ASIIN Seal & European Labels

Accreditation Report

Master's Degree Programmes

Master of Engineering (Civil)
Master of Engineering (Civil with Business)
Master of Engineering (Environmental)
Master of Engineering (Spatial)
Master of Engineering (Structural)
Master of Architectural Engineering
Master of Information Technology (Spatial) - withdrawn

Provided by
University of Melbourne, Australia

Version: 29 September 2017

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A About the Accreditation Process

Name of the degree programme (in original language)	(Official) English translation of the name	Labels applied for [1]	Previous accreditation (issuing agency, validity)	Involved Technical Committees (TC)[2]
Master of Engineering (Civil)	n/a	ASIIN, EUR-ACE® Label	ASIIN, 28.06.2011 – 30.09.16	03
Master of Engineering (Civil with Business)	n/a	ASIIN, EUR-ACE® Label	none	03, 06
Master of Engineering (Environmental)	n/a	ASIIN, EUR-ACE® Label	ASIIN, 28.06.2011 – 30.09.16	03
Master of Engineering (Spatial)	n/a	ASIIN, EUR-ACE® Label	ASIIN, 28.06.2011 – 30.09.16, under the name Master of Engineering (Geomatics)	03
Master of Engineering (Structural)	n/a	ASIIN, EUR-ACE® Label	ASIIN, 28.06.2011 – 30.09.16	03
Master of Information Technology (Spatial) – application withdrawn[3]	n/a	ASIIN, EUR-ACE® Label	None; Master of Spatial Information Science ASIIN, 28.06.2011 – 30.09.16	03
Master of Architectural Engineering	n/a	ASIIN, EUR-ACE® Label	none	03

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

[2] TC: Technical Committee for the following subject areas: TC 03 – Civil Engineering, Surveying and Architecture.

[3] Together with the comment of the HEI (15.08.2016), the application for this programme was withdrawn. It was thus not further assessed in the final assessments of the peers (section C) and the following sections (section F ff).

Date of the contract: 10.07.2015 **Submission of the final version of the self-assessment report:** 14.03.2016 **Date of the onsite visit:** 17.-18.05.2016 **at:** Melbourne School of Engineering, Parkville Campus	
Bivish Ghimire, Student, Charles Darwin University; Prof. Dr. H. Peter Gumm, Universität Marburg; Prof. Dr.-Ing. Reiner Jäger, Hochschule Karlsruhe[4]; Dipl.-Ing. Rüdiger Lexau, Bayerisches Staatsministerium für Umwelt und Gesundheit; Prof. Dr.-Ing. Günter Rombach, Technische Universität Hamburg-Harburg; Dipl.-Ing., Dipl.-Wirtschaftsing. Klaus Wende, A.V.G. Consulting; Prof. Dr.-Ing. Norbert Meyer, Technische Universität Clausthal	
Representatives of the ASIIN headquarter: Dipl.-Kulturw. Jana Möhren	
Responsible decision-making committee: Accreditation Commission for Degree Programmes	
Criteria used: European Standards and Guidelines as of 15.05.2015 ASIIN General Criteria, as of 04.12.2014 Subject-Specific Criteria of Technical Committee 03 – Civil Engineering, Surveying and Architecture as of 28.03.2012	

[4] Did not participate in the onsite visit

B Characteristics of the Degree Programmes

a) Name	Final degree (original/English translation)	b) Areas of Specialization	c) Corresponding level of the EQF[5]	d) Mode of Study	e) Double/Joint Degree	f) Duration	g) Credit points/unit	h) Intake rhythm & First time of offer
Master of Engineering (Civil)	ME (Civil)	None	EQF Level 7	Full time or part time; on campus	No	3 years or 6 Semesters (full time)	12.5 local credit points per subject	Late February and late July every year First intake Feb 2011
Master of Engineering (Civil with Business)	ME (Civil with Business)	None	EQF Level 7	Full time or part time; on campus	No	3 years or 6 Semesters (full time)	12.5 points per subject	Late February and late July every year First intake Feb 2014
Master of Engineering (Environmental)	ME (Environmental)	None	EQF Level 7	Full time or part time; on campus	No	3 years or 6 Semesters (full time)	12.5 points per subject	Late February and late July every year First intake Feb 2011
Master of Engineering (Spatial)	ME (Spatial)	None	EQF Level 7	Full time or part time; on campus	No	3 years or 6 Semesters (full time)	12.5 points per subject	Late February and late July every year First intake Feb 2011
Master of Engineering (Structural)	ME (Structural)	None	EQF Level 7	Full time or part time; on campus	No	3 years or 6 Semesters (full time)	12.5 points per subject	Late February and late July every year First intake Feb 2011
Master of Information Technology (Spatial) – application withdrawn	MIT (Spatial)	None	EQF Level 7	Full time or part time; on campus	No	2 years or 4 Semesters (full time)	12.5 points per subject	Late February and late July every year First intake Feb 2011
Master of Architectural Engineering	MArchEng	None	EQF Level 7	Full time or part time; on campus	No	4½ years or 9 Semesters (full time)	12.5 points per subject	Late February and late July every year First intake to be Feb 2016

The following profile is described on the website for the Master of Engineering (Civil):

Civil engineers design and create many different kinds of infrastructure to support our society. This program covers many facets of civil engineering including sustainable urban developments, environmental protection, the conservation of energy and water re-

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

sources, as well as the traditional disciplines of structural, geotechnical, hydraulic and transportation engineering.

[Students] will have the opportunity to interact with industry professionals through guest lectures, field and project work. The program is led by an internationally recognised team of academics and is designed to produce a broader and deeper approach to civil engineering by incorporating extra education in sustainability design and environmental processes.

For the Master of Engineering (Civil with Business), the university website states:

The Master of Engineering (with Business) is designed to provide students with a formal qualification in engineering at the masters level, with a business specialisation that recognises the need for engineers to understand the management and workings of modern professional organisations.

Graduates will have a grounding in financial, marketing and economic principles enabling them to work efficiently in any organisation, as well as the ability to apply the technical knowledge, creativity and team work skills learnt in their engineering training. This combination of knowledge and skills will be a powerful asset in the workplace.

Key Features

- Combine a technical specialisation with exposure to the business and management skills that can help fast-track your career.
- Benefit from subjects co-developed by Melbourne Business School and tailored specifically for engineering students.
- Tight integration of subjects ensures that you understand the business side of engineering applications.
- Be empowered with strong technical skills, as well as the business skills to understand how organisations work.

The Master of Engineering (Environmental) is characterized on the website as follows:

Environmental engineers create sustainable solutions to environmental problems. You will learn from leaders in energy, hydrology, water and waste management. [Students] will benefit by studying with consultants, who share their expertise in environmental engineering projects around the world, in countries such as China, Vietnam, Thailand, Nepal, Sri Lanka and India. Guest lecturers and seminars by industry professionals are available, as well as community project work, technical society meetings and site visits.

Environmental engineering is a rapidly growing field. It is an exciting area for anyone with an interest in the environment, understanding complex environmental systems, or developing the technical, management and policy solutions for some of the most pressing issues facing society over the coming decades. With growing opportunities, as well as new kinds of jobs being developed in environmental areas, such as bushfire protection, carbon management, climate change, sustainable systems, land and water management, conservation and hydrology, waste management and renewable energy, you can be assured of a satisfying career.

The following profile is provided for the Master of Engineering (Spatial) on the website:

Spatial Information is a rapidly expanding field fuelled by the growth in information and communication technology, satellites for imaging and positioning, and the web and communication infrastructure for access to spatial data using smart devices. Spatial information is an essential and indispensable part of any economy's infrastructure and graduates of this discipline are in strong demand. The Master of Engineering (Spatial) focuses on the science and technology of measurement, mapping and visualisation.

[Students] will develop sought-after skills in geographic information systems (GIS), measurement, mapping and visualisation, three-dimensional computer visualisations, surveying and satellite and photographic image processing.

The Master of Engineering (Structural) has the following profile on the website:

Structural engineers apply mathematical and scientific principles to design, develop and evaluate materials and systems used in building load-bearing structures such as roads, buildings, rail lines, dams and bridges.

[Students] will learn from researchers, who are recognised internationally for their expertise in high-rise structures, and earthquake and blast-resistant technologies and have access to some highly specialised subjects in the field of structural engineering, including the design of resilient structures to counter extreme conditions. Design seminars, field work and workshops provide opportunities to work with industry professionals.

The website describes the Master of Information Technology (Spatial):

[Students] will learn the fundamental adaptable technical skills that are applicable across a range of IT platforms; skills that will not date, such as applied algorithmics, data mining, distributed computing and programming language design, allowing [students] to evolve with and adapt to the swift pace of technology. As industry continues to be transformed by IT, a new workforce with transferrable problem-solving skills is in high demand. The

course caters equally to those with a limited IT background looking for in-depth technical and theoretical education and those with strong experience in the domain.

Prepare for a career in the spatial information industry, one of the fastest-growing IT sectors in the world. [Students] will learn to analyse, communicate and visualise spatial information in all its forms.

Major strands of study are:

- Spatial databases
- Spatial programming
- Web and mobile mapping and spatial services

Employment opportunities include senior roles in designing mobile location based applications and games, working with spatial ICT to manage infrastructure and transport issues, optimising disaster management and response, working as policy advisors to governments and NGOs.

Current industry shortfalls combined with a growing demand caused by the evolution of the spatial information industry ensure graduates a range of well-paid job opportunities.

The Master of Architectural Engineering is characterized on the website:

The Master of Architectural Engineering will produce graduates with a capacity to operate across the complementary disciplines of Architecture and Engineering. This program is distinct in its ambition to achieve dual accreditation and provide pathways to both professions.

Harnessing the teaching and research expertise of the Melbourne School of Engineering and the Faculty of Architecture, Building and Planning, students will undertake rigorous study in architecture and engineering via discipline-based subjects, while the linkages between the two disciplines will be explored via a dedicated architectural engineering capstone/thesis experience.

C Peer Report for the ASIIN Seal[6]

1. The Degree Programme: Concept, content & implementation

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

Evidence:

- Website (MEng): https://handbook.unimelb.edu.au/view/2016/MC-ENG (Accessed 01.06.2016)
- Website (MIT): https://handbook.unimelb.edu.au/view/2016/MC-IT (Accessed 01.06.2016)
- Website (MArchEng): https://handbook.unimelb.edu.au/view/2016/MC-ARCHENG (Accessed 01.06.2016)
- Objectives-Module-Matrices as part of self-assessment report
- Discussions with management, staff, students, graduates and employers during on-site visit

Preliminary assessment and analysis of the peers:

The Melbourne School of Engineering as the main unit within the university responsible for the programmes under review has defined the objectives and intended learning outcomes. Most of the programmes are disciplines within the overarching Master of Engineering degree which consists of a total of 11 disciplines (four of which are part of cluster B). Accordingly, programme level outcomes have been drafted only at the overarching level. The panel thus considered them to be rather generic and to provide little information about the specific profiles the School had in mind for each of the disciplines. The so-called "technical specifications" which the university stated to have developed for each discipline in order to provide a clear picture of the specific qualification profile of graduates were not available to the peers. Accordingly, the differentiation between the programmes under review could not be fully made. The panel nevertheless considered the information made in the matrices matching the programmes and disciplines and their

[6] 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.

respective modules against the Subject-Specific Criteria of ASIIN for civil engineering, surveying and architecture to be helpful in understanding the intention of each programme or discipline:

With regard to the Master of Engineering, the panel considered that deepened *knowledge and understanding* was adequately reflected in the expectation that graduates will possess a broad knowledge of their own and neighbouring disciplines as well as a sound understanding of scientific principles underlying technology and general mathematical and computational skills. *Engineering analysis* was linked to a number of expected knowledge and skills, namely the fundamental understanding of technological principles and the skills for the solution of theoretical and practical problems, also in view of future technology changes. Analytical, problem-solving skills are also explicitly expected from graduates. The latter also contribute, in the opinion of the panel, to the *investigation and assessment* competences that graduates shall possess, making use of available sources and unclear data. In terms of *engineering design*, the Master of Engineering graduates shall acquire relevant design skills, including those appropriate for sustainable development based on their analytical, problem-solving skills. This corresponds to the expectation that graduates can provide complex and novel designs in different areas of civil engineering. *Engineering practice*, specifically with regard to the creation of plans and concepts, process management and holistic, sustainable, ecological and economic projects, is also part of the degree as graduates shall be able to communicate with other professionals in their work and to understand the social, cultural, global and environmental responsibilities of the profession. With regard to *transferable skills*, the panel found these reflected foremost in the expectation towards graduates to have interpersonal and management as well as verbal and written communication skills, including the development of professional ethics and a sense of responsibility.

