

MANUAL FOR AUSIMM RECOGNITION OF MINERALS SECTOR COURSES

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1. WHAT IS AUSIMM RECOGNITION?

The Australasian Institute of Mining and Metallurgy (AusIMM) represents the interests of professionals in all facets of the minerals sector from exploration through to metal production. With a focus on enhancing professional excellence, one of the core priorities of the AusIMM is to support the professional development and knowledge enhancement of future minerals sector professionals.

Accordingly, the AusIMM reviews courses of study that offer a large number minerals related units and grants recognition to those courses which equip graduates with the necessary knowledge and skills to become world class minerals sector professionals. Having achieved AusIMM recognition, such courses are clearly identifiable to prospective students, employers, educators and the wider community.

Recognition is available both to specialist minerals related courses of study, as well as options based courses that give students the opportunity to undertake a minerals related stream. Courses most likely to gain recognition will offer students the opportunity to specialise in the areas of metallurgy, mining engineering, geoscience or environmental science. However given the broad range of professions which support the core technical specialists, courses which offer a significant number of units with readily apparent application to the minerals sector will be considered for recognition.

Recognition Provides:

- A Certificate of Recognition from the AusIMM and the right to identify the course as "Recognised by the AusIMM" in all advertising. The Certificate will include a short statement (20 - 25 words) identifying the key features of the course.
- Access to prestigious undergraduate scholarships from the AusIMM Education Endowment Fund, sponsored by major mining companies.
- Access to prestigious undergraduate Awards for Academic Excellence.
- Promotion of recognised courses in education materials released by the AusIMM, such as brochures distributed by The AusIMM at Careers Expos etc
- Greater opportunities for networking and consultation with senior minerals sector professionals who are members of the AusIMM.

Recognised courses can claim the distinction of having met the stringent criteria of the pre-eminent association serving minerals sector professionals in Australia and the Asia Pacific region.

2. BACKGROUND TO THE MANUAL

Course Recognition has been a feature of AusIMM for some time. The previous *AusIMM Course Recognition Guidelines* were closely modelled on IEAust *Manual for the Recognition of Professional Engineering Courses*. The IEAust document drew extensively from a report on methods for improving tertiary education for engineers entitled *Changing the Culture: Engineering Education Into the Future*, jointly sponsored by ACED, IEAust and AATSE.

Courses seeking AusIMM recognition were required to provide evidence which supported both generic criteria regarding graduate outcomes and comprehensive course content criteria for various disciplines. Consequently this recognition process was both too broad in the generic outcomes required to be demonstrated and too narrow in its recognition of minerals-relevant trajectories of study. Although the form of the courses encouraged by the process were in line with expectations of general engineering studies, they were not based on any comprehensive study of what was required of a minerals sector professional, many of whom are not engineers.

In 1996 the Western Australian Minerals Sector Task Force was created to investigate the problems facing minerals education. In 1998 the Minerals Council of Australia published its landmark discussion paper *Back from the Brink*. Both reports concluded that that minerals education in Australia had become a fragmented and unsustainable system that was failing to produce graduates with the right skills, knowledge and outlook. The Minerals Tertiary Education Council was set up by the MCA to implement initiatives to address this problem.

The studies identified three major changes which have impacted on the ability of courses to produce graduates to meet the human capital needs of the minerals sector:

- changes to the commercial context
- changes in the funding framework for higher education
- changes in the nature of student demand and impact on course delivery

2.1 Changes in the commercial context – what industry expects from higher education providers

Industry expects graduates to emerge from courses with a general understanding of the commercial context in which they work.

The industry is operating in a context of increased social awareness of the impact of mining, minerals processing and metal production activities on the environment, indigenous communities, local amenity and health and safety. The minerals sector has significantly improved its practices to meet community expectations that the rights of others will be respected.

The increasingly global nature of the minerals sector has also required professionals to be able to adapt to new challenges. In order to remain competitive minerals sector professionals need to be able to deal with companies with different ways of doing business, to be able to think strategically about projects and to be able to synthesise current and emerging technologies.

Therefore as well as having the requisite technical and scientific knowledge, graduates need to be possessed of skills such as communication, teamwork and adaptability as well as an understanding of the operating environment.

