

MASTER OF EARTH SCIENCE**1. Background**

The School of Earth Sciences proposes to use existing postgraduate subjects in a shared program to offer a Master of Earth Science (MESc) to local and international students. The course has been structured to provide specialist training for recent graduates as well as candidates from oil and mining companies keen to 'up-skill'. The course will be provided as either a one or two year program (depending upon the qualifications of the candidate) with three streams offered in the first instance (Geodynamics & Petroleum; Geodynamics & Ore Deposits; Earth Systems). This application should be considered in conjunction with applications for a related post-graduate certificate and a new Earth Sciences stream in the post-graduate diploma in Science. Together, these provide articulation pathways and maximum flexibility for applicants.

The increasing knowledge base within Earth Sciences, the global employment of Geoscience Professionals and the changing international political climate provide compelling reasons to increase the flexibility of degree offerings within the Earth Sciences at the University of Melbourne.

1. Over 70% of our third year students now proceed to Honours and this has been universally regarded as the basic professional qualification for the past 30 years. However, there is evidence that this is likely to change towards the Masters level in an increasingly globalised world, demanding ever more expertise. In creating this Masters degree we will bring our courses in line with international patterns in both Europe and North America where this is already the norm. The industries that employ our graduates are largely multinational in character, so it is important that we have structures in place that can meet this change in expectation.

2. The School of Earth Sciences has been invited to be a partner in a collaborative exchange program with a consortium of European (and two Australian) Universities, which would operate at the Masters level, the ERASMUS MUNDUS program. It is essential, therefore, that we have appropriate Masters Coursework programs in place. Previous informal experiences with student visitors at this level have produced a high flow through to enrolled PhD students here.

3. Applicants from the Middle East can no longer easily obtain visas to study in the USA so are turning to Australian Universities. In June 2004 the Petroleum Development Oman (responsible for training Oman employees for BSc and MSc courses in Petroleum Geology) staff Mr Rashid Jahadhmy (Head of Learning & Development, PDO) and Mohamed Al-Harthy, (Exploration team leader, PDO) contacted the School of Earth Sciences regarding the courses we provide. Mohamed Al-Harthy visited the university to discuss the content, facilities and structure of our existing (and planned) courses. Currently PDO sends 300 students/year overseas to study. Curtin University has recently signed an education agreement with the Iranian Petroleum Company and the Australian School of Petroleum in Adelaide has growing numbers of overseas MSc students from Saudi Arabia.

4. There is growing demand for Masters courses in SE Asia. Drs Hill and Hoffman (in Earth Sciences) currently teach courses, as consultants, to oil industry Geoscientists throughout SE Asia, including Indonesia, Malaysia, Japan, Korea, Vietnam and India. Both have received enquiries concerning Masters studies and subjects in Australia.

5. The mineral exploration industry is again booming and seeking high-quality trained graduates. The MESc provides a mechanism for such training. Both the Minerals Tertiary Education Council (MTEC) and the Predictive Mineral Discovery CRC (pmd*CRC) have their headquarters in the School of Earth Sciences at the University of Melbourne. MTEC has funded a position within the School to establish and run undergraduate and Masters-level subjects in ore deposits and geodynamics. The ongoing promotion through MTEC and the pmd*CRC is helping to increase

demand for Masters-level study as the necessary professional qualification for graduates wishing to work in industry.

6. The School of Earth Sciences has relatively low student-staff ratios within the Faculty and plans to increase student numbers and diversify funding by increasing the numbers of full fee-paying students. The School of Earth Sciences at Monash University has been successfully running an MSc program alongside Honours for over ten years now and have clearly demonstrated that there is demand amongst their own undergraduates for such flexibility. Approximately half of their students now choose the MSc route.

7. A final and compelling reason for creation of the MEdSc is that the postgraduate subjects already exist and have been taught informally since 1989. The School of Earth Sciences plans to reorganise these subjects to allow students to undertake them for degree qualifications.

The intensive one week-long 'workshop' style subjects proposed as part of the MEdSc program have been taught for the last 14 years by senior Research and Teaching staff in Earth Sciences and have been formally evaluated by students, industry and government attendees. The content is informed by both the industry experience of those involved in teaching these subjects and the research currently being conducted by staff and postgraduate students in the School of Earth Sciences. The structure and entry requirements of the proposed MEdSc have been aligned according to international best practice (see 15 above).

2. Entry Requirements

For the 100 credit point program

- an honours degree in a cognate discipline, with a minimum grade average of H2A (70%) in the fourth year, or equivalent; or
- an undergraduate degree in a cognate discipline and at least 2 years relevant, documented, work experience.

For the 200 credit point program

- an undergraduate degree in a cognate discipline, with a minimum grade average across third year subjects of H2B (70%), or equivalent.

3. Course Structure

| PREVIOUS QUALIFICATION | STREAM | Semester 1 | Semester 2 | Optional summer activity | Semester 1/3 | Semester 2/4 |
|--|--|--|---|--|--|--|
| Earth Science BSc with minimum 70% in third year | Two Year MESC | 25 pts 4 th year subject (625-497) + 25 pts thesis, incl. lit review & thesis proposal. | ≥70% hurdle for progression. 25 pts 600-level subject ¹ and 25 pts thesis | Potential summer employment with industry sponsor of thesis project. | 25 pts 600-level subject ¹ and 25 pts thesis.) | 25 pts 600-level subject and 25 pts thesis. Submit paper for publication. |
| Earth Science BSc with minimum 65% in third year | BSc Honours | As Above | If ≥70%, MESC candidature ² . 25 pts 600-level subject and 25 pts thesis | As Above | As Above | As Above |
| Earth Science BSc with Pass | Postgraduate Diploma in Science (Earth Sciences) | As Above | If ≥70%, MESC candidature ³ . 25 pts 600-level subject and 25 pts thesis | As Above | As Above | As Above |
| Earth Science BSc Honours or equivalent (e.g., PGradDipSc) (≥H2A) OR Earth Science BSc with Pass and ≥2 years documented relevant industry experience | | | | | 25-50 pts 600-level subjects ¹ 0-25 pts thesis (depending on experience: see table caption) | 0-25 pts 600-level subjects ¹ 25-50 pts thesis (depending on experience: see table caption) |

The structure of the proposed MESC is summarised in the table above. Each two-year program results in 100 pts coursework and 100 pts thesis. The one-year post-Honours program will be 75 pts coursework and 25 pts thesis. For applicants with industry experience, or with a PGradDipSc, the % of coursework vs thesis will be adjusted accordingly, but with not less than 50 pts coursework.

¹ Possible access to subjects in Europe under the Erasmus Program

² If <70%, the student continues with 50 pts of additional work on their thesis, and completes their BSc(Hons)

³ If <70%, the student continues with 50 pts of coursework at 400-level and completes their PGradDipSc (Earth Sciences)

4. EFTSU and Budgetary Consequences

It is envisaged that in five years time, 10-20 students will be enrolled in the MEdSc program. As long as the first year of the two-year version of the program is available on a HECS basis, the HECS consequences will be neutral for the University of Melbourne BSc students as they would otherwise be undertaking Honours. The MEdSc program will be a fee-paying course. See Business Case.

The MEdSc degree will be available to fee-paying overseas students. The MEdSc degree will be available to fee-paying Australian students, although it is hoped that for those students entering the 2-year course directly from their BSc, the first year will be available on a HECS basis. The ANU run their program in this way, but this may depend upon the consequences of the Nelson reforms.