The intended learning outcomes of the Master of Information Technology (Spatial) have also been matched against the Subject-Specific Criteria of Technical Committee 03 – Civil Engineering, Surveying and Architecture, more specifically the learning outcome statements for geodetic engineering and surveying. Graduates are expected to acquire knowledge and understanding in a more deepened way than the previous degree by having a broad knowledge base, a fundamental understanding of the principles as well as a key expertise in a key area of information technology. They shall also be enabled to possess analytical skills in problem-solving beyond the use of standard solutions. With regard to engineering analysis, i.e. the ability to work on geodetic datum issues and to develop spatial and other data models, the programme aims at fundamental understanding of IT principles and methods as well as computational skills necessary to solve problems in IT. These competences are also aligned with the analysis and solution of surveying, geo-

informatics or land management tasks, including those in the background of current scientific discussions, the integration of research and development and the implementation of quality management systems. Engineering design capacities, in particular those based on evaluation models and experimentation skills are also matched against the graduates expected analytical and problem-solving skills as well as computational skills. Investigation and assessment capacities in terms of data collection and evaluation is linked to analytical and problem solving skills, as is engineering practice, i.e. the ability to describe and analyse tasks independently and to develop and implement projects, including project management. In terms of transferable skills such as creating strategies to solve, reflect and present tasks and solutions, to guide others and to lead business units, graduates are expected to have verbal and written communication skills as well as professional ethics and responsibility towards the profession and community.

The panel considered the learning outcome statements for this degree to be also rather vague as they refer, for example, to the standards of professional boards and institutions with which the programme is accredited without specifically mentioning those competences such standards would entail. The panel therefore could not fully confirm the above alignment as attempted in the matrix. Furthermore, as the degree was understood to be accredited with the Australian Computer Science, it was unclear for the panel how this would contribute to the requested accreditation as an *engineering* degree with corresponding competences. While the panel learned during the discussions that the programme was not intended to be matched against the European informatics criteria, the national accreditation and the degree itself (see also below, section 1.2) did not match this expectation.

The intended learning outcomes of the Master of Architectural Engineering, the panel analysed the alignment with the qualification of architects in the Subject-Specific Criteria. In the area of design expertise, graduates abilities to create architectural design, to think creatively and solve problems is aligned with the intended knowledge of engineering principles and design, based on architectural history and practice as well as the skill to design, to analyse developments of professional practice and to apply research methodologies. Graduates are also expected to apply theories to different bodies of knowledge related to architecture and engineering and to reflect on problems critically. The intended skills to think strategically at different environmental and urban scales, to use cross-discipline knowledge and to produce creative technical output have been linked to the ability to think in three dimensions and to bring divergent factors in accordance with each other. In terms of knowledge and skills, graduates are expected to apply their knowledge based on historical and cultural theory and practice, apply knowledge of engineering prin-

ciples and use cognitive and creative skills to develop design concepts. Additionally, the expected understanding of building heritage and connections between architecture and other disciplines is aligned to the intended knowledge of current practice contexts, appreciation of economic, social and cultural issues and current practice contexts. Graduates shall also be able think strategically and have an awareness of the consequences of their work. In order to be able to have design skills to meet building users' requirements, graduates are expected to apply their technical research and theoretical interpretation and methodological skills. With regard to social and human sciences, graduates skills are linked to project management and communication, also with persons from other disciplines. Finally, the expectation that graduates acquire transversal skills such as team work and planning skills, these have been aligned with the intended ability to work individually and collaboratively, to manage project life cycles and to demonstrate mastery of theoretical knowledge and reflect critically on their practice.

Overall, in order to finalize their assessment, the panel asked that a clear description of the subject-specific programme level learning outcomes as well as expected professional profiles for all programmes and disciplines (except for the Master of Architectural Engineering) be submitted. This would also be necessary to allow for the final analysis of the programme objectives in terms of student learning outcomes against the corresponding EUR-ACE® (European Accredited Engineer) Label standards

The panel discussed the inclusion of soft skills in all programmes. During the discussions with employers and graduates the panel was confirmed that generally soft skills and team working skills were considered to be a strength of graduates. However, the business topics of the programmes not including the "with business" modules were covered on a very low level so that further strengthening of this area would be considered worthwhile for all programmes. In particular, the panel noted that the modules on offer could be better targeted towards engineering work life as students did not understand the necessity of very generic business knowledge at the expense of technical subjects.

With regard to the development and further development of the programmes and the involvement of internal and, particularly, external stakeholders in these processes, the panel learned that the Master degree as entering degree into the profession was still not fully known. However, the university had made numerous efforts to inform both industry and future students about the qualification. The panel thus found good relations with local and national employers to be in place which also contributed to further developing the different programmes. More specifically, an industry advisory group was put in place in each department and was the main link between the labour market and the pro-

grammes. Additionally, in the frame of the so-called endeavour project, final year students showcase their projects to industry representatives, an event leading to direct contacts and discussions between the university and employers. Despite these generally good relations, it was mentioned during the discussions that some graduates still had not found full-time employment which was considered to be at least partially due to the general situation of the national labour market. The panel also took into account that about 70% of graduates sought employment in their home countries, in particular in China and South East Asian countries where the employment rate was even higher than in Australia.

Furthermore, the "with business" streams had also been developed in collaboration with industry representatives. The panel noted that these programmes were jointly offered by the School of Engineering and the Business School. The difference to the regular streams consisted of five advanced engineering subjects which had been replaced with especially targeted engineering business subjects (see further section 1.3).

Criterion 1.2 Name of the degree programme

Evidence:

- Self-assessment report
- University website: http://www.eng.unimelb.edu.au/study/degrees%22 (Accessed 01.06.2016)

Preliminary assessment and analysis of the peers:

The panel considered the names and degrees of the programmes to well reflect the intended aims and learning outcomes. Concerning the Master of Information Technology (Spatial), however, the panel was not convinced that this was fully adequate as the degree and the explicit mention of information technology suggested a programme, and correlated competences, in this field (also as defined as one of the five sub-disciplines of computing defined by ACM). Despite the notion of "spatial", the panel considered the name and degree to be not fully adequate as no Master level competences in information technology were acquired. The panel therefore questioned the change from the Master of Spatial Information Science as the programme had been accredited before, and a name that the panel considered to be more fitting than the new title emphasizing "Information Technology" and containing Spatial only parenthetically.

Criterion 1.3 Curriculum

Evidence:

- Website (MEng): https://handbook.unimelb.edu.au/view/2016/MC-ENG (Accessed 01.06.2016)

- Website (MIT): https://handbook.unimelb.edu.au/view/2016/MC-IT (Accessed 01.06.2016)
- Website (MArchEng): https://handbook.unimelb.edu.au/view/2016/MC-ARCHENG (Accessed 01.06.2016)
- Learning Outcome-Subject-Mapping-Matrix
- Subject descriptions available online: https://handbook.unimelb.edu.au/faces/htdocs/user/search/SearchResults.jsp#postgraduateSubject (Accessed 01.06.2016)
- Review of course material during onsite visit
- Discussions with management, staff, students, graduates and employers during on-site visit

Preliminary assessment and analysis of the peers:
The panel based its analysis of the curricula of the programmes under review on the information provided in the self-assessment report as well as on the discussions during the onsite visit and the review of exams and additional course material. Additionally, the publication of detailed curricular information on the university's website was welcomed.

All disciplines of the Master of Engineering are based on a three-year curriculum. As a change from the first accreditation, the first year is designed as a foundation year for those students who have not completed the School's own Bachelor of Science degree (see further below, section 1.4). Correspondingly, the first year was found to contain engineering fundamentals such as Engineering Practice and Communication, Engineering Mathematics and Engineering Materials. In the spatial track, the first year contains Engineering Practice and Communication as well as fundamentals in surveying and mapping and GIS. The second year of all tracks is composed of core-discipline materials while the last year includes electives as well as the so-called IE Research Project that the panel confirmed to be similar to a final thesis in terms of scope and content.

The peers also assessed the contribution of the different subjects to the achievement of the intended learning outcomes, based on the outcomes-module-matrices provided in the self-assessment report:

In the civil engineering track, the area of *knowledge and understanding* was confirmed to be covered by the core foundation subjects including Engineering Mathematics, Engineering Mechanics, Fluid Mechanics, Engineering Materials and Structural Theory and Design as well as more advanced subjects and electives such as Geotechnical Engineering, Civil Hydraulics, Sustainable Infrastructure Systems and Transport Systems. *Engineering analysis* is part of the subjects Structural Theory and Design 1-2, Systems Modelling and Design,

and the above mentioned electives. Additionally, students select four advanced electives such as Concrete Design and Technology, Earthquake Resistant Design in Buildings, Extreme Loading of Structures or Solar Energy. The Engineering Practice and Communication, the Integrated Design subjects and the final IE Research Project also contribute to these skills. *Investigation and Assessment* skills are also expected in the Integrated Design subjects and IE Research, subjects which are furthermore core to the achievement of *engineering design* capacities. Engineering Project Implementation leading to the capstone Integrated Design subjects are also considered key to the achievement of engineering practice skills. Finally, the foundations for *transferable skills* are to be trained and acquired in the subject engineering Practice and Communications, the electives and the two Integrated Design subjects as well as the IE Research Project.

The alignment of subjects with intended learning outcomes for the civil with business track is identical to the above. Additionally, the engineering business subjects including Economic Analysis for Engineers and Strategic Execution for Engineers contribute *to engineering analysis* skills. All of the five business subjects, such as World of Engineering Management, Marketing Strategy for Engineers and Engineering Contracts and Procurement are also aligned to *engineering practice* competences and *transferable skills*, in particular related to the management of complex processes and projects and social competences.

Knowledge and Understanding in the environmental engineering track is linked to the core subjects Engineering Mathematics, Engineering Mechanics, Earth Processes for Engineers, Engineering Materials, Structural Theory and Design, Systems Modelling and Design and Risk Analysis as well as to more advanced subjects including Quantitative Environmental Modelling, Engineering Site Characterisation, Monitoring Environmental Impacts, Environmental Analysis Tools, Civil Hydraulics and Engineering and Project Implementation and electives. For *engineering analysis*, a contribution is expected from the mentioned advanced subjects as well as the advanced electives such as Energy Efficient Technology, International River Basin Management or Environmental Applied Hydrology. Additionally, the Integrated Design Subjects, the foundation Engineering Practice and Communications as well as the IE Research Project shall contribute to these skills. These subjects are also noted as essential for the achievement of *investigation and assessment*, *engineering design* and *engineering practice* competences. The final year IE Research Project and the Integrated Design subjects are furthermore designated to support the achievement of *transferable skills*.

In the spatial engineering track the achievement of *knowledge and understanding* is aligned with the foundation subjects in the first and second year: Engineering Risk Analysis, Applications of GIS, Imagining the Environment, Surveying and Mapping, Integrated

Spatial Systems, Land Administration Systems, Engineering Computation as well as Foundations of Spatial Information, Mathematics of Spatial Information, Management of Technological Enterprises, Remote Sensing, Spatial Analysis and Satellite Positioning Systems. The third year foundations, Spatial Data Infrastructure, Spatial Databases, Advanced Surveying and Mapping and Advanced Imaging also are expected to contribute, as are the subjects Remote Sensing, Advanced Surveying and Mapping, Satellite Positioning Systems and Cadastral Surveying. For the area of *engineering analysis*, the IE Research Project but also the subject Advanced Surveying and Mapping or Engineering Project Implementation are particularly linked. *Engineering design* competences shall be acquired in the subjects Foundations of Spatial Information, Mathematics of Spatial Information, Spatial Data Infrastructure and Spatial Databases and Advanced Surveying and Mapping. The latter subject as well as the IE Research Project also contributes to skills in the field of *investigations and assessment* and *engineering practice*. Engineering Project Implementation and the capstone IE Research Project are furthermore considered key to the achievement of *transferable skills*.

The panel generally concurred with this curricular design but pointed out very few core subjects to enable graduates to become a surveyor were presented. They considered this to the fact that a high number of subjects was taken together with the other specialisations in the MEng programme.

