exchange Consortium - MOU - FEIT
Sweden	Lund University	Global Engineering Education Exchange Consortium - MOU - FEIT
United Arab Emirates	Khalifa University of Science and Technology	Global Engineering Education Exchange Consortium - MOU - FEIT
United Kingdom	University of Leeds	Global Engineering Education Exchange Consortium - MOU - FEIT
United Kingdom	University of Sheffield	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	Boise State University	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	Case Western Reserve University	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	City College of New York	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	Clemson University	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	Drexel University	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	Embry-Riddle Aeronautical University	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	Franklin W. Olin College of Engineering	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	Georgia Institute of Technology	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	Illinois Institute of Technology	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	Lehigh University	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	Louisiana State University	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	Mississippi State University	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	Missouri University of Science & Technology	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	New Jersey Institute of Technology	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	New York University	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	Rensselaer Polytechnic Institute	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	Rose-Hulman Institute of Technology	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	Texas Tech University	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	University of Florida	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	University of Illinois, Urbana-Champaign	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	University of Miami	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	University of Michigan	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	University of Minnesota	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	University of New Hampshire	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	University of Pittsburgh	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	University of Portland	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	University of Rochester	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	University of Tulsa	Global Engineering Education Exchange Consortium - MOU - FEIT
United States	University of Wisconsin, Madison	Global Engineering Education Exchange Consortium - MOU - FEIT

The Faculty is kindly asked to provide statistical data regarding the program under review for admission, progression, drop-out rates and standard periods of studies for the past three student intakes/cohorts.

The numbers requested for the Master of Software Engineering. Do bear in mind that all students enrolled into these two programs have done quite well in their undergraduate degrees with a 65% average mark.

Commencing students

Name of degree	2020	2021	2022
Master of Software Engineering	118	96	121

Withdrawals (student who withdraw from the program)

Name of degree	2020	2021	2022
Master of Software Engineering	16 (8 withdrew in 2020 and 8 in 2021)	10 (5 in 2021 and 5 in 2022)	7 (all from 2022)

Distribution of Grades for the Master of Software Engineering. The table below shows the percentage of grades (H1, H2A etc) awarded for 2020, 2021 and 2022 in the Master of

Software Engineering. For example, in 2020, 27% of the grades awarded to all the students enrolled in the Master of Biomedical Engineering is H1, 16% is H3 etc.

	2020	2021	2022
H1 (80 and above)	27%	29%	25%
H2A (75-79)	21%	17%	18%
H2B (70-74)	19%	18%	18%
H3 (65-69)	16%	14%	14%
P (50-64)	15%	17%	19%
N (Fail)	3%	5%	5%

For the Master of Software Engineering, of the students who completed their degree between 2020-2022
134 students (47% of total completions) completed their degree within 2 years
70 students (25% of total completions) completed their degree between 2-2.5 years
44 students (16% of total completions) completed their degree between 2.5-3 years
19 students (7% of total completions) completed their degree between 3-3.5 years
5 students (2% of total completions) completed their degree between 3.5-4 years
6 students (1.5% of total completions) completed their degree between in more than 4 years

In this section, we address concerns raised by the ASIIN panel in the draft accreditation report sent to us on 24th August 2023.
Page 10 – "there are concerns about the level of industry relations due to the low turnout of industry representatives at the meeting and the absence of a comprehensive list of industry partners, particularly for the capstone project. The experts believe that a critical aspect for improvement is the establishment of more robust connections with industry partners"

We would like to iterate that the School of Computing and Information Systems has the Industry Advisory Group (IAG) since 2012 with members drawn from a range of industry (see AppendixD5.2.pdf). For example, in 2022, the members of the School of Computing and Information Systems' IAG include: Mr. Branko Panich from Fujistu, Mr. Yann Burden from Pendula, Dr. Rod Dilnutt from Australia Computer Society (ACS), Ms. Lisa Tobin from Seek. The IAG usually meets 2 to 4 times throughout the year with the goal of increasing industry involvement with the School's activities. The IAG's meeting minutes in 2022 are provided in the CIS IAG folder.

In early 2023, as the School of Computing and Information Systems become more establish in their new home at the Melbourne Connect building, the leadership of the school created new terms of reference for their Industry Advisory Group (IAG) which requires more involvement and integration of the IAG in the ongoing improvement of all their programs. It became apparent that the current members of the IAG were unable to commit to this new terms of reference and a decision was made to disband the current IAG and establish a new IAG. Thus, the most of previous IAG members were unable to participate the ASIIN meeting. Currently, a new IAG is being formed and will be chaired by Mr Sharma Madiraju

Sharma_Madiraju@infosys.com, from Infosys. The recruitment of IAG members is in progress and we expect the new IAG will be formed within 2023.