2.2 Changes in the funding framework for higher education

The higher education sector is increasingly adopting a user pays approach to education. Full fee paying students account for an increasing proportion of income for higher education providers. Economic pressures have led to higher education providers favouring courses that are inexpensive to run and subject to heavy student demand, such as Arts, Law and Commerce. In contrast, specialist courses such as Mining and Metallurgy where the student enrolments are low and the cost of teaching is high are being increasingly 'rationalised.' The view taken in *Back from the Brink* was that rather than trying to support a weak and scattered system of minerals education, course providers and the minerals sector should work together to support those minerals education courses that are functioning well. Resource sharing between minerals education providers should be encouraged. In those cases where specific courses have been incorporated into options based courses such as Engineering or Science, minerals related streams should still be supported insofar as they are capable of providing quality minerals education. Moreover options based courses pave the way for students to undertake postgraduate minerals-related studies.

2.3 Changes to student demand and impact on course delivery

In an era of rapidly accelerating technological change students are demanding more flexible course structure and a varied of methods of course delivery.¹ Students expect to be able to pick their most appropriate study pathway by drawing on a range of options, encompassing face to face classes, traditional distance materials (print plus audio visual and contact opportunities) and on line materials.

Advancements in technology have also allowed for greater collaboration between course providers on an international level. The leading courses will be the ones that attract the best students locally and overseas by offering flexible study pathways and which advance their content and teaching methods, through collaboration with other high ranking institutions both locally and overseas.

2.4 AusIMM Response to Challenges

In order to provide Australia with an appropriate skills base, minerals education needs to be **relevant, sustainable, attractive** and **innovative**. The AusIMM has amended its course recognition course to ensure that the criteria addresses these goals.

¹ Walkington J 'Designing the Engineering Curriculum to Cater for Generic Skills and Student Diversity,' *Australasian Journal of Engineering Education* 127, 131.

3. CRITERIA

All AusIMM recognised courses must meet the following criteria, which establish that courses are **relevant, sustainable, attractive** and **innovative**.

For essential criteria the word 'must' will be used. The AusIMM may decide to withhold recognition on the basis of failure to meet any one of the essential criteria.

For non essential criteria the word 'should' will be used. Although it is highly desirable that these criteria have been met, failure to meet some of them will not necessarily result in a decision not to recognise the course. The more non essential criteria are met, the more likely it is that the course will be recognised.

3.1 The Course

3.1.1 Title

The title of the higher education award received at the end of the course must be properly descriptive of the course content. Where it denotes specialisation in a particular discipline, the course must impart in-depth technical competence in that field to a level consistent with employer expectations and international practice generally.

3.1.2 Objectives

Each course must have a clear mission statement and outline of course objectives.

3.1.3 Prerequisites

All available pathways for entry to the course must be clearly articulated in the student handbook.

3.1.4 Duration

The course must be at least three years full-time equivalent duration.

3.1.5 Course Delivery

The course should be delivered by relatively flexible means which are accessible to a diverse range of students and which make use of developing technologies.

3.1.6 Career Outcomes and Opportunities for Further Education

Upon completion of the course graduates must be adequately prepared to undertake employment as a minerals sector professional should they so choose.

The course should also be capable of giving the student the opportunity to undertake a higher course in their discipline with the title of Honours, Master or Doctor, or equivalent award under the Australian Qualifications Framework.

3.1.7 Support for Continuing Professional Development

Students in other courses and students not formally enrolled in a course should be able to undertake one or more units for the course in order to broaden their understanding of the context of a particular discipline or for the purposes of continuing professional development.

3.2 Course Content

While there are many objectives of undergraduate studies, such as preparing some students for higher degrees by research and/or preparing a new generation of professionals with new values to reconstruct the profession, a key objective of courses must be to prepare students to operate effectively in the practice of their chosen profession.

AusIMM considers the following knowledge and skills are necessary for equipping a graduate for a career in the minerals sector.

3.2.1 Area of Specialisation

The course must give the student the opportunity to specialise in a minerals related discipline. Technical competency must be complimented by an ability to think critically and apply scientific method. Students should graduate with an appreciation of technical issues in that discipline and have a sound theoretical basis from which to develop competence handling advanced technical problems.

3.2.2 Exposure to Minerals Industry Practice

It is clear from the research undertaken for the *Western Australian Taskforce Discussion Paper* and *Back from the Brink* that industry believes that graduates do not have the benefit of relevant 'hands on' experience and are ill equipped to apply their technical knowledge in a practical setting.² Therefore courses must provide students with exposure to minerals sector practice. Elements of industry practice can be incorporated into the course in a number of ways, such as through short or long term field visits, through project work with contact between a student and sponsoring company, through the use of guest speakers from the industry or by getting students to engage in problem based activities drawn from contemporary mining practice.