The area of *knowledge and understanding* in the structural engineering track is aligned with foundation core subjects such as Engineering Mathematics, Engineering Mechanics, Earth Processes for Engineers, Engineering Materials, Fluid Mechanics, Structural Theory and Design, Systems Modelling and Design and Risk Analysis as well as the advanced subjects Geotechnical Engineering, Engineering Project Implementation and Construction Engineering or the electives such as Concrete Design and Technology. For the area of *engineering analysis*, the subjects Structural Theory and Design 2-3, Geotechnical Engineering, Engineering Project Implementation and Construction Engineering but also the subjects Engineering Practice and Communications, the Integrated Design subjects and the IE Research Project shall contribute. In terms of *investigations and assessment* as well as *engineering design*, students are expected to acquire competences in the Integrated Design subjects, the final year IE Research Project and the electives. These modules are also considered to support the achievement of *transferable skills*.

Concerning the discipline in structural engineering, the panel questioned why foundation engineering was not part of the curriculum. It remained unclear how students would be able to provide novel and complex designs for constructions and development, one of the core competences of a structural engineer. The same holds for design of concrete structures where a single elective subject is given only.

In discussing with the students, the panel learned that the reasoning of the management and business related subjects in the Master of Engineering, except the "with business" stream, was not transparent for them. In their experience, the subjects were not catered towards engineering specific business competences but generic. The panel supported this concern, but, at the same time lauded the approach in the "with business" track. The subjects in the latter have been developed with a view to realistic business tasks in an engineering firm such as managing staff and running an enterprise. Furthermore, the panel acknowledged that ethics principals played an important role in the special "with business" subjects.

The curriculum of the Master of Information Technology (Spatial) is based on two years full time study. The first year contains core fundamentals in informatics as well as spatial sciences while the second year is composed of further spatial information technology subjects and the final Spatial IT Project. The curriculum has been matched against the intended learning outcomes for geodetic engineering and surveying. In the area of *knowledge and understanding*, the subjects Foundations of Spatial Information, Database Systems and Information Modelling, Algorithms and Complexities, Programming and Software Development, Internet Technologies, Spatial Analysis and Spatial Visualization, Spatial Data Infrastructures, Spatial Databases, Spatial Information Programming and Advanced Topics in GIScience have been matched. Furthermore, the advanced spatial electives Remote Sensing and Satellite Positing Systems contribute. The Spatial IT Project is considered a key example for the achievement of *engineering analysis* skills, together with the subject IT Project and Change Management. *Engineering design* competences are to be acquired in the subjects Foundations of Spatial Information, Algorithms and Complexities, Programming and Software Development, Spatial Analysis, Spatial Data Infrastructure and the Spatial IT Project. This subject is also essential for the field of *investigations and assessment*. The Spatial IT Project, IT Project and Change Management as well as Advanced Topics in GIScience are expected to contribute to *engineering practice* skills. *Transferable skills* are aligned specifically to the subjects IT project and Change Management and Spatial IT Project.

The panel discussed with the university the change from the original programme that had been submitted five years ago. They understood that the old degree had been a standalone programme, not aligned with any other programme, for a very low number of approximately 20 students. The integration into the Master of Information Technology was thus done in the re-design of this programme with four streams (spatial, health informatics, distributed computing, computing). Not least since the programme was governed by the Department of Computer Science, the panel had difficulties in understanding the objectives, and correspondingly the curricular design of the degree. Despite the degree

name IT and the responsible department, the university clarified that the spatial stream was not to be assessed against the European standards for informatics or computer science degrees. For such a degree, also accredited by the Australian Computer Society, the panel missed topics such as *distributed computing* as part of overview topics while it was only offered as an elective. The panel learned that the spatial subjects had not been changed compared to the old programme but that the electives had been eliminated to make room for computing subjects. All of the five corresponding IT subjects, however, were considered by the panel to be on a Bachelor level of common computing foundations, and thus not adequate to contribute to the degree as a whole achieving Master level. For example, the topics of COMP90041 Programming and Software Development, COMP90038 Algorithms and Complexity, COMP 90007 Internet Technologies, INFO900002 Database Systems & Information Modelling were normally are found (under varying names) as basic beginner courses in virtually all Bachelor level CS degrees. The argumentation of the university that the subjects were Master level based on the maturity of the students and therefore the university had higher expectations towards them and higher workload, was not convincing to the peers and was also not reflected in the course material and exams reviewed.

On the other hand, the panel pointed out that the modern mobile society generates new challenges for information technology related to space. The mobility related challenges to spatial information technology are situated in the domains traffic and logistics, ubiquitous computing, algorithms and system development, location based services, UAS, robotics, autonomous driving, 3D city building models, virtual reality, building information modelling (BIM), seamless GNSS¬/MEMS/MOEMS multisensory out- and indoor navigation technologies for personal vehicles, goods, and mobile GIS. In all of the above fields spatial information technology has to be integrated with geodetic methods in order to generate a high level of competence. The respective increase of competences therefore cannot be directed only to the management of geodata and geoinformation in databases but needs to include the acquisition, modelling, parameter estimation and processing of different kinds of high rate sensor-data, the use of different system- and communication designs infrastructure for the above spectrum of tasks related to the spatial geo-referencing of mobile objects. Moreover, further new topics like time-synchronization algorithms and technologies for high rate sensor-data, the consideration of relativistic effects and the modelling of earth dynamics have to be considered in the algorithms for the data fusion of distributed sensors in order to solve the above mobility, navigation and geo-referencing tasks. Another type of future challenges for spatial information technology exists in the field of the latest earth observation satellites providing free applitude and phase data. Thus, architectures for distributed computers, parallel processing, cloud

computing are required for the algorithms development, in order to enable a respective computing. In order to achieve Master level, all the above innovation fields and respective in information technology as well as further interdisciplinary competences have to be part of the curriculum.

The panel understood that the programme was intended to combine the knowledge of different fields, information technology and spatial engineering. While such an interdisciplinary approach – broadening the competence of students based on a Bachelor programme rather than deepening competences in a specific field – was principally welcomed, the panel considered that subjects in the relevant specific areas to even out different background skills in the beginning could not be at the expense of the overall Master level. Nevertheless, the panel questioned where students would learn to design a large software development project. According to the university, such a competence was not intended as students should rather be enabled to manage spatial information projects.

Due also to the very general intake of students from different previous degrees (see also below, section 1.4), the panel gained the impression that each of the programmes subject areas was on a low level compared to Bachelor programmes and did not fully deepen and extend technical competences in any first degree in a systematic way. Even when considering the programme to be more interdisciplinary in scope, due to the vaguely described objectives, the panel could not determine Master level in “Information Technology”.

The Master of Architectural Engineering, to be launched in the next academic year, is based on a 4.5 year curriculum. As in the other programmes, the first year is designed to teach students the fundamentals not yet acquired in their first degree. The selection of subjects differs depending on the first degree in engineering or architecture. Accordingly, students have to take either architecture subjects (Master of Architecture Studio A-B, Construction Methods A-B, Architectural Cultures 1-2) or engineering core subjects (Engineering Practice and Communication, Engineering Mathematics, Engineering Mechanics, Fluid Mechanics, Earth Processing for Engineering, Engineering Materials, Structural Theory and Design, Systems Modelling and Design). These subjects are aligned with the area of *knowledge and understanding* in the curricular analysis. The following 2.5 years are taught for all students together. The subjects Architectural Cultures, Twenty-First Century Architecture, but also engineering subjects such as Structural Theory and Design 1-2, Civil Hyrdraulics or Engineering Site Characterisation also are linked to the field of knowledge and skills. In the field of *design expertise*, in particular the subjects Master of Architecture Studio A-E and the final capstone project Architectural Engineering Capstone as well as Architectural Practice and Integrated Design - Infrastructure are essential while the engi-

neering subjects contribute to the ability to collect information, define problems, apply analysis, judge critically and formulate strategies for action. Structural Theory and Design, Systems Modelling and Design and Engineering Project Implementation also support the ability to think in three dimensions and develop plans methodically, scientifically and artistically. *Transversal skills* are to be acquired particularly in the Master of Architectural Studios A-E subjects.

The panel considered the curricular lineout of the programme to be fully adequate to support the achievement of the intended learning outcomes.

Criterion 1.4 Admission requirements

Evidence:

- Admission requirements: http://about.unimelb.edu.au/__data/assets/pdf_file/0005/1647950/Resolutions-of-the-Academic-Board-selection-Eng-140715.pdf (Accessed 01.06.2016)
- Information about English requirements on website: http://futurestudents.unimelb.edu.au/admissions/entry-requirements/language-requirements (Accessed 01.06.2016)
- Discussions with management, staff, students, graduates and employers during on-site visit

Preliminary assessment and analysis of the peers:
The admission requirements are stipulated on the programme's websites and are based on the full three year Master with different credit recognition depending on the Bachelor degree. For the different streams of the Master of Engineering, a corresponding specialization in the local Bachelor of Sciences, Bachelor of Environments or Bachelor of Commerce is required. Graduates of the former two degrees with a specialization in civil engineering, engineering systems or spatial engineering receive up to one year of credits, while students having chosen civil engineering electives in the Bachelor of Commerce receive a half year of credits. In all cases of recognition, students must have an average of 65% or higher (50% is the pass grade). All students' undergraduate degrees must include chemistry or physics as their science subjects as well as first year mathematics at university level.

For the Master of Information Technology (Spatial) a BSc or BEnv Spatial Systems is required.

Admission for the Master of Architectural Engineering will be possible for students with a BSc in civil engineering or a BEnv in Engineering Systems or in Architecture. Depending on

the first degree, the first year will be dedicated to the respective other subjects. Students who do not have a first degree in either specialization but possess a three year undergraduate degree with at least 25 credits in university-level mathematics and science respectively can be admitted but will have to follow both foundation years consecutively.

For international students, English requirements based on IELTS or TOEFL or similar test results are also prescribed. While the panel considered that such a formal language requirement could be adequate, they questioned to what extent the verification of English language skills worked well in practice. As mentioned below (section 2.3) the effective low language skills of a number of students was found to cause problems in the implementation of some of the teaching. The panel thus considered it worthwhile reflecting how the language, particularly communication, skills of foreign students could be better assessed at admission. In addition to the English requirements, the university has ranked universities in China – where up to 50% of students stem from in some specializations – in order to assess their applications and set different requirements for different categories of institutions.

The panel discussed the admission requirements with students and teachers and confirmed that these contribute significantly to the success of the programmes, not least as about half of the current student cohorts had completed their Bachelor degree outside of the University of Melbourne. The panel therefore welcomed the introduction of the first year of the Master as essentially a bridge year for those students who did not have acquired the same competences as the university's own Bachelors. While staff considered admission into the programme to be a critical quality measure, the panel did noted that some difficulties arose, for example due to the language capacities of international students (see further, section 2.3).

With regard to the MIT (Spatial) the panel learned that some of the current students had a previous degree in urban planning or geomatics and thus no background in information technology or other computing areas. Accordingly, the panel took note that the students did not have any previous competences in programming so that the Master took up the subject at a basic level. It remained unclear whether all IT and programming students were joined in the same class by teaching the standard introductory CS course sequence, at the normal regular level. In that regard, also, the peers were not convinced that teaching a course like „Algorithms and Complexity" which draws upon basic programming experience and reasonable mathematical skills, concurrently with a first programming course could be adequately received. Furthermore, the panel questioned whether students with no background in linear algebra or calculus, i.e. those with a geoinformatics background, were accepted into the programme. It remained unclear, therefore, how the students could be brought to a Master level in information technology.

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

The review panel took note of the university's decision to withdraw the application for the Master of Information Technology (Spatial) programme. No further assessment was made for this programme.

With regard to the subject-specific learning outcomes and expected professional profiles for all specialisations, the panel noted that the university had not yet provided these. They welcomed the intention of the institution to develop and publish these statements. As intended programme learning outcomes are considered to be an incremental piece of reference for students, employers and other stakeholders, the panel concluded that the corresponding accreditation expectation was not yet fulfilled and that a requirement should be issued to this extent.

The panel appreciated the additional information concerning the elective internship as well as the links of the programmes to the industry beyond the "with business" topics and the Industry Advisory Groups. However, the panel considered further enhancements in these fields to be worthwhile, as the efforts made by the university were considered to be not yet fully transparent for students.

