Programme Review Report
Doctor of Philosophy Programme in Civil Engineering

University of Macau
Faculty of Science and Technology
Department of Civil and Environmental Engineering

Cluster Programme Review of:
Master of Science Programme in Civil Engineering
&
Doctor of Philosophy Programme in Civil Engineering

Agência de Avaliação e Acreditação do Ensino Superior – A3ES
(Agency for Assessment and Accreditation of Higher Education)

January 2020
**Abbreviations**

<table>
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<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>A3ES</td>
<td>Agência de Avaliação e Acreditação do Ensino Superior</td>
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<tr>
<td>DCEE</td>
<td>Department of Civil Engineering and Environmental Engineering</td>
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<td>CE</td>
<td>Civil Engineering</td>
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<td>CEE</td>
<td>Civil and Environmental Engineering</td>
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<td>DSES</td>
<td>Higher Education Bureau of the Government of Macao Special Administrative Region</td>
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<td>FST</td>
<td>Faculty of Science and Technology</td>
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<td>HEI</td>
<td>Higher Education Institution</td>
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<td>MSc</td>
<td>Master of Science (programme or degree)</td>
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<td>PhD</td>
<td>Doctor of Philosophy (programme or degree)</td>
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<td>PEO</td>
<td>Programme Educational Objectives</td>
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<td>PO</td>
<td>Programme outcomes</td>
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<td>QA</td>
<td>Quality Assurance</td>
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<td>SED</td>
<td>Self-Evaluation Document</td>
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<td>UM</td>
<td>University of Macau</td>
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Basic Information of the Programme

Name of the Higher Education Institution: University of Macau

Host Academic Unit: Faculty of Science and Technology, Department of Civil and Environmental Engineering

Name of the Programme: Doctor of Philosophy Programme in Civil Engineering

Degree Level: Doctor of Philosophy (PhD)

Major Mode of Delivery: Full-time

Major Language of Instruction: English

Commencing Year: 1997

Maximum Enrolment: Around 10
Executive Summary

This document concerns the review of the Doctor of Philosophy Programme in Civil Engineering carried out by the Agência de Avaliação e Acreditação do Ensino Superior - A3ES (Agency for Assessment and Accreditation of Higher Education), according to the "Guidelines on Program Review" and the "Guidelines for External Quality Assurance Agencies", which were compiled by the Higher Education Bureau (DSES) of the Government of Macao Special Administrative Region.

The assessment exercise was based on the Self-Evaluation Document (SED) received by A3ES on the first week of November 2019.

On November 08, 2019, the Panel had the Preparatory Meeting. It was decided to ask for the following documents/additional clarifications:

- supplementary information I: syllabi of the courses in the PhD in Civil Engineering and samples representative of the exams;
- supplementary information II: updated CV of the academic staff of the Department of Civil and Environmental Engineering, and;
- supplementary information III: link to download theses representative of the different fields.

The objectives of the Doctor of Philosophy Programme in Civil Engineering are clearly defined and the expected roles and functions of the staff and of the graduates are well stated. The programme provides the Civil Engineering skills to prepare graduates to pursue careers in related research, academy, industries or government bodies. They are trained to be able to appropriately identify, formulate and solve complex civil engineering problems in research or practical fields, as well as being creative and innovative, together with capacity of oral and written communications. The results of postgraduate students and alumni survey show, in terms of programme outcome and employment, that the PEOs are satisfactory met.

In what concerns admission requirements and selection process, it was concluded that the DCEE has, in general, well-established and correct procedures and criteria, despite some recommendations that are suggested to be implemented in the future: 1) for the entry of students, named “accelerated entry”, it may be relevant that the study plan is adjusted according to the candidates' prior education, 2) “exceptional admissions" should be clarified.

Despite the efforts of DCEE, it was identified that the number of students enrolled after 2014/2015, per year, varies between 4 and 8, i.e. below the offered vacancies. However, it can be expected that the newly established PhD Scholarship and Assistantship, as well as the State Key Laboratory of Internet of Things for Smart City established in 2018, will boost the capture of excellent students in the world to pursue their PhD studies in the UM.
As far as professional recognition is concerned, the information in the postgraduate student and alumni survey shows that the 6 graduates of the programme in the last 9 years work mainly in Education and the Government area, and, more significantly, the vast majority (85.7%) were engaged in research (survey about the professional occupation of DCEE graduates in the 2019 edition - 14 valid answers from doctoral students and former doctoral students).

However, it was identified that some graduations were obtained in 7 years, which means that it can be argued that there is some room for improvement in “time to graduation”, despite a good number of students succeeded to graduate in 4 or fewer years. The SED does not provides a clear indication of the dropout rate.

The programme structure and content prepared by the academic staff is a result of the participation of several players, such as internal and external stakeholders as well as comments from employers and graduates coming from the survey and meetings. This is a very good approach and allows the study programme to be regularly reviewed and updated. However, a more detailed analysis of the content of the courses identified some drawbacks and recommends improvements.

The assessment to deliver the degree of Doctor of Philosophy in Civil Engineering follows the well-established international rules, even though it was not clear whether the majority of the members of the examination committee is from other academic institutions outside UM, which would be commendable.

The academic staff is well qualified with proper scientific skills to teach the study programme and to conduct research projects on Civil Engineering.

The Panel supports the claim of material and human resources for new research laboratories, and commends that this will be optimised with installation of the State Key Laboratory of Internet of Things for Smart City approved by the Ministry of Science and Technology in 2018. It is foreseen that the DCEE will give priority to the opportunities of new research projects embracing topics like Smart Transportation, Smart Project Management, among others. It is expected that this will attract students for the programme and it will be a challenge for the DCEE, among other courses.

There are no doubts that the DCEE has in place sound internal quality assurance mechanisms, enabling the Department Head, the Programme Leader and other responsible academic staff, to monitor, manage, and improve continuously the study programme.

The Panel encourages the DCEE to keep implementing some improvement actions referred above.