3.2.3 Generic Skills

In order to be able to function in multidisciplinary teams in a complex environment, graduates should be equipped with the following generic skills

- Communication (written, oral, presentation)
- Computer application (word processing, spreadsheets, CAD systems)
- Team working, thinking (clear, independent creative)
- Problem Solving (define problem, analyse, resolve, deal with uncertainty)
- Interpersonal (understands and can adapt to differences)
- Time Management

² Western Australian Minerals sector Tertiary Education Taskforce 1996 Discussion Paper. *The Chamber of Minerals and Energy of Western Australia Inc.* July. See page 12:

"54% of respondents to a Taskforce survey indicated the need for a more practical, relevant approach to undergraduate education achieved in an applied environment."

- The ability to acquire knowledge
- An understanding of professionalism and the meaning of ethics

3.2.4 Awareness of Social Context

Graduates need to have a basic understanding of the social environment in which, as minerals sector professionals, they will operate. Courses should incorporate some discussion of the relevance of environmental, indigenous and other community concerns to minerals sector practice.

3.2.5 Minerals Sector Overview

Given the multidisciplinary nature of the mining, minerals processing and extraction process, students should be provided with an overview of the entire minerals sector, so that they can place their expertise in the context.

They should also be made aware of the JORC³ and VALMIN⁴ Codes.

3.2.5 Understanding of Business and Law Concepts

A survey of recent engineering graduates showed that business and management skills were highly valued, and that these ideas were not taught sufficiently in courses.⁵ Students should emerge from the course with a basic commercial understanding that will enable them to develop skills in expenditure justification, project management etc.

Students should also be aware of the existence of legislation regulating issues of occupational health and safety, the environmental, and the exercise native title rights.

3.3 Facilities

The learning environment must have adequate resources to support quality learning.

Where courses require specialised, capital intensive facilities, resource sharing through collaboration with other higher education providers or with industry should have begun to occur.

3.4 Staff Composition

The course must have a mix of academic staff with recent minerals sector experience as well as staff who have enhanced experience within the teaching and research areas.

The majority of staff members should be members of a recognised professional institute having a code of ethics

³ Joint Oil Reserves Code.

⁴ Code and guidelines for technical assessment and/or valuation of mineral and petroleum assets and mineral and petroleum securities for independent expert reports.

⁵ Palmer, Stuart, 'Whither Management Studies in Australian Engineering Undergraduate Courses,' *Australasian Journal of Engineering Education Vol 9 No 2*, 113.

Industry secondments for academics and opportunities for secondments for industry professionals should be encouraged.

Academic staff should include people who are at the forefront of their field of expertise; the course should be aiming to attain world-class strength in at least one significant area, reflected in its staff profiles.

3.5 Course Design and Forward Planning Mechanisms

The higher education provider must have systems in place to ensure that course objectives are met and that processes are continually reviewed and improved.

Mechanisms for securing feedback from students, graduates and industry and for incorporating these into the course should be in place.

Course design should be informed by consultation with industry.

4. DOCUMENTATION ADDRESSING CRITERIA

In order to be recognised by The AusIMM, the Course must show that it has met all of the essential criteria and most of the non essential criteria in Section 3 by supplying documentary evidence. The documentation required is very straightforward and is itemised beneath criteria headings. Documentation will take the form of either a photocopy of pages from the student handbook, a direct answer or a short descriptive statement.

Where a photocopied page from the student handbook is sufficient, "student handbook" will appear in brackets next to the statement of document required. If writing a statement is easier a copy need not be used.

Where a direct answer or list of units without further descriptors is sufficient, the statement of document required will appear in ordinary font.

Where a short descriptive statement is required (of no more than 200 words) the statement of document required will be *italicised*.

4.1 The Course

4.1.1 Title/Objectives/Duration/Outcomes

Please submit the following information:

- i. The formal title of the course (student handbook).
- ii. If the title of the course denotes an options-based course for which a minerals related stream is available, identify the stream and state whether this constitutes a formal major.
- iii. A clear statement of the mission and objectives of the course (student handbook).
- iv. *A short statement of the key features of the course which can be used as a descriptor on The AusIMM Recognition Certificate* (approx. 30 words)
- v. A clear statement of all available pathways for entry into the course including minimum academic performance requirements, prerequisites and exemptions for previous study or work experience (student handbook).
- vi. Duration of course when study is undertaken full time (student handbook)
- vii. Statement as to whether individual units are for study are made available to students in other courses or non enrolled students.
- viii. Statement as to whether at the completion of the course students are possessed with suitable knowledge and skills to find employment as a minerals industry professional, and in what capacity they may be employed.
- ix. Statement as to whether at the completion of the course the student is eligible to undertake a higher degree at an Honours, Masters or Doctors or Australian Qualifications Framework equivalent level in their discipline.