The panel took note of the clarifications made by the institution regarding the subjects in the environmental and spatial engineering streams. These clarifications did not lead to revisions to the panel's overall positive assessment of these programmes. With regard to the issue of concrete structures and foundation engineering, the panel understood where these topics are covered within the programme. Upon further analysis of the relevant descriptions, they still found the programme to be lacking because the courses mentioned (Structural Theory and Design 1-3) cover structural analysis and all materials (concrete, steel, wood, composite). The knowledge in concrete is very basic as can be seen in the learning outcomes and in the books and the MA thesis (e.g. Implement the design of RC beams, columns and slabs with combined loading, Design simply-supported concrete-steel composite beams). The panel concludes that FEM methods at least related to statis problems and stiffness matrices but also to dynamics with stiffness, damping and mass matrix and related inverse problems, such as structural health monitoring should be part of the programme. The panel members are not convinced that the programme provides a very well developed core of concrete structures as mentioned by the institution.

Concerning the admission requirements and the English language competence of incoming students, the panel acknowledged the planned additional support in terms of additional tutorials. Taking into account the information provided also in the other clusters, the panel considered improvements in this area to still be necessary.

Overall, the panel concluded that criterion 1 was not yet fully met by the programmes in the areas mentioned (programme objectives, curriculum, admission requirements).

2. The degree programme: structures, methods and implementation

Criterion 2.1 Structure and modules

Evidence:

- Degree structure available online: http://www.eng.unimelb.edu.au/study/degrees (Accessed 01.06.2016)
- Statistics about student mobility in SAR
- Admission and progression policy, available online: http://unimelb.edu.au/__data/assets/pdf_file/0005/1655726/r111a2.pdf (Accessed 01.06.2016)
- Discussions with staff and students during onsite visit

Preliminary assessment and analysis of the peers:
The panel analysed the curricular structure and acknowledged that all programmes were divided into subjects that are corresponding to modules. All subjects are completed within one semester except for the projects. The panel generally found the structure of the programmes to be adequate and easy to manage as all subjects are calculated on a multiplier of the same value of credit points (see below, section 2.2).

The structure of all Master of Engineering streams, including the "with business" streams, is designed in a way that students can switch to the "with business" streams until about halfway through the programme. The experts appreciated this flexibility. They also considered the offer of electives to be adequate, and with regard to the Master of Architectural Engineering followed the reasoning of the university not to offer electives. As most electives of the Master of Information Technology (Spatial) are also part of other degrees, the panel took note that these are usually offered on an annual basis. Students also reported no significant issues with regard to the programme structure and module offer. Nevertheless, as some changes seemed to have been caused by staff shortages, the panel pointed this out as an issue for consideration when student numbers are expected to further grow (see also section 4.1).

The panel intensively discussed the questions of (international) mobility and industry placements within the programmes, in particular in light of the large number of interna-

tional students. The panel followed the explanations of the university that these students would not normally seek an additional stay abroad during their studies. However, the panel members convinced themselves that international mobility was encouraged and opportunities made use of by national students. Additionally, a time window during the summer break was encouraged to be used for the final project, which could also be completed at industry or internationally.

However, while in principle rules for recognition in line with the Lisbon Convention, to which Australia is a signatory, were confirmed to exist (Regulation 11.1.A2 - Courses, Selection, Admission and Assessment, Part 5 – Academic Credit), in practice students and staff mentioned some difficulties in finding equivalent subjects which could easily be recognized.

Criterion 2.2 Work load and credits

Evidence:

- Subject descriptions available online: https://handbook.unimelb.edu.au/faces/htdocs/user/search/SearchResults.jsp#postgraduateSubject (Accessed 01.06.2016)
- Subjects and Credit Points Policy: https://policy.unimelb.edu.au/MPF1015 (Accessed 01.06.2016)
- Discussions with staff and students during onsite visit

Preliminary assessment and analysis of the peers:
The student workload associated with each credit has been increased since the last accreditation following a recommendation to check its adequacy. Each subject is worth 12.5 credits or a multiple of this. For all Master programmes, one such subject is now estimated at 200 hours (for the second and third year) of student workload with more time allocated for students' self-learning as well as assessment. Accordingly, students normally complete four subjects per semester. The panel considered the workload and credit system to be very clear and straight-forward. In particular, the panel appreciated the modifications made since the first accreditation bringing the annual workload of approximately 1600 hours in the range typical also for European degrees.

During the discussions, the panel learned that the credit allocation and expected workload is clearly communicated to students in the subject descriptions. While students mentioned that, in fact, not all subjects required exactly the same workload, overall the workload expectation per semester was adequate. The panel took note that issues of workload could be discussed during the staff-student liaison committee meetings but were not specifically monitored, for example in subject evaluations or student questionnaires so that

generally students felt they were not involved in this topic. The university rather expected a self-regulation with regard to student workload. While appreciating the improvements and taking into account the general satisfaction of students as well as the general fulfilment of a corresponding recommendation from the last accreditation, the panel considered a more systematic approach to workload monitoring useful.

Criterion 2.3 Teaching methodology

Evidence:

- Subject descriptions available online: https://handbook.unimelb.edu.au/faces/htdocs/user/search/SearchResults.jsp#postgraduateSubject (Accessed 01.06.2016)
- Discussions with staff and students during onsite visit

Preliminary assessment and analysis of the peers:
The teaching methodology of each subject is determined by the teaching staff and stipulated in the subject descriptions, thus made very transparent to students and other interested stakeholders. The general approach of the university is to put a higher emphasis on project based learning – an approach that was confirmed to be implemented by the students. Additionally, team work was found to play an important role, for example in spatial subjects or GIS as well as research-based small group projects in the advanced subjects. With regard to research skills, additional research training was also offered. However, the panel also learned during the discussions that team work was not always easy to implement, in particular for the international students stemming from regions which did not place a high emphasis on self-regulated – individual or group-based – learning in the previous studies. Accordingly, students' lack of prior teamwork skills and timidity, sometimes in addition to language difficulties, was considered to be an ongoing issue in the implementation of various teaching methods. The panel acknowledged the efforts to ensure that such essential engineering skills were imparted to all students but considered that additional intercultural coaching might be worthwhile.

The panel furthermore discussed the question of engineering ethics and was convinced that the topic was taught and assessed in a number of lectures and workshops placing real-life scenarios to students. In particular, the subjects in the "with business" streams used different teaching methods such as case-studies to deal with issues of business governance, ethics (for example in marketing) as well as professional development topics such as communication, teamwork and leadership.

The panel also appreciated that some lectures are recorded and made available to students on the intranet, including blackboard notes. The intranet is also used for problem-

solving among students as well as homework. Teaching staff members usually post answers to students' questions after they have tried to solve problems among themselves. Additionally, a dedicated unit with the School, the Engineering Learning Unit, provides so-called flip-lectures where short 5 to 10 minute video lectures are produced to supplement the regular lectures.

Overall, the panel was satisfied that a sufficient variety of didactic methods was used at an adequate level of teaching.

Criterion 2.4 Support and assistance

Evidence:

- Information about student services available online: http://services.unimelb.edu.au/finder (Accessed 01.06.2016)
- Discussions with staff and students during onsite visit

Preliminary assessment and analysis of the peers:

During the discussions, the panel acknowledged that students were generally satisfied with the level and form of support they received. Nevertheless, the largely increased student numbers have also led to the involvement of more so-called casuals (teaching assistants) in classes. In particular, these casuals are active in the tutorials and labs so that student groups can be smaller. The number is indicated in each subject description and students typically have up to 12 tutorials per semester. The tutors are hired by the subject coordinators based on the number of students enrolled in a subject. The panel generally appreciated this approach, and took particular note of the positive ration of students to tutors in the architecture subjects. Nevertheless, they learned during the discussions that the quality of the tutors differed significantly among the subjects. Students also raised this issue as tutors were also involved in marking subjects and felt that fairness of grading was thus not always assured. The experts shared this concern and pointed it out as an area to which consistent quality checks should be applied.

The panel discussed the recent introduction of the "Stop 1" approach with staff and students. They understood that this new service was introduced in order to streamline students' inquiries and answer a majority of questions, specifically those of a more administrative nature. For more academic questions, the panel acknowledged that the Deputy Dean (Academic) and the other staff members were nevertheless still available to provide advice and support to students.

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

The panel welcomed the feedback of the institution regarding the structure, workload and modules. They agreed with the university that measuring students' actual workload is difficult. Examples of good practice, as also suggested in other clusters of this accreditation procedure, include the enclosure of corresponding questions in students' questionnaires. The panel furthermore acknowledged the initiatives undertaken to ensure transparent, fair and consistent marking also in large subjects.

Overall, the panel considered criterion 2 to be fulfilled.

3. Exams: System, concept and organisation

Criterion 3 Exams: System, concept and organisation

Evidence:

- Subject descriptions available online: https://handbook.unimelb.edu.au/faces/htdocs/user/search/SearchResults.jsp#postgraduateSubject (Accessed 01.06.2016)
- Selection of assessment policies and procedures : Academic Performance Policy, Coursework Assessment Policy, Special Consideration Policy, Assessment Procedure, Extensions Procedure, Examinations Procedures, Grading Scheme Procedures, Coursework Assessment Design and Methods Procedure (appendix to SAR)
- Information for students with disabilities on website: http://services.unimelb.edu.au/disability (Accessed 01.06.2016)
- Statistical data about subject pass rates (appendix to SAR)
- Sample exam schedule (appendix to SAR)
- Review of exams during onsite visit
- Discussions with management, staff, students, graduates and employers during onsite visit

Preliminary assessment and analysis of the peers:

The panel considered the assessment methods used and the information provided about the assessments in each of the subject descriptions. Additionally, the panel reviewed exams, project and thesis reports during the onsite visit. The so-called e-portfolio which had started to be implemented at the time of the first accreditation had been discontinued since then. The School explained that the method has not proven as successful as ex-

pected in order to foster students' interdisciplinary and professional skills. In its place, the Skills towards Employment Program (STEP) had been introduced, requiring students to complete an oral and written presentation in order to graduate. The panel acknowledged this form of assessment for non-technical skills but noted that the STEP programme was currently also under revision.

In the discussion with students the panel was confirmed that the exam load and variety of exams was principally practicable. The assessments and their contribution to the final subject grade were clearly stipulated in the relevant handbook entry. The panel appreciated that all subjects contained different and continuous forms of assessment to measure whether the intended learning outcomes have been met. Thus, the expert team considered the types, variety and level of assessment to be generally adequate in order to allow the School to verify whether the intended learning outcomes had been achieved.

The informatics subjects within the MIT (Spatial) were found to be on an introductory level, however. In particular the documentation made available onsite for the four foundation subjects (Programming and Software Development, Algorithms and Complexity, Internet Technologies and Database Systems & Information Modelling) were considered to be on Bachelor level.

With regard to exam administration and organisation, the panel considered the policies in use to be suitable. All exams are scheduled centrally over a thirteen-day period at the end of each semester in a manner that students have no more than two written examinations scheduled on one day and no more than three examinations in a 48-hour period. A Board of Examiners, including all academics of a department, looks into the grade distribution of each subject before the publication of results. Failed exams are always assessed by a second examiner. These measures are intended to ensure that grading is done in a fair manner. The panel considered them to be necessary, also in light of the reported issues with some tutors (see above, section 2.4).

The experts also discussed the failure rates, which they considered to be very low at an average of less than 1%, and the mechanisms for repeating failed exams. While a retake is normally not foreseen, students with short-term illness or disabilities and chronic illness will benefit from so-called special consideration. If accepted, students can re-sit the exam the next time the subject is offered or have an extension of the exam duration, for example. As the university allowed students to follow a subject for which a failed subject was a prerequisite, no significant prolongation of the study time would occur. Additionally, a special re-sit is offered if only one subject of the final year has been failed. Overall, the panel considered the measures to be reasonable.

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

The panel took note of the statement that pre-requisites are not normally waived in the programmes under review. While the panel had understood that failed modules would normally have to be repeated and not be completely waived, they supported the policy of the programmes.

Overall, the panel considered the expectations for criterion 3 to be fully met.

4. Resources

Criterion 4.1 Staff

Evidence:

- CVs of teaching staff (appendix to SAR)
- Information about Melbourne School of Engineering research online: http://www.eng.unimelb.edu.au/#research (Accessed 01.06.2016)
- Discussions with management, staff, students, graduates and employers during on-site visit

Preliminary assessment and analysis of the peers:

The review team considered the composition and qualification of the teaching staff based on the CVs provided as well as the additional information about their research activities. Currently, 50 academic staff members are involved in the teaching of the programmes under review. The team members gained the impression that the staff members were very well qualified to teach the programmes under review. In particular, the panel lauded the collaboration with the Melbourne Business School staff in developing the subjects for the "with business" streams. The subjects in the field of business are taught be engineers with significant industry experience are geared towards engineering relevant topics. Generally, the panel considered the additional involvement of guest speakers from companies to be beneficial for the practice-orientation and relevance of the programmes.