Whilst we acknowledge the concern on the low turnout of industry representatives, we would like to note that our program has actively engaged with the industry partners. We have numerous industry partners who participated as the project clients providing the real-world problems and actual requirements for our capstone projects (SWEN90017 & SWEN90018). In addition to the capstone projects, some of our subjects also involve with industry partners. For example, SWEN90009 Software Requirement and Analysis and SWEN90014 Master Software Engineering Project. Lists of industry partners for our software engineering projects over the past 3 years are provided (see Industry List - Capstone projects.docx and Industry List - SE projects (SWEN90009 & SWEN90014).docx)

Criterion 1.3 Curriculum

Page 17 – "However, as highlighted under Criterion 1.1, there is a need to expand the network of industry partners collaborating with the program. In light of this, the experts recommend strengthening the relationship with the industry partners to enable internship options and capstone projects."

As listed in Industry List - Capstone projects.docx and Industry List - SE projects (SWEN90009 & SWEN90014).docx), we have numerous industry and organisation outside of the School (e.g., Gamin, CoachingMate, Telstra, Apromore, Defence Science Institute, Royal Melbourne Hospital) to participate our software engineering projects as clients to provide real-world problem. The School of Computing and Information Systems (CIS) also has done a lot of work to expand their industry relations working with their Melbourne clients/partners such as Airwallex. Further, CIS are currently working with Cremone digital hub and Infosys to expand their industry partnership. These large organisations will likely support projects for our students.

Page 17 - "However, the experts see room for the inclusion of a research component in the curriculum. In the experts' eyes, moreover, not every aspect of managing the engineering process for capstone projects is adequately covered, as measured by EQF Level 7 standards."

We would like to point out that the capstone projects cover all aspects of software engineering, including team management, communication, requirement engineering, software design, coding/development, deployment, testing as shown in the assessment samples (see Project Evaluation Team C and T.xlsx and Project Rubric Teams b and D.xlsx). As reflected in the samples of capstone project reports (see in the Capstone folder), students have to apply specialised knowledge of requirement engineering, software architecture design, software testing to design and develop complex software systems for the actual problems of clients, showing that students can assess complex, combine knowledge from different field and gain practical skills for solving problems, and have special skills for the design, development, and operation of complex technical systems, meeting the Knowledge attribute of EQF level 7. Students will have to conduct research and investigation of the

appropriate solutions and can assemble the components of these systems in an optimal way (for example, see the Research section in Project Report - SWEN900132023GZ.pdf), meeting the Skills attribute of EQF level 7. Finally, students were required to actively engage and communicate with the clients and within the team as well as perform rigorous planning and effective management in order to deliver software products in time (for example, see Sprints and Meeting section in Project Report - SWEN900132022CZ.pdf), highlighting that students were able to take responsibility to contributing to professional practice and for reviewing the strategic performance of teams according to the Responsibility and autonomy of EQF level 7. Therefore, we believe that our capstone projects adequately meet the EQF level 7.

Nevertheless, we acknowledge the recommendation of including a research component in the curriculum. We will adjust the assessment of our capstone subjects (SWEN90017 & SWEN90018) to include a software engineering research component and adjust the assessment weighting to be 80% individual based and 20% group based. This change is expected to be effective in Semester 1 in 2024.

Criterion 2 Exams: System, concept and organization

Page 26 –"the experts see a heightened need for students to practically demonstrate their software development skills. The program's core focus on Software Engineering demands that each student is afforded the opportunity to actively participate in the role of developer. Additionally, they remark upon the recommendation mentioned in previous sections that the program would benefit from more industry partners. Practical work and industry experience are crucial components of the program".

As part of the assessment of the capstone subject (SWEN900017 & SWEN90018), students must meet the hurdle requirement, i.e, students must obtain at least 50% of the individual marks to pass the subject. This hurdle requirement will ensure that each student will be required to actively participate in the capstone projects as one of one of the software engineer roles. As shown in the assessment samples (see Individual Evaluation Team C and T .xlsx), the students were assessed their individual contributions in three main aspects: leadership/collaboration, software development, documentation (including requirements and design). Note that the individual contribution was assessed based on the individual reports (see Individual Contribution Reports) together with the artefacts and activities recorded in the software tools that the students used to manage the project. Finally, we would like to note that regardless of whether the clients are from external or internal organisations, the problems chosen for the capstone projects must be authentic and actual problems with an appropriate level complexity which requires research and prototyping activities before design and development in order to ensure that students will be able to demonstrate the ability to manage and transform work that are complex, unpredictable, and require new strategic approaches.

Criterion 4.1 Module descriptions

Page 33 – "…The experts recommend reviewing this in order to ensure that the teaching methods for the mentioned modules are publicly accessible,…"

At this stage, our university does not require all subjects/modules to explicitly write down their teaching methods (the manner in which they will deliver subject content). As noted by the experts, this is an optional entry and some subject coordinators have chosen to write down the method that they will be delivering their subjects (while many other have not). While we feel that this is a good idea, it has the disadvantage of affecting the flexibility for a new subject coordinator to deliver the subject in a new and innovative manner. We are of the opinion that subject coordinators should have the freedom to choose the teaching methods that best suits them as long as they ensure the attainment of all the learning outcomes (which is a compulsory entry in our handbook).