4.1.2. Course Delivery

Please submit the following information:

- i. Details of all available options for completing the course ie full time study, part-time study, summer semester etc (student handbook)

- ii. Whether the course may be completed as part of a combined degree (student handbook)
- iii. *List of mediums by which course materials are communicated to students (ie classrooms, tutorials, lecture audio stream on web, on line discussion forums etc)*
- iv. *List of mechanisms which support ability differences (ie availability of update courses for mature age students, English language assistance for overseas students, availability of exemptions for industry experience etc)*

4.2 Course Content

4.2.1 Area of Specialisation

Please submit the following information:

- i. The area of specialisation offered by the course
- ii. Unit list for course (Student Handbook)⁶

4.2.2 Exposure to Minerals Sector Practice

Please submit the following information:

- i. List units which include exposure to minerals sector practice
- ii. *State the nature of the exposure to minerals sector practice for at least three units⁷*

4.2.3 Generic Skills

Please submit the following information:

- i. List of assessment tasks for units (student handbook)
- ii. *Brief statement outlining the approach to teamwork exercises, problem based learning, project based learning and oral presentations, multidisciplinary projects etc.*

4.2.4 Awareness of Social Context

Please submit the following information:

- i. List of units that incorporate social and environmental considerations.
- ii. *A brief statement of how these considerations are incorporated into three or more units.*

4.2.5 Minerals Sector Overview

- i. Do any units incorporate a minerals sector overview? Please List. Do not provide additional detail.

⁶ Where the course constitutes a stream minerals related units must be clearly highlighted/asterisked.

⁷ The following activities will be considered to provide practical experience: short and long term field visits, industry sponsored project work, problem based learning drawn from contemporary mining practice, industry speakers, any other means by which the course enables students to apply technical competencies in a practical minerals related context.

- ii. Do any units make mention of JORC or VALMIN Codes? Please list, do not provide additional detail.
- iii. Do any of the units introduce students to the notions of professionalism and/or ethics?
- iv. *Describe how the notions of professionalism and/or ethics are incorporated into at least one unit.*

4.2.6 Business and Law Concepts

- i. Are there any units which give students an introduction to commercial concepts? Please list, do not provide additional detail.
- ii. Are there any units which make mention of OH&S, Native Title and Environmental Impact legislation? Please list, do not provide additional detail.

4.3 Facilities

Please submit the following information:

- i. List of facilities made available for teaching the course
- ii. *Overview of study support facilities made available for students.*
- iii. *Statement as to whether the higher education provider engages in resource sharing or collaboration with any other providers in the area of minerals education or with industry and describe the nature of this collaboration.*

4.4 Staff

- i. List all staff involved in teaching course units. Indicate whether they are full time, part time or casual. Please note whether they have industry experience and are members of any professional associations, particularly The AusIMM.
- ii. *Please describe remarkable achievements by academic staff eg achievements in the field of research, participation in Working Groups etc.*

4.5 Course Design and Forward Planning Mechanisms

- i. *Are there any mechanisms in place to consult with industry regarding course design. Please describe.*

5. PROCESS

5.1 Request for Recognition

The higher education provider submits a request to the AusIMM for a course or courses to be recognised. Where there are several minerals related disciplinary streams within a course seeking to be recognised, a separate application must be made for each one.

5.2 Scheduling of Initial Review Process

The AusIMM acknowledges the request and schedules:

- A date for initial documentation to be submitted by the higher education provider, usually three months from the date of the initial request.
- A provisional date for the completion of an Evaluation Report by Central Services, usually two months from the date after receipt of complete documentation from the higher education provider

5.3 Submission of Initial Documentation

The higher education provider submits documentation addressing the Criteria for Recognition in the form specified in section 4 above. Documentation supporting each and every numbered item must be included. Upon receipt, the AusIMM acknowledges the documentation.

5.4 Review by Central Services

AusIMM Central Services will review the application. If documentation is not adequate Central Services will request that the higher education provider supply further documentation. Central Services will prepare an Evaluation Report addressing the extent to which the higher education provider has met the criteria. Central Services will then submit the Evaluation Report to the higher education provider, notifying the higher education provider whether it has been successful at this stage of the process. If the higher education provider feels that there was some aspect of the documentation that Central Services failed to understand, or a criteria was not evaluated properly, Central Services must be notified within four weeks.