During the visit, the panel discussed the large increase in student numbers with the students, staff and management. While students reported some issues caused by staff shortages, for example changes in the schedules, the university considered that their staff rates are growing more quickly than the student numbers (the latter expected to grow by 40%), a statement which could not be fully checked by the review team based on its impression that student numbers had already increased while staff numbers were more in a planning stage. It was acknowledged positively that the School planned to hire up to 100

additional qualified teaching staff in the next four to five years. The university did not share the panel's concern about possible difficulties in finding sufficient qualified applicants. Nevertheless, the panel took note that the university had a lot of applications to level B (lecturer) positions but it remained unclear to what extent also more senior and research-driven positions could be easily filled.

Criterion 4.2 Staff development

Evidence:

- List of recent participation in Graduate Certificate in University Teaching in SAR
- Discussions with staff during onsite visit

Preliminary assessment and analysis of the peers:
Staff development and development opportunities were found to be one of the strong points of the School. The university offers the Graduate Certificate in University Teaching mandatorily for all new teaching staff members during their first two years of teaching. To date 16 staff members from the School of Engineering have participated.

Additionally, the School supports the participation in relevant research conference and allows staff members to take a sabbatical every 7-8 years. The panel also learned that about half of staff members arrange their full teaching load within one semester so as to carry out research in the other semester. Despite the fact that replacement is sometimes difficult, specifically for subjects taught only by one person, the staff members felt well supported. They particularly lauded the new rules allowing the sabbatical to be also taken locally which was considered particularly beneficial for staff members with family commitments. The new offer to take sabbaticals with industry was also viewed favourably.

Furthermore, the panel appreciated the Tutor and Demonstrator Development (TADD) programme that is offered every semester and mandatory for new casual staff.

Criterion 4.3 Funds and equipment

Evidence:

- Data about funds and equipment in SAR
- Visit of facilities during onsite visit
- Discussions with management, staff, students, graduates and employers during onsite visit

Preliminary assessment and analysis of the peers:
During the onsite visit the panel gained an impression of the facilities available for students, specifically the laboratories. The panel found the funding available and the facili-

ties to be well suited for the implementation of the programmes under review. The funds for the programmes under review stem largely from students' tuition fees and research income generated by the staff members.

Students confirmed their satisfaction with the library, resources and the working spaces. The review team noted particularly the investments which were committed to increase and improve the infrastructure in light of the quickly and largely growing student numbers. It was confirmed that not all new facilities were in place yet but that the School had identified this as an area of priority.

The panel noted, however, that computer rooms were not always available for students as the rooms were usually occupied by classes, including non-computer classes due to a lack of classrooms. As the licences for some of the software needed were only available on the computers in the rooms or not in a sufficient number for all students to download to their personal computers, students pointed out that this caused some difficulties. Additionally, some problems occurred in the MAC-equipped labs where licenses were only available for PCs. The panel considered this as an area for improvement.

Cooperation with external institutions existed mainly in the form of arrangements with international universities for exchange programmes. The panel found these to be working well for the limited number of student mobility (see above, section 2.1), specifically since students were encouraged to implement their mobility only in the frame of the pre-arranged programmes.

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

With regard to the number of teaching staff, the panel noted the information that a large number of subjects are taught by junior staff, in particular PhD candidates, also in light of rising student numbers. This information did not fully assuage the concern of the panel regarding the staff development as they considered the involvement of senior and research-experienced (professorial level) staff to be essential for Master level engineering programmes. Accordingly, they found that a systematic plan of how the programmes will be adequately taught in the upcoming years should still be provided.

Regarding the availability of software licenses, the panel acknowledged the list of available free software but was concerned about the accessibility of subject-specific software rather than more generic programmes. In particular, the panel reminded that this was one of the issues most strongly felt by students.

Overall, the panel considered that criterion 4 was not yet fully met with regard to the mentioned aspects (staff growth, software). Other aspects of this criterion were considered to be fully met.

5. Transparency and documentation

Criterion 5.1 Module descriptions

Evidence:

- Subject descriptions available online: https://handbook.unimelb.edu.au/faces/htdocs/user/search/SearchResults.jsp#postgraduateSubject (Accessed 01.06.2016)

Preliminary assessment and analysis of the peers:
The description for each subject was found online in the student handbook and could be easily tracked for each stream or programme. The descriptions were very complete including information about the subject including formal and administrative details (code, level, dates of teaching, prerequisites, coordinator and contact, fee information and related courses, amendment date, use and applicability for different programmes), information about the credits and workload, and content-related information such as participation requirements, teaching content, literature and reading material, intended learning outcomes as well as assessment forms and their respective contribution towards the subject grades.

The panel considered the information provided to be very complete and constitute an element of good practice. They also positively acknowledged that staff and students used the handbook actively to provide and gather information about the subjects.

Criterion 5.2 Diploma and Diploma Supplement

Evidence:

- Sample of AHEGS Statement (Australian Higher Education Graduation Statement)

Preliminary assessment and analysis of the peers:
The so-called Australian Higher Education Graduation Statement (AHEGS) is a formal document issued by Australian higher education institutions to their graduates. The document was considered to be very similar in scope to the Diploma Supplement in use in the European Higher Education Area and thus to comply with a recommendation from the last accreditation. It provides information about the issuing institution, the programme studied, the individual graduate's achievements, including a key to the grading

scheme in use as well as information about the Australian higher education system and Australian Qualifications Framework.

The panel pointed out, nevertheless, that the information about the programme was rather generic and that the competence profile in terms of subject-specific (on the level of the stream selected by the student) learning outcomes was missing. In order to ensure that external stakeholders receive information about the track of the student and the related competences, this information should be added. Additionally, in European practice in the Diploma Supplement statistical data about the final grades of a student cohort is provided in order to allow an external stakeholder to assess the value of the final grade. The panel pointed out that this would also be beneficial for the AHEGS.

Criterion 5.3 Relevant rules

Evidence:

- Selection of assessment policies and procedures : Academic Performance Policy, Coursework Assessment Policy, Special Consideration Policy, Assessment Procedure, Extensions Procedure, Examinations Procedures, Grading Scheme Procedures, Coursework Assessment Design and Methods Procedure (appendix to SAR)
- Website for policies: https://policy.unimelb.edu.au/ (Accessed 01.06.2016)

Preliminary assessment and analysis of the peers:
The panel found an impressive number of rules and regulations in place of policies and procedures. These were all accessible on the website of the university and could be sorted according to the necessity for the user, for example for a student. The subject descriptions and the School websites for the individual degrees also contained links to relevant policies. For example, information for students with disabilities was provided in each subject handbook entry.

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

The panel acknowledged the limitation of the university in amending an official, national document such as the AHEGS statement. Nevertheless, the panel considered the mention of programme-specific competences to be an essential feature of any such document to make it valuable and usable for external stakeholders and thereby facility mobility and transparency. The university was thus encouraged to explore possibilities to add such information in an easily readable manner for all stakeholders (e.g. as an annex to the statement).

Apart from this issue, the panel concluded that the expectations for this criterion were met.

6. Quality management: quality assessment and development

Criterion 6 Quality management: quality assessment and development

Evidence:

- Teaching and Learning Quality Assurance Committee (TALQAC) review report
- Results of Student Experience Surveys
- Discussions with management, staff, students, graduates and employers during on-site visit

Preliminary assessment and analysis of the peers:

The quality management system of the university contains a number of distinct but interrelated mechanisms. A big emphasis is put on the activities and responsibilities of the Teaching and Learning Quality Assurance Committee (TALQAC) that reviews all progammes on a regular basis and is also responsible for the development and review of qualitative and quantitative indicators of performance of teaching and learning, the review of reports and assessments of quality in teaching and learning as well as the monitoring of the quality and effectiveness of programmes. The last review report, dating from 2012, had been presented to the panel while a current review was going on at the time of the onsite visit. The peers discussed a number of issues raised in the 2012 report with the university, such as infrastructure, credits received and assessment, and concluded that these had been sufficiently taken into account in the further development of the programmes in the meantime, more specifically through actions triggered by the Staff-Student Liaison Committee.

Another quality assurance element is the so-called Subject Experience Survey (SES) that is carried out every semester. It is intended to gather feedback from students about the quality of teaching and learning with questions focussing on the usefulness, assessment and feedback mechanisms as well as learning experiences. The results were made available on department level; for the programmes under review in the underlying cluster the infrastructure engineering. The panel noted that the results for the department were generally at or slightly above the average and remained rather steady over the two years for which data was available. It was unclear, however, to what extent the rather generic feedback could and had actually been used for the development of the programmes and

its specific disciplines. As the panel understood that each staff member received not only the aggregated but also his specific subject results, the information could be used for individual improvement, but still the level of questions was considered rather vague to allow for this. Nevertheless, the teaching staff confirmed that staff members with below average marks in the SES would be offered a meeting with the assistant dean and could benefit from mentoring, for example. The panel also acknowledged that the results of the SES played a role in staff promotion.

The Staff-Student Liaison Committee of each discipline was mentioned by staff and students as an important body for providing feedback and clarifying and solving problems. The committees meet at least twice per semester. Results of the SES and from the committee meetings were confirmed to be mandatorily published in the internal learning management system so as to close a feedback loop for students. Students confirmed that issues could be raised directly with teaching staff or through the student members of the Staff-Student Liaison Committee which they considered to be working well. Immediate feedback after mid-term evaluations was also mentioned as a good practice.

The involvement of external stakeholders in the programme development is principally governed through the Industry Advisory Groups that have been put in place for all disciplines of the Master of Engineering. The panel considered these groups to be essential to ensure the placement of the graduates on the labour market, specifically in light of the uniqueness of the programme in the national context (see also section 1.1).

The peers questioned whether and how feedback from graduates was sought in order to verify the appropriateness of the achieved learning outcomes, the immersion into the labour market and further developments. They understood that a course experience questionnaire was distributed three months after graduation but it remained unclear what the results of this survey had been in the past and how they had been used to amend the programmes, where necessary. As the labour market, rather in Australia than in the home countries of many students, was understood to be under strain, the panel learned that some graduates had difficulties in obtaining adequate positions. Some companies had, for example, phased out graduate programmes. While graduates of the spatial streams and surveying were reported to have very good prospects, the mining industry absorbed fewer graduates. The panel pointed out that tracking the professional life of graduates could provide valuable information in these circumstances.

Final assessment of the peers after the comment of the Higher Education Institution regarding criterion 6:

The panel agreed with the institution that maintaining contact with graduates is not trivial. Nevertheless, as one important pillar of quality assurance and as key stakeholder group, the panel encouraged the university to proceed developing this element.

Overall, the panel considered criterion 6 to be fulfilled.

D Additional Documents

Before preparing their final assessment, the panel ask 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:

D 1. Clear description of the subject-specific programme learning outcomes (on stream level) as well as expected professional profiles for all streams [except for the Master of Architectural Engineering]

E Comment of the Higher Education Institution (15.08.2016)

The institution provided the following statement regarding the requested additional documents:

“We agree with the recommendation to develop subject-specific learning outcomes and expected professional profiles for all specialisations in Cluster B. These would be useful documents both for students and employers and to assist to guiding them on what they can expect from our graduates. We are happy to develop these in an appropriate time-frame and post them on our website along with other relevant documentation.”

The following quotes the comment of the institution:

„ We thank the ASSIN panel for providing us with the Cluster B version 2016-07-22 report of Technical Committee 3. The report gives us very valuable insights into how our professional peers in Europe view our programs. In the paragraphs below we provide clarifications, and where necessary signal our intentions for change. On a very few occasions we provide a correction if we believe we have not communicated the actual situation to the panel effectively resulting in a misunderstanding by the panel.

The Melbourne School of Engineering has decided to withdraw its current application for the EurACE label for the Master of Information Technology (Spatial) in light of the concerns raised in the draft report. While our initial view was the submitted material represented a relatively minor change to an already accredited degree, we now understand the peers’ concern after having read the draft report. Therefore this response will not consider further the comments in regard to that program. We will use the comments to continue to improve the quality of the Master of Information Technology (Spatial) program, but we will no longer be seeking accreditation for the program. We would like to take this opportunity to thank the peers for their time in reviewing this program and we hope that our decision has not caused any inconvenience.

