The Master of Engineering Practice program at the University of Southern Queensland: A pathway to registration as a Registered Professional Engineer Queensland in Civil (Public Works).

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Abstract:  
An abstract with 100-300 words

The Master of Engineering Practice program (MEPR) is an innovative University of Southern Queensland (USQ) distance education program accredited by Engineers Australia that enables experienced engineering technologists to graduate from the program and be eligible to apply for graduate membership as a professional engineer. The Master of Engineering Practice program generally enables students to work full-time, study on-line as a part-time student and use their workplace learning to complete up to 50% of the courses in the program. Students use their workplace learning to demonstrate the achievement of course objectives through Career Episode Reports documenting competencies, attributes and capabilities benchmarked against Engineers Australia Professional Engineer Stage 2 Competency Assessment. In 2018, the Public Works and Infrastructure major was introduced as a specialisation within the Master of Engineering Practice...
program, providing a technologist pathway to registration in Queensland as Registered Professional Engineer Queensland in the Civil (Public Works) area of engineering.

This paper summarises the Master of Engineering Practice program aims, objectives, admission requirements, structure and key elements for admission to the program and registration as a Registered Professional Engineer Queensland, by the Institute of Public Works Engineering Australasia – Queensland Division (IPWEAQ), as an assessment entity for the Board of Professional Engineers Queensland.

Keywords: Workplace learning; Registered Professional Engineer; Engineering practice

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1.0 Introduction

The Master of Engineering Practice (MEPR) program was developed by the University of Southern Queensland (USQ) at the request of, and in conjunction with Engineers Australia (EA) and was developed by Professor David Dowling and the Engineers Australia Articulation Committee in 2002/3 and commenced operational enrolments in 2004. The program addressed a need to enable an articulation pathway for experienced Engineering Technologists to gain the knowledge and skills required to commenced practice as a Professional Engineer (Dowling 2014), at the level of Stage 1 Competency Standard for Professional Engineer. It is accredited by Engineers Australia and is subject to re-accreditation every five years. Once an MEPR graduate has Engineers Australia Stage 1 Professional Engineer accreditation then it is possible to begin Engineers Australia Stage 2 Experienced Professional Engineer accreditation as a Chartered Engineer in an area of practice.

Upon graduation, the MEPR graduate is eligible to apply for Engineers Australia graduate membership or full membership as an accredited Stage 1 Professional Engineer. Traditionally the post-nominals indicating both grade and occupational category of Professional Engineer (MIEAust), required the completion of an Engineers Australia-accredited tertiary engineering program (four or more years) in Australia, or equivalent, and minimum of three years acceptable work experience at the level of Professional Engineer.

For the Engineering Technologist this meant completing a Bachelor of Engineering (Honours) program, however in the past decade or so, alternative pathways such as a Master of Engineering Science or the Master of Engineering Practice program have been developed and accredited.

However, the Bachelor of Engineering (Honours) pathway may not suit experienced, mature age Engineering Technologists, whom may have already acquired many of the Stage 1 Competencies, by element of competency and indicator of attainment, through engineering application and industry based experiential learning. Because of geographic locality, family and work commitments, full or part-time on-campus study may not always be possible.
The Master of Engineering Practice Program was designed to accommodate off-campus and/or part-time study with due consideration to the experiential learning of applicants to the program. The MEPR pathway for Engineering Technologists to Stage 1/Stage 2 accreditation is unique in that the MEPR program assesses the Work Integrated Learning (WIL) experience of the student, for credit within the program and/or as satisfying the objectives and requirements of the program, to a prescribed limit.

Initially the specialisation study areas in the Master of Engineering Practice were:

- Civil Engineering;
- Electrical and Electronic Engineering;
- Environmental Engineering;
- Mechanical Engineering;
- Power Systems Engineering; and
- Structural Engineering

The success of the MEPR program is indicated in the following table:

<table>
<thead>
<tr>
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<td><strong>128</strong></td>
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<td>Graduates</td>
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<td>23</td>
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<td>27</td>
<td>26</td>
</tr>
<tr>
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<td>87%</td>
<td>88%</td>
<td>88%</td>
<td>86%</td>
<td>85%</td>
</tr>
</tbody>
</table>

Table 1: Master of Engineering Practice Program Statistics 2013-2017

In 2017, in conjunction with the Institute of Public Works Engineering Australasia Queensland, a Public Works and Infrastructure specialisation has been developed and offered in 2018, as a specialisation and discipline within Civil Engineering. The new specialisation addresses a gap in the engineering specialisation market and was primarily developed for a Local Authority or Transport Authority market.

2.0 Program aims and objectives
The program is a post-graduate Australian Qualifications Framework (AQF) Qualification Level 9 program with a typical volume of learning associated with the admission requirements and qualification of this type. It is expected that graduates at this level have specialised knowledge and skills for research and/or professional practice and/or further learning (AQF 2013).

The program allows experienced Engineering Technologists to demonstrate and/or acquire the academic, personal, professional, and technical knowledge, skills and understanding required to commence practice as a graduate or professional engineer in Australia.