F Summary: Expert recommendations

Taking into account the additional information and the comments given by the University, the experts summarise their analysis and **final assessment** for the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Master of Software Engineering	With requirements for one year	30.09.2030	EUR-ACE®	30.09.2030

Requirements

A 1. (ASIIN 4.2) It is required to issue an additional Diploma Supplement according to the Bologna regulations.

Recommendations

E 1. (ASIIN 1.1; 1.3) It is recommended that the relationship with the industry partners is strengthened to enable internship options and Capstone projects.

E 2. (ASIIN 1.2.) It is strongly recommended to implement a system systematically monitoring the success of the Master graduates in the labour market (Tracer Studies).

E 3. (ASIIN 1.3) It is recommended to further encourage the students' academic mobility with clear rules for crediting external courses taken abroad to avoid extending the study period.

E 4. (ASIIN 1.3) It is recommended to incorporate a research component in the curriculum.

E 5. (ASIIN 2) It is recommended to ensure that for the Capstone project, every student can play the role of a developer. As the program's primary focus is on Software Engineering, it becomes essential for each student to demonstrate their practical software development skills during the final assessment task

E 6. (ASIIN 4.1) It is recommended that teaching methods are described and accessible publicly for all subjects, as far as these course descriptions are within the responsibility of the Faculties offering the study program under review.

G Comment of the Technical Committees (14.09.2023)

Technical Committee 02 – Electrical Engineering/Information Technology (04.09.2023)

Assessment and analysis for the award of the ASIIN seal:

The TC follows the assessment of the experts without any changes.

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

The Technical Committee deems that the intended learning outcomes of the degree programme do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committee 02 – Electrical Engineering/Information Technology.

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

Degree Programme	**ASIIN Seal**	**Maximum duration of accreditation**	**Subject-specific label**	**Maximum duration of accreditation**
Master of Software Engineering	With requirements for one year	30.09.2030	EUR-ACE®	30.09.2030

Technical Committee 04 – Informatics/Computer Science (14.09.2023)

Assessment and analysis for the award of the ASIIN seal:

The TC discusses the procedure and proposes editorial changes to recommendation E 2. Apart from that, it agrees with the assessment of the experts without any changes.

The Technical Committee 04 – Informatics/Computer Science recommends the award of the seals as follows:

Degree Programme	ASIIN Seal	Maximum duration of accreditation	Subject-specific label	Maximum duration of accreditation
Master of Software Engineering	With requirements for one year	30.09.2030		

Requirements

A 1. (ASIIN 4.2) It is required to issue an additional Diploma Supplement according to the Bologna regulations.

Recommendations

E 1. (ASIIN 1.1; 1.3) It is recommended that the relationship with the industry partners is strengthened to enable internship options and Capstone projects.

E 2. (ASIIN 1.2.) It is recommended to implement a process systematically monitoring the success of the Master graduates in the labour market (Tracer Studies). [FA 04]

E 3. (ASIIN 1.3) It is recommended to further encourage the students' academic mobility with clear rules for crediting external courses taken abroad to avoid extending the study period.

E 4. (ASIIN 1.3) It is recommended to incorporate a research component in the curriculum.

E 5. (ASIIN 2) It is recommended to ensure that for the Capstone project, every student can play the role of a developer. As the program's primary focus is on Software Engineering, it becomes essential for each student to demonstrate their practical software development skills during the final assessment task

E 6. (ASIIN 4.1) It is recommended that teaching methods are described and accessible publicly for all subjects, as far as these course descriptions are within the responsibility of the Faculties offering the study program under review.

H Decision of the Accreditation Commission (22.09.2023)

Assessment and analysis for the award of the subject-specific ASIIN seal:

The AC discusses the procedure and agrees with the proposed editorial changes to recommendation E 2 of TC 04. Apart from this, the TC follows the assessment of the experts and the Technical Committees without any changes.

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

The Accreditation Commission deems that the intended learning outcomes of the degree programme do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committees 02 and 04.

The Accreditation Commission decides to award the following seals:

Degree Programme	**ASIIN Seal**	**Maximum duration of accreditation**	**Subject-specific label**	**Maximum duration of accreditation***
Master of Software Engineering	With requirements for one year	30.09.2030	EUR-ACE®	30.09.2030*

* Subject to the approval of the ENAEE Administrative Council

Requirements

A 1. (ASIIN 4.2) It is required to issue an additional Diploma Supplement according to the Bologna regulations.

Recommendations

E 1. (ASIIN 1.1; 1.3) It is recommended that the relationship with the industry partners is strengthened to enable internship options and Capstone projects.

E 2. (ASIIN 1.2.) It is recommended to implement a process systematically monitoring the success of the Master graduates in the labour market (Tracer Studies).