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

We note the preliminary analysis of the peers with regard the various Master of Engineering streams and the Master of Architectural Engineering that a prima facie case was made for students to learn in the domains of knowledge and understanding, engineering analy-

sis, investigation and assessment, engineering design, engineering practice and transferable skills.

We note the issue regarding the lack of program level learning outcomes and expected professional profiles. We will work as a School to address this issue in consultation with ASSIN over the coming year.

We note the concern of the panel with regard to coverage of 'business topics' in those programs other than the ME 'with business'. We would like to remind the peers that in 2015 we introduced a 25 point internship elective subject that requires a student to work for typically 10 to 12 weeks in an engineering company. The assessment of this subject is very much focused on students reflecting on the synergies and integration of business thinking and requirements with their university study. While enrolments are still modest, it is our clear intention to grow this subject considerably to attempt to ensure that all graduating students have exposure to the engineering industry either through an internship or via extra-curricular work experience. We would also like to add that most design subjects include industry presenters and mentors to provide an element of business reality in these experiences. While the panel notes that the Industry Advisory Groups are the main link between the labour market and the programs, we would probably typify them as a key link but one of many. For example, the University-wide Careers Service maintains close liaison with the labour market across a much broader range of companies, while the Endeavour Exhibition provides opportunity for personal conversations between industry, students, and academic leaders. Most staff also have industry based liaison through their research portfolios.

In the first paragraph of page 13, the report refers to the employment rate in Asia. We wondered whether it was actually the unemployment rate that was being referred to.

Criterion 1.2 Name of the degree programme

We note the acceptance of the names of the ME programs.

Criterion 1.3 Curriculum

We note the broad acceptance of the peers on the issue of Curriculum with regard to the Master of Engineering. Several points of clarification are in order. In the Environmental Engineering stream, the subject Structural Theory and Design is not required as suggested on page 15.

In the ME (spatial) program we agree that the there are few core subjects related to becoming a professional land surveyor, however this is a reflection of the much broader range of career outcomes sought by and available to graduates from this stream. It is our

experience that students seeking professional registration as surveyors know the requirements for registration and take the necessary elective subjects to achieve this.

In the structural engineering stream, we failed to clearly communication to the peers that foundation engineering is taught in the subject CVEN90050 Geotechnical Engineering, and for those students to want develop further expertise, the elective subject CVE90027 Geotechnical Applications is available. Similarly, with regard to concrete structures, a series of modules with increasing complexity commences in the foundation year in CVEN30009 Structural Theory and Design, followed by more advanced reinforced concrete design in CVEN90049 Structural Theory and Design 2, leading to CVEN90035 Structural Theory and Design 3 which treats more specialized areas such as concrete-steel composite beams. Further specialization is available in Concrete Design and Technology (CVEN90016) as an elective, while the construction engineering aspects of concrete construction are covered in Construction Engineering (CVEN90058). Thus while there is only a single elective, there is a very well developed core of concrete structures.

On the more general question of how students learn how to develop novel and complex designs, our overall philosophy is to provide students with a stimulating environment to pursue a relatively high amount of project based learning rather than taking a more didactic approach. This does encourage and allow the above average students to go far beyond what one might achieve in a more structured environment.

We note the general observation about business specific competencies being poorly catered for across the board and will include this in deliberations about curriculum change into the future.

Criterion 1.4 Admission Requirements

We note the peers' observations about the selection difficulties with regard to English language competency of non-English speaking background students. We concur that formal language testing does not always provide a good measure. Our response is to try to provide adequate levels of support via the University's Academic Skills Unit, the STEP and PASS programs, and other extracurricular activities if deficiencies are identified. Starting in August 2016, we are creating an additional weekly tutorial for students studying Engineering Practice and Communication who are identified as being at risk due to poor language skills.

Criterion 2.1 Structure and modules

We agree with the peers that the keeping flexibility between the "with Business" and the corresponding "technical" streams are important. We intend to continue this practice into the future.

Our experience concurs with the peers' observations that a great diversity of Australian and international students successfully arrange study exchanges. We will discuss with the University's Global Mobility office our obligations under the Lisbon Convention with the intention of making our compliance with that convention more transparent.

We note the peers' acknowledgement of the revised handbook entries and other measures put in place to clarify the workload expectations, and that the current requirement is in line with European degrees. We do not find it too surprising that students experience different workloads in different subjects, because student aptitude and motivation are important factors in determining how many hours are actually allotted to different subjects. If the peers can direct us to good practice around monitoring workload we would be interested in learning about such initiatives

Criterion 2.3 Teaching methodology

We note the peers' conclusions.

Criterion 2.4 Support and assistance

We note the peers' conclusions.

With regard to consistency of marking in large subjects, typical practice is to have marking rubrics for each assignment and for the marking team and coordinator to discuss the approach the approach to marking of assignments. In some cases double marking of some assignments is done before the main cohort is marked in order to allow markers to compare marks. All exams or large assignments that are given a failing grade that leads to a fail in the subject are required to be double marked under University policy. Where a student believes an error in marking other than the academic judgement has occurred, they can use the University's grievance and complaints policy to both informally and formally seek redress.

Criterion 3 Exams: System, concept and organisation

The observation about students having pre-requisite study requirements waived is not typically true in Cluster B subjects. Only in case of generally high academic performance in other subjects would pre-requisites be waived. We would generally encourage a re-arrangement of study plans and typically an extension of one semester to accommodate a failed subject. There is generally enough flexibility and availability of subjects to allow students to continue studying 3 or 4 subjects per semester.

Criterion 4.1 Staff

While we note the concerns of the peers about the growth in staff not keeping pace with student growth, we also point out that our education delivery model uses large number of junior staff (usually casually employed PhD candidates) to assist in responding to changes in student numbers. While the number of subjects on offer does not change, the growth required in more senior staff involved in curriculum design and delivery is more modest.

Criterion 4.2 Staff development

We note the peers' conclusions.

Criterion 4.3 Funds and equipment

As noted by the peers there is considerable pressure on the provision of computer lab space. On the other hand the rapid changes in the ownership of relatively powerful laptop computers by students, combined with the licensing arrangements the University has in place helps to ameliorate the pressure. Software that is free to download for students is outlined on http://studentit.unimelb.edu.au/study/software-locations#downloadable-software and includes Matlab and its toolboxes, Autodesk products and Microsoft Office among others.

Criterion 5.1 Module descriptions

We note the peers' conclusions.

Criterion 5.2 Diploma and Diploma Supplement

We note the peer's conclusions, but also respond that we have limited influence on the national system of AHEGS statements in the short term.

We are in agreement that we can improve information in this area outside of the AHEGS statement. In the University handbook, which is publicly available, we plan to enhance the description of learning outcomes for each specialization, and provide a more student and employer centred competence profile statement.

Criterion 5.3 Relevant rules

We note the peers' conclusions.

Criterion 6 Quality management: quality assessment and development

We note the peers' conclusions. It should be noted that the Course Experience Questionnaire provides quite course data and often cannot be traced to the individual program level. It Is generally used to triangulate other local survey data or focus group data to guide reforms.

When students graduate they automatically become alumni of the University and are invited to provide alternate contact details through several avenues including letter from the Dean. The students' university email address expires 3 months after graduation. Students can remain clients of the University Career service for 12 months after graduation. While we do attempt to keep in contact with students, maintaining addresses is a constant struggle, and requests for participation in surveys and focus groups generally generate very sparse responses. There is a plan to contact graduates about 6 months after graduation to enquire of their employment outcomes and offer career help."

F Summary: Peer recommendations (31.08.2016)

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

Degree Programme	ASIIN seal	Subject-specific Label	Maximum duration of accreditation
Master of Engineering (Civil)	With requirements	EUR-ACE®	30.09.2023
Master of Engineering (Civil with Business)	With requirements	EUR-ACE®	30.09.2021
Master of Engineering (Environmental)	With requirements	EUR-ACE®	30.09.2023
Master of Engineering (Spatial)	With requirements	EUR-ACE®	30.09.2023
Master of Engineering (Structural)	With requirements	EUR-ACE®	30.09.2023
Master of Architectural Engineering	With requirements	EUR-ACE®	30.09.2021

Requirements

For all degree programmes

A 1. (ASIIN 1.1) Draft the educational objectives/learning outcomes for each specialisation (stream) so that they describe the academic, subject-specific and professional classification of the qualifications gained in the degree programmes.

A 2. (ASIIN 1.4) Ascertain that the admission rules ensure that students, who are admitted, have an appropriate level of English to follow the classes and are able to express themselves orally and in writing.

A 3. (ASIIN 5.2) Ensure that the Diploma Supplement contains detailed information about the educational objectives, intended learning outcomes as well statistical data to allow readers to categorise the individual results.

For MEng (Structural)

A 4. (ASIIN 1.1, 1.3) Demonstrate that graduates can provide novel and complex designs, constructions and development.

Recommendations

For all degree programmes

E 1. (ASIIN 1.3) It is recommended to ensure that and make transparent to the students how all management or business subjects (outside of the "with business track") are geared towards engineering.

E 2. (ASIIN 4.1) It is recommended to more systematically monitor the quality of the tutors.

E 3. (ASIIN 4.1) It is recommended to increase the number of qualified teaching staff, also beyond PhD Candidate level, as the student numbers are raising and demonstrate how they fit to the different student numbers in the different disciplines.

A 5. (ASIIN 4.3) It is recommended to improve the availability of subject-specific software licenses, taking into account students' feedback.

E 4. (ASIIN 6) It is recommended to systematically close the feedback loops and involve all relevant stakeholders in the quality management system. In particular, a systemati follow up on the graduates and track of the professional life of the graduates is recommended to ensure that the programme is matching labour market requirements.

Additionally, it is recommended to monitor whether the workload of the individual subjects and the programme as a whole is in line with the expected hours.

G Comment of the Technical Committees

Technical Committee 03 – Civil Engineering, Surveying and Architecture (21.09.2016)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discussed the report of the peer group and follows the assessment of the peers 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 programmes do comply with the engineering specific part of Subject-Specific Criteria of the Technical Committee 03.

The Technical Committee recommends the award of the seals as follows:

Degree Programme	**ASIIN seal**	**Subject-specific Label**	**Maximum duration of accreditation**
Master of Engineering (Civil)	With requirements	EUR-ACE®	30.09.2023
Master of Engineering (Civil with Business)	With requirements	EUR-ACE®	30.09.2021
Master of Engineering (Environmental)	With requirements	EUR-ACE®	30.09.2023
Master of Engineering (Spatial)	With requirements	EUR-ACE®	30.09.2023
Master of Engineering (Structural)	With requirements	EUR-ACE®	30.09.2023
Master of Architectural Engineering	With requirements	EUR-ACE®	30.09.2021

Technical Committee 06 – Industrial Engineering (08.09.2016)

Assessment and analysis for the award of the ASIIN seal:

The Technical Committee discusses the procedure. It judges the assessment of the peers as well as the proposed requirements and recommendations to be adequate.

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 part of Subject-Specific Criteria of the Technical Committee 06.

The Technical Committee recommends the award of the seals as follows:

Degree Programme	**ASIIN seal**	**Subject-specific labels**	**Maximum duration of accreditation**
Master of Engineering (Civil with Business)	With requirements	EUR-ACE®	30.09.2021

H Decision of the Accreditation Commission (30.09.2016)

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

The Accreditation Commission made a few editorial changes to the requirements 1-3 to make them clearer and to streamline them for all clusters. Additional editorial changes were made to requirement 4 as well as to recommendations 3 to 6.

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

The Accreditation Commission deemed that the intended learning outcomes of the degree programmes do comply with the engineering specific parts of Subject-Specific Criteria of the Technical Committees 03 and 06.

The Accreditation Commission for Degree Programmes decided to award the following seals:

Degree Programme	**ASIIN seal**	**Subject-specific Label**	**Maximum duration of accreditation**
Master of Engineering (Civil)	With requirements	EUR-ACE®	30.09.2023
Master of Engineering (Civil with Business)	With requirements	EUR-ACE®	30.09.2021
Master of Engineering (Environmental)	With requirements	EUR-ACE®	30.09.2023
Master of Engineering (Spatial)	With requirements	EUR-ACE®	30.09.2023
Master of Engineering (Structural)	With requirements	EUR-ACE®	30.09.2023
Master of Architectural Engineering	With requirements	EUR-ACE®	30.09.2021

Requirements

For all degree programmes

A 1. (ASIIN 1.1) Draft the educational objectives/learning outcomes for each specialisation (stream) so that they describe the academic, subject-specific and professional classification of the qualifications gained in the degree programmes.