If the application meets with the recognition requirements at this stage of the process the nearest AusIMM Branch will be contacted in preparation for a Recognition Visit. The higher education provider will be provided with a provisional date for both the Recognition Visit and the Final Decision - usually one month after the Recognition Visit.

5.5 Recognition Visit

The nearest AusIMM Branch will establish a Recognition Visit Panel which will comprise at least four individuals, including:

- (1) The panel chair, who will normally be a senior member of the AusIMM Branch local to the higher education provider.
- (2) One representative higher education sector with suitable expertise who is not affiliated with the higher education provider making the application for recognition.

- (3) Two industry representatives with experience relevant to the application, to be nominated by the AusIMM.

The visit will normally extend over one or two days and the Panel will focus primarily on evaluating factors that cannot readily be described in documentation, such as:

- the nature and quality of teaching and study support facilities
- considering assessment procedures through examining representative examples of students' work
- forming a general impression of the morale and calibre of staff and students, the educational culture, and general awareness of current developments in academia and in minerals sector practice

At the conclusion of the visit, the Panel will provide preliminary comments to the officer/s representing the higher education provider. However, the Panel cannot anticipate the Final Decision.

5.6 Recognition Visit Report

The Panel will prepare an Recognition Visit Report. The Higher education provider will also be provided with the Recognition Visit Report and has four weeks to respond to any factors it feels may have been misunderstood by the Panel.

5.7 Final Decision by The AusIMM Board

Based on the Evaluation Report and the Recognition Visit Report, The AusIMM Board will make a final decision as to whether the Course should be granted Recognition.

For each course evaluated, Board may decide:

- (1) To accord or renew recognition for five years, or
- (2) To decline or withdraw recognition. In such case, a further application is not normally considered within two years.

Once accepted, the final decision is then forwarded to the higher education provider with a Statement of Reasons. All Recognition reports are confidential between the Institution concerned and The AusIMM and are not to be published.

5.8 Appeals

An Institution may appeal against a decision not to recognise a course. The appeal must be made in writing to the CEO of The AusIMM within two weeks of receiving the decision, and must state the grounds on which it is based. Grounds for appeal are normally limited to factual misunderstandings, conflict of interest or breach of procedure laid down in this manual.

5.9 Material Change of Circumstances

If a course changes materially from the features that were originally assessed, the higher education provider is expected to draw this to the attention of the AusIMM. The AusIMM can withdraw recognition at any time if the course fails to meet the Recognition criteria set out in section 3.

APPENDIX 1: GLOSSARY

course means:

- (a) a single course leading to a higher education award*;
or
- (b) a course recognised by the higher education provider* at which the course is undertaken as a combined or double course leading to one or more higher education awards.

higher education award means:

- (a) a degree, status, title or description of bachelor
- (b) an equivalent award specified under the Australian Qualifications Framework

higher education provider means a body corporate that has central management and control in Australia or New Zealand:

- (c) that is established as a higher education provider, or recognised as a higher education provider, by or under the relevant jurisdiction and/or
- (d) whose name is included in the Australia Qualifications Framework Register as the name of a higher education institution empowered to issue its own qualifications

minerals related unit means:

a unit* of study in which knowledge and skills are imparted with readily apparent utility to the minerals sector.

minerals related stream means:

a series of minerals related units* which enrolled students may elect to take within a course* which progress in depth or difficulty. In most cases a student will need to undertake the units of lesser difficulty in order to be eligible to enrol in the more advanced units in the minerals related stream.

project based learning means:

an instructional strategy in which students confront contextualized problems that require a decision regarding a definite solution, and where the quality of that solution is the key means of assessing the students performance. Primarily directed toward the application of knowledge.

problem based learning means:

an instructional strategy in which students confront contextualized problems and strive to find meaningful solutions based on incomplete data. Primarily directed toward the acquisition of knowledge.

student handbook means:

a publication issued by the higher education provider at the beginning of each year which outlines the program for each course. Matters covered in the handbook will include descriptions of courses* and units*, options for undertaking a specialist stream of study, prerequisites for units, course objectives, assessment procedures and requirements for entry into the course.

unit means:

- (a) a unit of study that a person may undertake with a higher education provider* as part of a course* of study; or
- (b) a unit of study made available by a higher education provider;

- (ii) access to which was provided by Open Learning Australia; and
- (iii) that a person could undertake as part of a course* of study leading to a higher education award*; or
- (c) part of a bridging course for overseas-trained professionals