E 3. (ASIIN 1.3) It is recommended to further encourage the students' academic mobility with clear rules for crediting external courses taken abroad to avoid extending the study period.

E 4. (ASIIN 1.3) It is recommended to incorporate a research component in the curriculum.

E 5. (ASIIN 2) It is recommended to ensure that for the Capstone project, every student can play the role of a developer. As the program's primary focus is on Software Engineering, it becomes essential for each student to demonstrate their practical software development skills during the final assessment task

E 6. (ASIIN 4.1) It is recommended that teaching methods are described and accessible publicly for all subjects, as far as these course descriptions are within the responsibility of the Faculties offering the study program under review.

I Fulfilment of Requirements (24.09.2024)

Analysis of the experts and the Technical Committees (05.09.2024)

Requirements

For all degree programmes

A 1. (ASIIN 4.2) It is required to issue an additional Diploma Supplement according to the Bologna regulations.

Initial Treatment	
Peers	Fulfilled. Justification: The university has submitted a revised Diploma Supplement, which now follows the Bologna regulations, so that the requirement is considered fulfilled.
TC 02	Fulfilled. Vote: unanimous Justification: The TC follows the vote of the experts.
TC 04	Fulfilled. Vote: unanimous Justification: The TC follows the assessment of the experts.
AC	Fulfilled. Vote: unanimous Justification: The AC follows the assessment of the experts and the TC.

Decision of the Accreditation Commission (24.09.2024)

Degree programme	**ASIIN-label**	**Subject-specific label**	**Accreditation until max.**
Ma Software Engineering	All requirements fulfilled	EUR-ACE®	30.09.2030

Appendices

I. Stage 1 Competencies of Engineers Australia

"**1. KNOWLEDGE AND SKILL BASE**

1.1. Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.

1.2. Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.

1.3. In-depth understanding of specialist bodies of knowledge within the engineering discipline.

1.4. Discernment of knowledge development and research directions within the engineering discipline.

1.5. Knowledge of engineering design practice and contextual factors impacting the engineering discipline.

1.6. Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline.

2. ENGINEERING APPLICATION ABILITY

2.1. Application of established engineering methods to complex engineering problem solving.

2.2. Fluent application of engineering techniques, tools and resources.

2.3. Application of systematic engineering synthesis and design processes.

2.4. Application of systematic approaches to the conduct and management of engineering projects.

3. PROFESSIONAL AND PERSONAL ATTRIBUTES

3.1. Ethical conduct and professional accountability.

3.2. Effective oral and written communication in professional and lay domains.

3.3. Creative, innovative and pro-active demeanour.

3.4. Professional use and management of information.

3.5. Orderly management of self, and professional conduct.

3.6. Effective team membership and team leadership."

II. Objective-Module Matrix

ASIIN SSC	Intended Learning Outcomes of the Degree Programme	Corresponding Modules
Knowledge, Understanding and application		
Graduates		
have in-depth knowledge of advanced methods in Formal, Algorithmic and Mathematical Competencies,	Formal, Algorithmic and Mathematical Competencies are pre-requisite knowledge for the Master of Software Engineering	Most subjects in the degree require Mathematical knowledge, e.g., COMP20003 Algorithms and Data Structures
have in-depth knowledge of advanced methods in Analysis, Design, Implementation and Project Management	CLO1: Have gained knowledge and practice in software engineering topics including software processes, project management, requirement analysis, modelling, design, architecture, implementation, and testing, CLO3: Be able to apply their knowledge to plan, manage, analyse, design and implement software products using appropriate processes, CLO6: Be able to explain the basic principles underlying the management of physical, human and financial resource	Core Year 1, 2, and 3 courses: COMP20003 Algorithms and Data Structures SWEN20003 Object Oriented Software Development INFO20003 Database Systems SWEN30006 Software Modelling and Design COMP30026 Models of Computation COMP30023 Computer Systems SWEN90009 Software Requirements Analysis SWEN90016 Software Processes & Management SWEN90014 Masters Software Engineering Project SWEN90006 Security & Software Testing SWEN90017 Masters Advanced Software Project Pt 1 SWEN90018 Masters Advanced Software Project Pt 2 SWEN90004 Modelling Complex Software Systems SWEN90010 High Integrity Systems Engineering SWEN90007 Software Design and Architecture
have in-depth knowledge of advanced subject-specific methods in software engineering such as: - *Digital Technology and Computer Organisation, Operating Systems, Computer Networks and Distributed Systems, Databases and Information Systems, IT Security*	CLO2: Have gained knowledge and practice in advanced software engineering topics which include designing secure and reliable software, high integrity systems, distributed systems, and advanced software architectures, CLO9: Be conversant with important issues relevant to sectors influenced by software engineering, such as the sustainability of resources, the efficient operation of all processes and privacy and security in the age of the internet	Core Year 1, 2, and 3 courses: SWEN90004 Modelling Complex Software Systems SWEN90010 High Integrity Systems Engineering SWEN90007 Software Design and Architecture SWEN90009 Software Requirements Analysis SWEN90006 Security & Software Testing SWEN90017 Masters Advanced Software Project Pt 1 SWEN90018 Masters Advanced Software Project Pt 2 SWEN30006 Software Modelling and Design SWEN90014 Masters Software Engineering Project