A 2. (ASIIN 1.3) Ensure that students, who are admitted, have an appropriate level of English to follow the classes and are able to express themselves orally and in writing.

A 3. (ASIIN 5.2) Ensure that the Diploma Supplement contains detailed information about the educational objectives, intended learning outcomes as well statistical data to allow readers to categorise the individual results.

For MEng (Structural)

A 4. (ASIIN 1.1, 1.3) Demonstrate that graduates can provide complex designs, constructions and development.

Recommendations

For all degree programmes

E 1. (ASIIN 1.3) It is recommended to ensure that and make transparent to the students how all management or business subjects (outside of the “with business track”) are geared towards engineering.

E 2. (ASIIN 4.1) It is recommended to more systematically monitor the quality of the tutors.

E 3. (ASIIN 4.1) It is recommended to increase the number of highly qualified teaching staff at the lecturer level, as the student numbers are increasing, and to demonstrate how they fit to the different student numbers in the different disciplines.

E 4. (ASIIN 4.3) It is recommended to improve the availability of subject-specific software licenses, taking into account students‘ feedback.

E 5. (ASIIN 6) It is recommended to systematically close the feedback loops and involve all relevant stakeholders in the quality management system. In particular, a systematic follow up on the graduates and track of the professional life of the graduates is recommended to ensure that the programme is matching labour market requirements.

E 6. It is recommended to monitor whether the workload of the individual subjects and the programme as a whole is in line with the expected hours.

A Fulfillment of Requirements (29.09.2017)

Requirements

For all degree programmes

A 1. (ASIIN 1.1) Draft the educational objectives/learning outcomes for each specialisation (stream) so that they describe the academic, subject-specific and professional classification of the qualifications gained in the degree programmes.

Initial Treatment	
Peers	fulfilled Justification: The university defined new objectives and learning outcomes for all streams. Now the the academic, subject-specific and professional classification are described clearly.
TC 03	fulfilled Vote: unanimous Justification: The Technical Committee follows the assessment of the peers.
TC 06	fulfilled Vote: unanimous Justification: The Technical Committee follows the assessment of the peers.

A 2. (ASIIN 1.3) Ensure that students, who are admitted, have an appropriate level of English to follow the classes and are able to express themselves orally and in writing.

Initial Treatment	
Peers	fulfilled Justification: The university raised the requirements for the language skills in the enrolment regulations.
TC 03	fulfilled Vote: unanimous Justification: The Technical Committee follows the assessment of the peers.
TC 06	fulfilled

	Vote: unanimous Justification: The Technical Committee follows the assessment of the peers.

A 3. (ASIIN 5.2) Ensure that the Diploma Supplement contains detailed information about the educational objectives, intended learning outcomes as well statistical data to allow readers to categorise the individual results.

Initial Treatment	
Peers	fulfilled Justification: The university gives an equivalent to a diploma supplement named Australian Higher Education Graduation Statement (AHEGS) which is defined by the government. The university got the permission to add the asked additional information to the document.
TC 03	fulfilled Vote: unanimous Justification: The Technical Committee follows the assessment of the peers.
TC 06	fulfilled Vote: unanimous Justification: The technical committee follows the proposal for a decision of the peers and assesses all requirements to be fulfilled. Thereby it takes note that due to governmental restrictions the HEI is not free to issue the diploma supplement according to ASIIN standards. However, adding a reference to a Website that contains all relevant information is considered as an acceptable solution.

For the Master's programme (Structural Engineering)

A 4. (ASIIN 1.1, 1.3) Demonstrate that graduates can provide complex designs, constructions and development.

Initial Treatment	
Peers	fulfilled Justification: The university listed up how students are prepared to complex designs, constructions and developments and add several new formulated module descriptions.
TC 03	fulfilled Vote: unanimous Justification: The Technical Committee follows the assessment of the peers.
TC 06	fulfilled

	Vote: unanimous Justification: The Technical Committee follows the assessment of the peers.

Decision of the AC Programmes on 29.09.2017:

Degree Programme	**ASIIN seal**	**Subject-specific Label**	**Maximum duration of accreditation**
Master of Engineering (Civil)	All requirements fulfilled	EUR-ACE®	30.09.2023
Master of Engineering (Civil with Business)	All requirements fulfilled	EUR-ACE®	30.09.2021
Master of Engineering (Environmental)	All requirements fulfilled	EUR-ACE®	30.09.2023
Master of Engineering (Spatial)	All requirements fulfilled	EUR-ACE®	30.09.2023
Master of Engineering (Structural)	All requirements fulfilled	EUR-ACE®	30.09.2023
Master of Architectural Engineering	All requirements fulfilled	EUR-ACE®	30.09.2021

Appendix: Programme Learning Outcomes and Curricula

For the Master of Engineering degree programmes (all specializations) the institution has presented the following profile in the Student Handbook online:

“The ME programs have as their objectives that graduates should:

1) have a sound fundamental understanding of the scientific principles underlying technology;

2) have acquired the educational and professional standards of the professional institutions and boards with which the School's courses are accredited;

3) possess a broad knowledge base of their chosen discipline, and of other disciplines so as to facilitate effective communication with those other professionals with whom engineers routinely communicate;

4) understand the basic principles underlying the management of physical, human and financial resources;

5) have acquired the mathematical and computational skills necessary for the solution of theoretical and practical problems for further professional development and for meeting future changes in technology;

6) possess analytical, problem-solving and, where relevant, design skills, including those appropriate for sustainable development;

7) have verbal and written communication skills that enable them to make a meaningful contribution to the changes facing our society;

8) have developed professional ethics and responsibility towards the profession and the community;

9) have an appreciation of the interpersonal and management skills required by engineers in undertaking professional activities; and.

10) understand the social, cultural, global and environmental responsibilities of the professional engineer, and the need for sustainable development.”

For the Master of Information Technology (Spatial), the following objectives are stated in the Student Handbook online:

"The MIT programs have as their objectives that graduates should:

1) have expertise in a key area of information technology;

2) possess analytical skills and competencies in problem solving;

3) have a sound fundamental understanding of the principles and methods of information technology;

4) be able to demonstrable competencies in the educational and professional standards of the professional institutions and boards with which the course is accredited;

5) have a broad knowledge base of information technology so as to facilitate effective communication with those involved in the IT industry;

6) have acquired the computational skills necessary to solve theoretical and practical problems for further professional development and for meeting future changes in IT;

7) have verbal and written communication skills that enable them to make a meaningful contribution to changing face of the IT industry; and,

8) have developed professional ethics and responsibility towards the IT profession and the broader community."

For the Master of Architectural Engineering, the Student Handbook, available online, states the following objectives:

"The MArchEng program has as its learning outcomes that graduates should have:

Knowledge

• Advanced knowledge of the principles of engineering underpinning the provision of infrastructure and advanced knowledge of design based on architectural history, theory and contemporary practice.

• Knowledge of current practice contexts, including environmental, technological, regulatory and project-delivery systems.

• A knowledge of research and design-research methodologies and methods, including empirical and advanced research methods drawn from the sciences and humanities relevant to the disciplines of architecture and civil engineering.

Skills

• The cognitive and creative skills to develop and evaluate a design concept that demonstrates the exercise of theoretical reflection, critical choice, imagination and professional responsibility, through the exploration, testing and refinement of different technical and aesthetic alternatives.

• Technical and communication skills to design, evaluate, implement, analyse, theorise about developments that contribute to professional practice or scholarship in the fields of engineering and architecture.

• The technical and creative skills to produce output that demonstrates an appreciation of economic factors, environmental issues, social and cultural issues, building systems and materials.

• The technical research skills to justify and interpret theoretical propositions, methodologies, conclusions, professional and business decisions to specialist and nonspecialist audiences.

• The skills to generate design and contractual documentation that clearly conveys information to both specialist and non-specialist audiences and that enables a project to be realised.

• Development of skills in research principles and methods relevant to engineering and architecture.

• Cognitive, technical and creative skills to investigate, analyse and synthesise complex information, problems, concepts and theories and to apply established theories to different bodies of knowledge or practice related to architecture and engineering.

Application of Knowledge and Skills

• Demonstrate application of knowledge and skills in the fields of engineering and architecture, and an ability to operate effectively across the disciplines.

• Use of cross-discipline knowledge to solve problems that span interdisciplinary space in professional practice.

• The ability to think strategically at different environmental and urban scales

• The ability to establish and evaluate requirements and priorities in new project situations and contexts.

• The ability to work individually and collaboratively to prepare and deliver a project.

• The ability to prepare, structure, schedule, evaluate and deliver a substantial research or design research project.

• Cognitive skills to demonstrate mastery of theoretical knowledge and to reflect critically on theory and professional practice of engineering and architecture."

The following **curricula** are presented:

Master of Engineering (Civil)

YEAR 1					
Semester 1			*Semester 2*		
ENGR90021	Engineering Practice and Comm.	12.5	ENGR20003	Engineering Materials	12.5
ENGR20004	Engineering Mechanics	12.5	CVEN30009	Structural Theory and Design	12.5
ENEN20002	Earth Processes for Engineering	12.5	CVEN30010	Systems Modelling and Design	12.5
MAST20029	Engineering Mathematics	12.5	ENGR30001	Fluid Mechanics	12.5

YEAR 2					
Semester 3			*Semester 4*		
CVEN90049	Structural Theory and Design 2	12.5	CVEN90045	Engineering Project Implementation	12.5
CVEN90050	Geotechnical Engineering	12.5	CVEN90051	Civil Hydraulics	12.5
CVEN90044	Engineering Site Characterisation	12.5	CVEN90048	Transport Systems	12.5
CVEN90043	Sustainable Infrastructure Systems	12.5		Civil Engineering Elective	12.5

YEAR 3					
Semester 5			*Semester 6*		
CVEN90022	IE Research Project				25.0
CVEN30008	Risk Analysis	12.5	CVEN90058	Construction Engineering	12.5
	Civil Engineering Elective or Integrated Design Elective	12.5		Civil Engineering Elective or Integrated Design Elective	12.5
	Civil Engineering Elective	12.5		Civil Engineering Elective	12.5

Civil Engineering Electives (Select as required)		
CVEN90016	Concrete Design and Technology	12.5
CVEN90017	Earthquake Resistant Design of Bldgs	12.5
CVEN90018	Structural Dynamics and Modelling	12.5
CVEN90019	Sustainable Water Resources Systems	12.5
CVEN90024	High Rise Structures	12.5
CVEN90026	Extreme Loading of Structures	12.5
CVEN90027	Geotechnical Applications	12.5
CVEN90035	Structural Theory and Design 3	12.5
ENEN90005	Environmental Managemt ISO14000	12.5
ENEN90006	Solid Wastes to Sustainable Res.	12.5
ENEN90011	Energy Efficiency Technology	12.5
ENEN90014	Sustainable Buildings	12.5
ENEN90027	Energy for Sustainable Development	12.5
ENEN90029	Water and Waste Water Management	12.5
ENEN90033	Solar Energy	12.5
ENEN90034	Environmental Applied Hydrology	12.5
ENGM90007	Project Management Practices	12.5
ENEN90030	Groundwater Hydrogeology	12.5
ENEN90037	International River Basin Managemt	12.5
ENGM90006	Engineering Contracts & Procurement	12.5
ENGR90026	Engineering Entrepreneurship	12.5
ENGR90033	Industry Based Learning	25.0
GEOM90033	Satellite Positioning Systems	12.5

Integrated Design Elective (Select 1)		
CVEN90059	Integrated Design – Infrastructure	12.5
CVEN90060	Integrated Design – Civil	12.5

Master of Engineering (Civil with business)

YEAR 1					
Semester 1			*Semester 2*		
ENGR90021	Engineering Practice and Comm.	12.5	ENGR2003	Engineering Materials	12.5
ENGR20004	Engineering Mechanics	12.5	CVEN30009	Structural Theory and Design	12.5
ENGR30002	Fluid Mechanics	12.5	CVEN30010	Systems Modelling and Design	12.5
MAST20029	Engineering Mathematics	12.5	ENEN20002	Earth Processes for Engineering	12.5