On completion of the program students should be able to:

- justify, evaluate and illustrate the professional attributes, competencies and capabilities that will lead to recognition by Engineers Australia as a professional engineer
- acquire expert and specialised cognitive and technical skills and competencies in the specialisations within the program;
- demonstrate and/or acquire an advanced and integrated understanding of a complex body of knowledge and theories, concepts and processes in their chosen discipline as a professional engineer;
- critically analyse, reflect and synthesise information to interpret and transmit knowledge, skills and ideas to a variety of professional and non-professional audiences; and
- be eligible to apply for Stage 1 Professional Engineer membership of Engineers Australia.

3.0 Admission requirements

To be eligible for admission to the MEPR program, applicants must satisfy the following requirements:

- completion of an Australian university three year Bachelor degree in the area of engineering science or engineering technology in the relevant cognate major or equivalent and a minimum of five years' professional work experience, or equivalent;
- must be an Australian citizen or permanent resident of Australia, or a citizen of New Zealand or the holder of a 457 visa with a duration of at least three years; and
- standard English language proficiency requirements.

Applicants may be admitted into the program on the basis of professional registration as a Technologist Member of Engineers Australia within the cognate discipline.

Applicants must be able to demonstrate that they have at least five years of relevant and significant engineering experience usually after graduation and are required to provide a Curriculum Vitae (CV) to demonstrate their industry experience. The post-graduation experience is particularly pertinent
to high school leavers whom studied full-time within the 3 year Bachelor of Engineering Science program.

Importantly, applicants may be eligible for Commonwealth support where the Australian Government makes a contribution towards the cost of a students' higher education and students pay a student contribution amount and may also be eligible to defer fees through a Government loan called HECS-HELP.

4.0 Program structure

The Master of Engineering Practice program is a 12 unit program (1.5 years equivalent full-time) comprising three discrete Schedules (A, B and C). Schedule A contains the courses that are common to all specialisations, Schedule B contains the courses that are unique to each technical specialisation and Schedule C is a 1 week residential school practice course unique to areas of practice.

The MEPR program schedule actually comprises 14 units, which incorporates 2 units allocated for Work Integrated Learning. You cannot study a course, whilst simultaneously documenting credit for Work Integrated Learning in the same course. Given there is a 2 unit Workplace Portfolio course, 2 units are allocated as technical content for Work Integrated Learning assessment.

A minimum units of 6 units of study must be studied within the Master of Engineering Practice program, dependent upon your recognised prior learning, workplace learning and engineering competency. The average MEPR student undertakes 9 to 10 units of study in the MEPR program as a guide; and you have up to 6 years to complete the program.
Table 2: Structure of the Master of Engineering Practice program

The Master of Engineering Practice program comprises three discrete Schedules (A, B and C).

Schedule A comprises 5 core courses which represent 7 units of program load, which include:

- ENG8300 Self-Assessment Portfolio;
- ENG8311 Workplace Portfolio (2 unit load);
- ENG8308 Industry Project (2 unit load);
- ENM1600 Engineering Mathematics; and
- ENG8208 Advanced Engineering Project Management or ENG8104 Asset Management in an Engineering Environment or ENG8205 Technology Management Practice

The course ENG8300 Self-Assessment Portfolio course is the first unit undertaken in the program and is designed to enable students to assess their existing attributes and capabilities and nominate specific workplace experiences to demonstrate their level of engineering competency for a course. A minimum of two courses are generally expected to be nominated as demonstrable workplace learning competencies. Students will also nominate the Academic courses they will study in the program to enable them to satisfy the remaining attribute and capability requirements in the program objectives. The outcome of the self-assessment process is a Pathway to Graduation Plan for the student prepared in consultation with the examiner of the course and require students to be capable of demonstrating achievement of two of the specified attributes and capabilities by Engineering Competency claim reporting within the Workplace portfolio course. The pathway for
both what is studied and what is assessed as Workplace Integrated Learning is documented in the gateway ENG8300 Self-Assessment course.

The ENG8311 Workplace Portfolio (2 units) course is designed to enable students to develop Portfolios that will enable them to obtain credit for workplace learning during their employment as an Engineering Technologist. Students would demonstrate achievement of at least two of the specified attributes and capabilities by Engineering Competency claim reporting, within the Workplace portfolio course. Whilst the MEPR program allows graduates to apply for Stage 1 Professional Engineer membership of Engineers Australia, the program is also benchmarked to the competency attributes for Engineers Australia Stage 2 Chartered status. The adoption of the Stage 2 Competency Standard means that graduates can use the documents they have prepared as a basis for their application to Engineers Australia for Chartered status and is a key outcome and driver for applicants to undertake the Master of Engineering Practice program (Newman and Dowling 2014).

In 2015, ENG8308 Industry Project (2 units) was introduced to allow graduates to demonstrate Australian Qualifications Framework level expert, cognitive and technical skills in a body of knowledge of specialised practice. The ENG8308 capstone Industry Project course demonstrates the capacity for innovation, engineering application and research skills and allows you to demonstrate the required research and innovation skills to make a recognisable contribution to the engineering profession. The ENG8308 Industry Project is also an opportunity to showcase professional career and employment development upon MEPR completion.