ASIIN SSC	Intended Learning Outcomes of the Degree Programme	Corresponding Modules
have in-depth knowledge in one of the abovementioned key application areas,	CLO2: Have gained knowledge and practice in advanced software engineering topics which include designing secure and reliable software, high integrity systems, distributed systems, and advanced software architectures, CLO9: Be conversant with important issues relevant to sectors influenced by software engineering, such as the sustainability of resources, the efficient operation of all processes and privacy and security in the age of the internet	Same as above
are able to develop solutions independently	CLO2: Have gained knowledge and practice in advanced software engineering topics which include designing secure and reliable software, high integrity systems, distributed systems, and advanced software architectures, CLO9: Be conversant with important issues relevant to sectors influenced by software engineering, such as the sustainability of resources, the efficient operation of all processes and privacy and security in the age of the internet	Same as above
Engineering Methodology		
Graduates		
can assess complex, new modelling, calculation, design, and test methods with regard to their relevance, effectiveness and efficiency and develop new methods independently.	CLO2: Have gained knowledge and practice in advanced software engineering topics which include designing secure and reliable software, high integrity systems, distributed systems, and advanced software architectures	Core Year 1, 2, and 3 courses: SWEN90004 Modelling Complex Software Systems SWEN90010 High Integrity Systems Engineering SWEN90007 Software Design and Architecture SWEN90009 Software Requirements Analysis SWEN90006 Security & Software Testing SWEN90017 Masters Advanced Software Project Pt 1 SWEN90018 Masters Advanced Software Project Pt 2
Engineering Development		
Graduates		
have special skills for the design, development and operation of complex technical systems and services,	CLO7: Be able to effectively work in teams to solve complex, open-ended software engineering problems that require significant research and exploration	Core Year 1, 2, and 3 courses: SWEN90009 Software Requirements Analysis SWEN90006 Security & Software Testing SWEN90017 Masters Advanced Software Project Pt 1 SWEN90018 Masters Advanced Software Project Pt 2 SWEN30006 Software Modelling and Design SWEN90014 Masters Software Engineering Project SWEN90016 Software Processes & Management
are able to assemble the components of these systems in an optimal way, taking into account the interaction of the systems with their	CLO7: Be able to effectively work in teams to solve complex, open-ended software engineering problems that require significant research and exploration	Same as above

ASIIN SSC	Intended Learning Outcomes of the Degree Programme	Corresponding Modules
environment as well as technical, social, economic, and ecological aspects.		
Investigation and Evaluation		
Graduates		
can develop suitable methods to design, carry out and evaluate detailed investigations into technical issues according to their level of knowledge and understanding.	CLO3: Be able to apply their knowledge to plan, manage, analyse, design, and implement software products using appropriate processes, CLO4: Have developed problem solving and trouble shooting skills that may be applied in professional practice	Core Year 1, 2, and 3 courses: SWEN90009 Software Requirements Analysis SWEN90016 Software Processes & Management SWEN90006 Security & Software Testing SWEN90014 Masters Software Engineering Project ENGR90034 Creating Innovative Engineering ENGR90039 Creating Innovative Professionals
Engineering Practice and Product Development		
Graduates are capable of		
methodically classifying and systematically combining knowledge from different fields and of dealing with complexity,	CLO7: Be able to effectively work in teams to solve complex, open-ended software engineering problems that require significant research and exploration	Core Year 1, 2, and 3 courses: SWEN90009 Software Requirements Analysis SWEN90006 Security & Software Testing SWEN90017 Masters Advanced Software Project Pt 1 SWEN90018 Masters Advanced Software Project Pt 2 SWEN30006 Software Modelling and Design SWEN90014 Masters Software Engineering Project SWEN90016 Software Processes &Management
using and developing their knowledge and skills to gain practical skills for solving problems, conducting investigations, and developing systems and processes,	CLO1: Have gained knowledge and practice in software engineering topics including software processes, project management, requirement analysis, modelling, design, architecture, implementation and testing, CLO2: Have gained knowledge and practice in advanced software engineering topics which include designing secure and reliable software, high integrity systems, distributed systems and advanced software architectures, CLO4: Have developed problem solving and trouble shooting skills that may be applied in professional practice, CLO5: Be able to demonstrate proficiency over established and emerging engineering methods and tools to solve practical engineering problems	Core Year 1, 2, and 3 courses: SWEN90006 Security & Software Testing SWEN90009 Software Requirements Analysis SWEN90017 Masters Advanced Software Project Pt 1 SWEN90018 Masters Advanced Software Project Pt 2 SWEN90010 High Integrity Systems Engineering SWEN90004 Modelling Complex Software Systems SWEN90007 Software Design and Architecture COMP30026 Models of Computation SWEN90014 Masters Software Engineering Project SWEN30006 Software Modelling and Design COMP20003 Algorithms and Data Structures SWEN20003 Object Oriented Software Development INFO20003 Database Systems COMP30023 Computer Systems