YEAR 2					
Semester 3			*Semester 4*		
CVEN90043	Sustainable Infrastructure Systems	12.5	CVEN90045	Engineering Project Implementation	12.5
CVEN90044	Engineering Site Characterisation	12.5	CVEN90051	Civil Hydraulics	12.5
CVEN90049	Structural Theory and Design 2	12.5	CVEN90048	Transport Systems	12.5
ENGM90014	World of Engineering Management	12.5	ENGM90012	Marketing Management for Engin's	12.5

YEAR 3					
Semester 5			*Semester 6*		
CVEN90022	IE Research Project	25.0			
	Civil Engineering Elective or Integrated Design Elective	12.5		Civil Engineering Elective or Integrated Design Elective	12.5
CVEN90050	Geotechnical Engineering	12.5	ENGM90006	Engineering Contracts & Procurement	12.5
ENGM90011	Economic Analysis for Engineers	12.5	ENGM90013	Strategy Execution for Engineers	12.5

Civil Engineering Electives (Select as required)		
CVEN90016	Concrete Design and Technology	12.5
CVEN90017	Earthquake Resistant Design of Bldgs	12.5
CVEN90018	Structural Dynamics and Modelling	12.5
CVEN90019	Sustainable Water Resources Systems	12.5
CVEN90024	High Rise Structures	12.5
CVEN90026	Extreme Loading of Structures	12.5
CVEN90027	Geotechnical Applications	12.5
CVEN90035	Structural Theory and Design 3	12.5
ENEN90005	Environmental Managemt ISO14000	12.5
ENEN90006	Solid Wastes to Sustainable Res.	12.5
ENEN90011	Energy Efficiency Technology	12.5
ENEN90014	Sustainable Buildings	12.5
ENEN90027	Energy for Sustainable Development	12.5
ENEN90029	Water and Waste Water Management	12.5
ENEN90033	Solar Energy	12.5
ENEN90034	Environmental Applied Hydrology	12.5
ENGM90007	Project Management Practices	12.5
ENEN90030	Groundwater Hydrogeology	12.5
ENEN90037	International River Basin Managemt	12.5
ENGM90006	Engineering Contracts & Procurement	12.5
ENGR90026	Engineering Entrepreneurship	12.5
ENGR90033	Industry Based Learning	25.0
GEOM90033	Satellite Positioning Systems	12.5

Integrated Design Elective (Select 1)		
CVEN90059	Integrated Design – Infrastructure	12.5
CVEN90060	Integrated Design – Civil	12.5

Master of Engineering (Environmental)

YEAR 1					
Semester 1			*Semester 2*		
ENGR90021	Engineering Practice and Comm.	12.5	ENGR20003	Engineering Materials	12.5
CVEN30008	Risk Analysis	12.5	ENGR20004	Engineering Mechanics	12.5
ENEN20002	Earth Processes for Engineering	12.5	CVEN30010	Systems Modelling and Design	12.5
MAST20029	Engineering Mathematics	12.5	ENGR30001	Fluid Mechanics	12.5

YEAR 2					
Semester 3			*Semester 4*		
ENEN90031	Quantitative Environmental Modelling	12.5	ENEN90028	Monitoring Environmental Impacts	12.5
CVEN90043	Sustainable Infrastructure Systems	12.5	ENEN90032	Environmental Analysis Tools	12.5
CVEN90044	Engineering Site Characterisation	12.5	CVEN90045	Engineering Project Implementation	12.5
	Environmental Engineering Elective	12.5	CVEN90051	Civil Hydraulics	12.5

YEAR 3					
Semester 5			*Semester 6*		
CVEN90022	IE Research Project	25.0			
	Environmental Engineering Elective or Integrated Design Elective	12.5		Environmental Engineering Elective or Integrated Design Elective	12.5
	Environmental Engineering Elective	12.5		Environmental Engineering Elective	12.5
	Environmental Engineering Elective	12.5		Environmental Engineering Elective	12.5

Environmental Engineering Electives (Select as required)		
CVEN90019	Sustainable Water Resources Systems	12.5
CVEN90050	Geotechnical Engineering	12.5
CVEN90058	Construction Engineering	12.5
ENEN90005	Environmental Managemt ISO14000	12.5
ENEN90006	Solid Wastes to Sustainable Res.	12.5
ENEN90011	Energy Efficiency Technology	12.5
ENEN90014	Sustainable Buildings	12.5
ENEN90027	Energy for Sustainable Development	12.5
ENEN90029	Water and Waste Water Management	12.5
ENEN90030	Groundwater Hydrogeology	12.5
ENEN90033	Solar Energy	12.5
ENEN90034	Environmental Applied Hydrology	12.5
ENEN90037	International River Basin Managemt	12.5
GEOM90033	Satellite Positioning Systems	12.5
GEOM90005	Remote Sensing	12.5

Master of Engineering (Spatial)

YEAR 1					
Semester 1			*Semester 2*		
ENGR90021	Engineering Practice and Comm.	12.5	GEOM20015	Surveying and Mapping	12.5
CVEN30008	Engineering Risk Analysis	12.5	GEOM30012	Integrated Spatial Systems	12.5
GEOM20013	Applications of GIS	12.5	GEOM30013	Land Administration Systems	12.5
GEOM30009	Imaging the Environment	12.5	COMP20005	Engineering Computation	12.5

YEAR 2					
Semester 3			*Semester 4*		
GEOM90008	Foundations of Spatial Information	12.5	GEOM90005	Remote Sensing	12.5
GEOM90040	Mathematics of Spatial Information	12.5	GEOM90006	Spatial Analysis	12.5
ENGM90010	Management of Tech Enterprises	12.5	GEOM90033	Satellite Positioning Systems	12.5
	Approved Elective	12.5		Approved Elective	12.5

YEAR 3					
Semester 5			*Semester 6*		
GEOM90015	Spatial Data Infrastructure	12.5	GEOM90038	Advanced Imaging	12.5
GEOM90018	Spatial Databases	12.5	CVEN90045	Engineering Project Implementation	12.5
GEOM90039	Advanced Surveying and Mapping	12.5	CVEN90047	IE Research Project	25.0
	Spatial Elective	12.5			

Spatial Electives		
CVEN90043	Sustainable Infrastructure Engineering	12.5
GEOM90007	Spatial Visualisation	12.5
GEOM90041	Cadastral Surveying	12.5
ABPL90041	Property Law	12.5

Master of Engineering (Structural)

YEAR 1					
Semester 1			*Semester 2*		
ENGR90021	Engineering Practice and Comm.	12.5	ENEN20002	Earth Processes for Engineering	12.5
ENGR20004	Engineering Mechanics	12.5	ENGR20003	Engineering Materials	12.5
CVEN30008	Risk Analysis	12.5	ENGR30001	Fluid Mechanics	12.5
MAST20029	Engineering Mathematics	12.5	CVEN30009	Structural Theory and Design	12.5

YEAR 2					
Semester 3			*Semester 4*		
CVEN90043	Sustainable Infrastructure Eng'ing	12.5	CVEN90035	Structural Theory and Design 3	12.5
CVEN90044	Engineering Site Characterisation	12.5	CVEN90045	Engineering Project Implementation	12.5
CVEN90049	Structural Theory and Design 2	12.5	CVEN30010	Systems Modelling and Design	12.5
	Structural Engineering Elective	12.5		Structural Engineering Elective	12.5

YEAR 3					
Semester 5			*Semester 6*		
CVEN90022	IE Research Project	12.5	CVEN90022	IE Research Project	12.5
CVEN90050	Geotechnical Engineering	12.5	CVEN90058	Construction Engineering	12.5
	Structural Engineering Elective or Integrated Design Elective	12.5		Structural Engineering Elective or Integrated Design Elective	12.5
	Structural Engineering Elective	12.5		Structural Engineering Elective	

Structural Engineering Electives		
CVEN90016	Concrete Design and Technology	12.5
CVEN90017	Earthquake Resistant Design for Buildings	12.5
CVEN90018	Structural Dynamics and Modelling	12.5
CVEN90024	High Rise Structures	12.5
CVEN90026	Extreme Loading of Structures	12.5
CVEN90027	Geotechnical Applications	12.5
CVEN90051	Civil Hydraulics	12.5
ENEN90014	Sustainable Buildings	12.5
ENEN90033	Industry Based learning	12.5

Integrated Design Elective (Select 1)		
CVEN90059	Integrated Design – Infrastructure	12.5
CVEN90060	Integrated Design – Civil	12.5

Master of Information Technology (Spatial)

YEAR 1					
Semester 1			*Semester 2*		
GEOM90008	Foundations of Spatial Information	12.5	COMP90007	Internet Technologies	12.5
INFO90002	Database Systems and Information Modelling	12.5	GEOM90006	Spatial Analysis	12.5
COMP90038	Algorithms and Complexities	12.5	GEOM90007	Spatial Visualization	12.5
COMP90041	Programming & Software Developmt	12.5		Spatial Elective	12.5

YEAR 2					
Semester 3			*Semester 4*		
GEOM90015	Spatial Data Infrastructure	12.5	ISYS90050	IT Project and Change Management	12.5
GEOM90016	Advanced Topics in GIScience	12.5		Advanced Spatial Elective	12.5
GEOM90018	Spatial Databases	12.5	GEOM90043	Spatial IT Project	25.0
GEOM90042	Spatial Information Programming	12.5			

Spatial Electives		
SWEN90002	Engineering for Internet Applications	12.5
COMP90049	Knowledge Technologies	12.5
COMP90050	Advanced Database Systems	12.5
ISYS90039	Innovation and Entrepreneurship in IT	12.5
ISYS90026	Fundamentals of Information Systems	12.5
ISYS90032	Emerging Technologies and Issues	12.5
ISYS90035	Knowledge Management Systems	12.5
ISYS90085	Interaction Design and Usability	12.5
ISYS90086	Data Warehousing	12.5
CVEN90048	Transport Systems	12.5
CVEN90043	Sustainable Infrastructure Engineering	12.5
ENEN90028	Monitoring Environmental Impacts	12.5
ENEN90031	Quantitative Environmental Modelling	12.5
ENEN90032	Environmental Analysis Tools	12.5

Advanced Spatial Electives		
GEOM90005	Remote Sensing	12.5
GEOM90033	Satellite Positioning Systems	12.5
GEOM90040	Mathematics of Spatial Information	12.5
ISYS90080	IT Industry Placement	12.5
ISYS90082	Industry Based IT Experience Project	12.5

Master of Architectural Engineering

Students entering with an engineering major will be required to complete the following first year:

YEAR 1 (for students with an engineering major)					
Semester 1			*Semester 2*		
ABPL90284	Master of Architecture Studio A	25.0	ABPL90285	Master of Architecture Studio B	25.0
ABPL90286	Construction Methods A	12.5	APBL90287	Construction Methods B	12.5
ABPL90288	Architectural Cultures 1	12.5	APBL90289	Architectural Cultures 2	12.5

Students entering with an architectural major will be required to complete the following first year:

YEAR 1 (for students with an architectural major)					
Semester 1			*Semester 2*		
ENGR90021	Engineering Practice and Comm.	12.5	ENEN20002	Earth Processes for Engineering	12.5
MAST20029	Engineering Mathematics	12.5	ENGR20003	Engineering Materials	12.5
ENGR20004	Engineering Mechanics	12.5	CVEN30009	Structural Theory and Design	12.5
ENGR30001	Fluid Mechanics	12.5	CVEN30010	Systems Modelling and Design	12.5

All students then complete the next 2½ years of study.

YEAR 2					
Semester 3			*Semester 4*		
ABPL90142	Master of Architecture Studio C	25.0	ABPL90143	Master of Architecture Studio D	25.0
ABPL90118	Applied Construction	12.5	CVEN90045	Engineering Project Implementation	12.5
CVEN90049	Structural Theory and Design 2	12.5	CVEN90051	Civil Hydraulics	12.5

YEAR 3					
Semester 5			*Semester 6*		
ABPL90140	Architectural Practice	12.5	ABPL90115	Master of Architecture Studio E	25.0
CVEN90043	Sustainable Infrastructure Eng'ing	12.5	APBL90117	Twenty-First Century Architecture	12.5
CVEN90044	Engineering Site Characterisation	12.5	CVEN90058	Construction Engineering	12.5
CVEN90050	Geotechnical Engineering	12.5			

YEAR 4		
Semester 7		
No code yet	Architectural Engineering Capstone	25.0
ENEN90014	Sustainable Buildings	12.5
CVEN90059	Integrated Design - Infrastructure	12.5