The core foundation knowledge and skills course ENM1600 Engineering Mathematics is designed to give students the enabling skills in mathematics and problem solving required to undertake the technical courses in the program.

Either of the core engineering application courses ENG8208 Advanced Engineering Project Management/ENG8104 Asset Management in an Engineering Environment/ENG8205 Technology Management Practice are designed to give students the enabling skills to apply systematic approaches to the management of engineering projects or assets.

Schedule B comprises 7 specialised technical courses which represents 7 units of load, of which a maximum of 5 courses can be studied.

The Pathway to Graduation plan nominates how students will demonstrate achievement of the objectives for each of the Technical Courses defined for their specialisation and as listed in the Schedule. They may achieve this by either studying a course or by demonstrating achievement of the objectives of the course in their Workplace Portfolio. A student can study a maximum of 5 of the technical courses listed in this Schedule and a minimum of 2 technical courses are addressed as workplace learning and assessed in the ENG8311 Workplace Portfolio course.

Schedule C: One Practice Course

Students must complete the practice course allocated in the recommended enrolment pattern for their specialisation, which is a zero unit course and is a one week residential school of specialised
area of practice. This course can also be addressed as workplace learning and assessed in the ENG8311 Workplace Portfolio course.

5.0 Public Works and Infrastructure specialisation

The Master of Engineering Practice program comprises three discrete Schedules (A, B and C) and students are able to enrol in any offered mode of a course (on-campus, external or online), regardless of the program’s external mode of study. All students in the program study the standard Schedule A structure and Schedules B and C represent core specialised technical courses unique to Public Works and Infrastructure. The MEPR program is an opportunity for experienced Technologists to broaden and deepen their technology practice base to the broader and wider professional engineer discipline through the Schedule B courses.

Since 2017, the Public Works and Infrastructure (PWI) major has been offered as a specialised sub-discipline of civil engineering. This strand is specifically developed for Local authorities or Transport engineers and allows a choice of specialisation courses relevant to the engineering professionals engaged in those sectors of the engineering services industry (Helwig, Simmons & McDougall 2018).

Schedule B: Technical Courses

Students must demonstrate achievement of the objectives of each of the courses in this schedule, this can be achieved by course study or addressing the course objectives within the Workplace Portfolio. Students may study a maximum of five courses listed in this schedule.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
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<tbody>
<tr>
<td>CIV3403</td>
<td>Geotechnical Engineering</td>
</tr>
<tr>
<td>CIV3603</td>
<td>Construction Methods</td>
</tr>
<tr>
<td>CIV3703</td>
<td>Transport Engineering</td>
</tr>
<tr>
<td>ENV3104</td>
<td>Hydraulics II</td>
</tr>
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</table>

Select three of the following six courses:

<table>
<thead>
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<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>ENV4203</td>
<td>Public Health Engineering</td>
</tr>
<tr>
<td>ENV4107</td>
<td>Water Resources Engineering</td>
</tr>
<tr>
<td>ENV4205</td>
<td>Water and Wastewater Treatment*</td>
</tr>
<tr>
<td>CIV5704</td>
<td>Road and Street Engineering</td>
</tr>
</tbody>
</table>
Table 3: The Public Works and Infrastructure Schedule B and C

The PWI major comprises 4 core Schedule B courses that are key knowledge and skills expected for all graduates in this specialisation. The courses are:

- CIV3403 Geotechnical Engineering
- CIV3603 Construction Methods
- CIV3703 Transport Engineering
- ENV3104 Hydraulics II

The remaining 3 courses in the Schedule allow flexibility and choice of course to allow students to complete courses either relevant to their employment and sector of the engineering services industry or to mix and match across areas of practice. In general, the course choices are aimed at those practicing in local authority or transport sectors, are not undertaking structural design and eligible to apply for Registered Professional Engineer Queensland, Civil (Public Works) area of engineering with the Institute of Public Works Engineering Australasia, Queensland Division (IPWEAQ), as an assessing entity for the Board of Professional Engineers Queensland.

Conclusion

The Master of Engineering Practice program has proven to be a flexible distance education based program incorporating workplace learning and assessment that enables experienced Engineering Technologists to achieve Professional engineer registration and fast-track a pathway to Chartered status.

If you wish to enrol on-line, apply at https://www.usq.edu.au/study/apply and follow the prompts, attach a current CV with work/project history, all testamurs of tertiary and professional development qualifications you have completed. If there is additional information you would like, please contact Andreas Helwig (ENG8300/ENG8311 Examiner and Engineering Practice Leader) at Phone: +61 [0]7 4631 1903; Email: Andreas.Helwig@usq.edu.au or myself (Shane Simmons) at Phone: +61 [0]7 46312910, Email: Mailto: shane.simmons@usq.edu.au
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References
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- Last name, First initial. (Year published). Title. Edition. (Only include the edition if it is not the first edition) City published: Publisher.