ASIIN SSC	Intended Learning Outcomes of the Degree Programme	Corresponding Modules
familiarising themselves methodically and systematically with new and unknown things,	CLO8: Have effective verbal and written communication skills that enable them to make a meaningful contribution to the changes facing society	Core Year 1, 2, and 3 courses: SWEN90009 Software Requirements Analysis SWEN90017 Masters Advanced Software Project Pt 1 SWEN90018 Masters Advanced Software Project Pt 2 SWEN90014 Masters Software Engineering Project SWEN30006 Software Modelling and Design SWEN90016 Software Processes & Management
assessing applicable methods and their limitations,	CLO5: Be able to demonstrate proficiency over established and emerging engineering methods and tools to solve practical engineering problems, CLO6: Be able to explain the basic principles underlying the management of physical, human and financial resource	Core Year 2 and 3 courses: SWEN90009 Software Requirements Analysis SWEN90017 Masters Advanced Software Project Pt 1 SWEN90018 Masters Advanced Software Project Pt 2 SWEN90014 Masters Software Engineering Project
systematically reflecting on the non-technical effects of engineering activities to responsibly incorporate them into their actions,	CLO9: Be conversant with important issues relevant to sectors influenced by software engineering, such as the sustainability of resources, the efficient operation of all processes and privacy and security in the age of the internet, CLO1: Have gained knowledge and practice in software engineering topics including software processes, project management, requirement analysis, modelling, design, architecture, implementation and testing, CLO10: 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	Core Year 1, 2, and 3 courses: SWEN90010 High Integrity Systems Engineering SWEN90004 Modelling Complex Software Systems SWEN90007 Software Design and Architecture SWEN90006 Security & Software Testing SWEN90009 Software Requirements Analysis SWEN90017 Masters Advanced Software Project Pt 1 SWEN90018 Masters Advanced Software Project Pt 2 SWEN30006 Software Modelling and Design SWEN90014 Masters Software Engineering Project SWEN90016 Software Processes & Management
have communicative skills to present their ideas and proposed solutions convincingly in writing or orally,	CLO7: Be able to effectively work in teams to solve complex, open-ended software engineering problems that require significant research and exploration, CLO8: Have effective verbal and written communication skills that enable them to make a meaningful contribution to the changes facing society	Core Year 1, 2, and 3 courses: SWEN90006 Security & Software Testing SWEN90009 Software Requirements Analysis SWEN90017 Masters Advanced Software Project Pt 1 SWEN90018 Masters Advanced Software Project Pt 2 SWEN30006 Software Modelling and Design SWEN90014 Masters Software Engineering Project SWEN90016 Software Processes & Management
developing products for the global market.	CLO7: Be able to effectively work in teams to solve complex, open-ended software engineering problems that require significant research and exploration, CLO8: Have effective verbal and written communication skills that enable them to make a meaningful contribution to the changes facing society	Same as above
Interdisciplinary Competences		

ASIIN SSC	Intended Learning Outcomes of the Degree Programme	Corresponding Modules
Graduates are		
empowered to lead and shape complex, changing work or learning contexts that require new strategic approaches,	CLO7: Be able to effectively work in teams to solve complex, open-ended software engineering problems that require significant research and exploration, CLO8: Have effective verbal and written communication skills that enable them to make a meaningful contribution to the changes facing society	Core Year 1, 2, and 3 courses: SWEN90006 Security & Software Testing SWEN90009 Software Requirements Analysis SWEN90017 Masters Advanced Software Project Pt 1 SWEN90018 Masters Advanced Software Project Pt 2 SWEN30006 Software Modelling and Design SWEN90014 Masters Software Engineering Project SWEN90016 Software Processes & Management
capable of assuming responsibility for scientific contributions to professional knowledge and practice,	CLO4: Have developed problem solving and trouble shooting skills that may be applied in professional practice	Core Year 1, 2, and 3 courses: SWEN90004 Modelling Complex Software Systems SWEN90010 High Integrity Systems Engineering SWEN90007 Software Design and Architecture SWEN90009 Software Requirements Analysis SWEN90006 Security & Software Testing SWEN90017 Masters Advanced Software Project Pt 1 SWEN90018 Masters Advanced Software Project Pt 2 SWEN30006 Software Modelling and Design SWEN90014 Masters Software Engineering Project COMP20003 Algorithms and Data Structures SWEN20003 Object Oriented Software Development INFO20003 Database Systems COMP30026 Models of Computation COMP30023 Computer Systems
empowered to review the strategic performance of teams.	CLO7: Be able to effectively work in teams to solve complex, open-ended software engineering problems that require significant research and exploration	Core Year 1, 2, and 3 courses: SWEN90009 Software Requirements Analysis SWEN90006 Security & Software Testing SWEN90017 Masters Advanced Software Project Pt 1 SWEN90018 Masters Advanced Software Project Pt 2 SWEN30006 Software Modelling and Design SWEN90014 Masters Software Engineering Project SWEN90016 Software Processes & Management

III. Program Outline

Core Discipline Subject	Elective Discipline Subject
Selective Discipline Subject	Supporting Science Subject
Core Engineering Specialisation Subject	Approved Elective

YEAR 1					
Semester 1			*Semester 2*		
COMP20003	Algorithms and Data Structures	12.5	SWEN30006	Software Modelling and Design	12.5
SWEN20003	Object Oriented Software Development	12.5	COMP30026	Models of Computation	12.5
INFO20003	Database Systems	12.5	COMP30023	Computer Systems	12.5
	Soft Eng Group A Selective*	12.5		Soft Eng Group B Selective†	12.5
YEAR 2					
Semester 3			*Semester 4*		
SWEN90009	Software Requirements Analysis	12.5	SWEN90006	Security & Software Testing	12.5
SWEN90016	Software Processes & Management	12.5	SWEN90014	Masters Software Engineering Project	12.5
	Engineering Selective	12.5		Software Engineering Elective	12.5
	Software Engineering Elective	12.5		Software Engineering Elective	12.5
YEAR 3					
Semester 5			*Semester 6*		
SWEN90017	Masters Advanced Software Project Pt 1	12.5	SWEN90018	Masters Advanced Software Project Pt 2	12.5
SWEN90004	Modelling Complex Software Systems	12.5	SWEN90007	Software Design and Architecture	12.5
SWEN90010	High Integrity Systems Engineering	12.5		Software Engineering Elective	12.5
	Software Engineering Elective	12.5		Approved Elective	12.5

* A SoftEng Group A selective is any level 2 or 3 subject drawn from the Bachelor of Science (B-SCI) program

† A SoftEng Group B selective is any level 3 Computer Science Subject

Software Engineering Electives (62.5 points)					
COMP90014	Algorithms for Functional Genomics	12.5	COMP90073	Security Analytics	12.5
COMP90015	Distributed Systems	12.5	COMP90074	Web Security	12.5
COMP90016	Computational Genomics	12.5	COMP90077	Adv Algorithms and Data Structure	12.5
COMP90017	Sensor Networks and Applications	12.5	COMP90083	Computational Modelling and Simulation	12.5
COMP90018	Mobile Computing Systems and Appns	12.5	COMP90084	Quantum Software Fundamentals	12.5
COMP90020	Distributed Algorithms	12.5	COMP90085	Volunteer Experience in I.T.	12.5
COMP90024	Cluster and Cloud Computing	12.5	COMP90086	Computer Vision	12.5
COMP90025	Parallel and Multicore Computing	12.5	COMP90087	The Ethics of Artificial Intelligence	12.5
COMP90042	Natural Language Processing	12.5	COMP90089	Machine Learning Applications for Health	12.5
COMP90046	Constraint Programming	12.5	ISYS90070	Information Security Consulting	12.5
COMP90048	Declarative Programming	12.5	INFO90003	Designing Novel Interactions	12.5
COMP90049	Introduction to Machine Learning	12.5	INFO90004	Evaluating the User Experience	12.5
COMP90050	Advanced Database Systems	12.5	INFO90005	Information Architecture	12.5
COMP90051	Statistical Machine Learning	12.5	INFO90006	Fieldwork for Design	12.5
COMP90053	Program Analysis and Transformation	12.5	INFO90007	Social Computing	12.5
COMP90054	AI Planning for Autonomy	12.5	GEOM90007	Information Visualization	12.5
COMP90056	Stream Computing and Applications	12.5	ENGR90033	Internship	25
COMP90057	Advanced Theoretical Comp Science	12.5	ENGR90036	Leadership for Innovation	12.5

Engineering Selectives (12.5 points)		
ENGR90021	Critical Communication for Engineers	12.5
ENGR90034	Creating Innovative Engineering	12.5
ENGR90039	Creating Innovative Professionals	12.5

Approved Electives (12.5 points)		
BUSA90473	Business Practicum	12.5
BUSA90485	Global Business Practicum	12.5
ENGM90006	Engineering Contracts and Procumbent	12.5
ENGM90011	Economic Analysis for Engineers	12.5
ENGM90012	Marketing Management for Engineers	12.5
ENGM90013	Strategy Execution for Engineers	12.5
ENGM90014	The World of Engineering Management	12.5
ENGR90026	Engineering Entrepreneurship	12.5
LAWS90125	Fundamentals of Intellectual Property	12.5
MCEN90031	Applied High Performance Computing	12.5

Specialisations

Business:

To obtain a specialisation in Business, students must complete:

- 12.5 credit points of Year 2 core specialisation subjects
- 50 credit points of Year 3 core specialisation subjects
- 12.5 credit points of Computing and Information Systems (CIS) Advanced electives

Year 2 core specialisation subjects

ENGM90014 The World of Engineering Management

Year 3 core specialisation subjects

ENGM90011 Economic Analysis for Engineers
ENGM90006 Engineering Contracts and Procurement
ENGM90012 Marketing Management for Engineers
ENGM90013 Strategy Execution for Engineers

Computing and Information Systems (CIS) Advanced electives

BUSA90473 Business Practicum
BUSA90485 Global Business Practicum
COMP90014 Algorithms for Bioinformatics
COMP90015 Distributed Systems
COMP90016 Computational Genomics
COMP90017 Sensor Networks and Applications
COMP90018 Mobile Computing Systems Programming
COMP90020 Distributed Algorithms
COMP90024 Cluster and Cloud Computing
COMP90025 Parallel and Multicore Computing
COMP90042 Natural Language Processing
COMP90043 Cryptography and Security
COMP90044 Research Methods
COMP90045 Programming Language Implementation
COMP90046 Constraint Programming
COMP90048 Declarative Programming
COMP90049 Introduction to Machine Learning
COMP90050 Advanced Database Systems
COMP90053 Program Analysis and Transformation
COMP90054 AI Planning for Autonomy
COMP90056 Stream Computing and Applications
COMP90057 Advanced Theoretical Computer Science
COMP90073 Security Analytics
COMP90074 Web Security
COMP90077 Advanced Algorithms and Data Structures
COMP90085 Volunteer Experience in I.T.
COMP90086 Computer Vision
COMP90087 The Ethics of Artificial Intelligence
ENGR90036 Leadership for Innovation

Cyber Security:

To obtain a specialisation in Cyber Security, students must complete:

- 25 credit points of Year 2 core specialisation subjects
- 12.5 credit points of Year 3 core specialisation subject
- A minimum of 25 credit points of Year 3 Cyber Security electives
- A maximum of 12.5 credit points of Year 3 Software Engineering/Approved electives

Year 2 core specialisation subjects

COMP90015 Distributed Systems
COMP90049 Introduction to Machine Learning

Year 3 core specialisation subject

COMP90043 Cryptography and Security

Year 3 Cyber Security electives

COMP90054 AI Planning for Autonomy
COMP90073 Security Analytics
COMP90074 Web Security
ISYS90070 Information Security Consulting

Distributed Computing

To obtain a specialisation in Distributed Computing, students must complete:

- 12.5 credit points of Year 2 core specialisation subject
- 12.5 credit points of Year 2 Software Engineering/Approved electives
- 50 credit points of Year 3 Distributed Computing electives

Year 2 core specialisation subject

COMP90015 Distributed Systems

Year 3 Distributed Computing electives

COMP90017 Sensor Networks and Applications
COMP90018 Mobile Computing Systems Programming
COMP90020 Distributed Algorithms
COMP90024 Cluster and Cloud Computing
COMP90025 Parallel and Multicore Computing
COMP90043 Cryptography and Security
COMP90056 Stream Computing and Applications
COMP90057 Advanced Theoretical Computer Science
MCEN90031 Applied High-Performance Computing
ELEN90095 AI for Robotics
ELEN90096 Hardware Accelerated Computing

Artificial Intelligence:

To obtain a specialisation in Artificial Intelligence, students must complete:

- 25 credit points of Year 2 core specialisation subjects
- A minimum of 37.5 credit points of Year 3 Artificial Intelligence electives
- A maximum of 12.5 credit points of Software Engineering/Approved electives

Year 2 core specialisation subjects

COMP90049 Introduction to Machine Learning
COMP90054 AI Planning for Autonomy

Year 3 Artificial Intelligence electives

COMP90042 Natural Language Processing
COMP90046 Constraint Programming
COMP90050 Advanced Database Systems
COMP90051 Statistical Machine Learning
COMP90073 Security Analytics
COMP90083 Computational Modelling and Simulation
COMP90087 The Ethics of Artificial Intelligence
COMP90089 Machine Learning Applications for Health
COMP90090 Natural Language Processing for Health

Human Computer Interaction

To obtain a specialisation in Human Computer Interaction, students must complete:

- 25 credit points of Year 3 core specialisation subjects
- A minimum of 37.5 credit points of Human Computer Interaction electives (Year 2: 25 credit points; Year 3: a minimum of 12.5 credit points)
- A maximum of 12.5 credit points of Year 3 Software Engineering/Approved electives

Year 3 core specialisation subjects

INFO90003 Designing Novel Interactions
INFO90004 Evaluating the User Experience

Human Computer Interaction electives

COMP90015 Distributed Systems
COMP90018 Mobile Computing Systems Programming
COMP90049 Introduction to Machine Learning
GEOM90007 Information Visualisation
INFO90005 Information Architecture
INFO90006 Fieldwork for Design
INFO90007 Social Computing