

## ENGR90016 Mine Dewatering, Ventilation and Power

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| <b>Credit Points:</b>                    | 12.50   |
| <b>Level:</b>                            | 9 (Graduate/Postgraduate)   |
| <b>Dates &amp; Locations:</b>            | 2010, Parkville<br>This subject commences in the following study period/s:<br>Semester 2, Parkville - Taught on campus.   |
| <b>Time Commitment:</b>                  | Contact Hours: One 1 hour lecture + one 2 hour tutorial weekly Total 36 hours Total Time Commitment: 144 hours (including non-contact time).  |
| <b>Prerequisites:</b>                    | None  |
| <b>Corequisites:</b>                     | None  |
| <b>Recommended Background Knowledge:</b> | Students undertaking this subject will be expected to be competent in the use of Microsoft Excel or alternative spreadsheet software.   |
| <b>Non Allowed Subjects:</b>             | None  |
| <b>Core Participation Requirements:</b>  | For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Students Experiencing Academic Disadvantage Policy, academic requirements for this subject are articulated in the Subject Description, Subject Objectives, Generic Skills and Assessment Requirements of this entry. The University is dedicated to provide support to those with special requirements. Further details on the disability support scheme can be found at the Disability Liaison Unit website: <a href="http://www.services.unimelb.edu.au/disability/">http://www.services.unimelb.edu.au/disability/</a>  |
| <b>Coordinator:</b>                      | Prof Ian Johnston   |
| <b>Contact:</b>                          | Melbourne School of Engineering Office<br>Building 173, Grattan Street<br>The University of Melbourne<br>VIC 3010 Australia<br>General telephone enquiries<br>+ 61 3 8344 6703<br>+ 61 3 8344 6507<br>Facsimiles<br>+ 61 3 9349 2182<br>+ 61 3 8344 7707<br>Email<br><a href="mailto:eng-info@unimelb.edu.au">eng-info@unimelb.edu.au</a> ( <a href="mailto:eng-info@unimelb.edu.au">mailto:eng-info@unimelb.edu.au</a> )   |
| <b>Subject Overview:</b>                 | <p>The primary objectives of the subject are to familiarise students with the way in which mining environments are rendered safe and comfortable for people to work in, and for machinery to be powered</p> <p>Major aspects include :</p> <ul style="list-style-type: none"> <li>• <b>Dewatering:</b> Optimum pipe diameter of a pumping line, System curve of a pumping line, Pump selection in terms of the operating conditions of a pump, Design/plan a pumpstation (layout), Pipeline design (incorporating all the components) and water hammer analysis, Electrical design, instrumentation and control, Pump curves for parallel and series coupled pumps.</li> <li>• <b>Mine Power and Distribution:</b> Mine power requirements and reticulation, Electrical power distribution in surface and underground operations, Mine cables and switch gear, Explosion-protected electrical devices, Fault protection and risk analysis, Design and operational characteristics of electric motors and drive systems, Speed and torque control, Signalling and communications, Types and designs of control systems.</li> <li>• <b>Ventilation Underground:</b> Mine Ventilation principles and design issues, Hazards from gases, radiation and dusts, Mine Fires and other emergencies, Psychrometric processes, heat and climate, Thermodynamics, Pressure, resistance, flow and other properties related to fluid flow, Fan theory, Airway sizing based on practical and economic criteria., Primary Ventilation</li> </ul> |

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|                           | design, Auxiliary (secondary) ventilation design, Measurement and testing of air properties and quantities, Mine refrigeration, Physiological effects of climate extremes, Analysis of mine ventilation networks, Airflow requirements based on practical, legal and good practice , Noise exposure, Mine heating and cooling processes.  |
| <b>Objectives:</b>        | On completion of this subject, the students should have: <ul style="list-style-type: none"> <li># Developed the skills and knowledge to understand the theoretical fundamentals of fluid mechanics and to apply them to practical applications.</li> <li># An understanding of the design principles related to electrical power distribution systems used in and about mine sites.</li> <li># An understanding of the design principles related to ventilation systems used underground.</li> </ul>  |
| <b>Assessment:</b>        | • Formally supervised written examination - 3 hours 50% (end of semester). • 3 Homework assignments (1,500 words limit each) each of equal value, totalling 50% (commencing in Weeks 4, 7, and 10).   |
| <b>Prescribed Texts:</b>  | H. Hartman & J. Mutmansky – Introductory Mining Engineering, SME, 2002.M. Karmis – Mine Health and Safety Management, SME, 2001.  |
| <b>Recommended Texts:</b> | SME – Mining Engineering Handbook, 1992.  |
| <b>Breadth Options:</b>   | This subject is not available as a breadth subject.   |
| <b>Fees Information:</b>  | Subject EFTSL, Level, Discipline & Census Date, <a href="http://enrolment.unimelb.edu.au/fees">http://enrolment.unimelb.edu.au/fees</a>   |
| <b>Generic Skills:</b>    | On completion of this subject, the students should have developed: <ul style="list-style-type: none"> <li>• Analytical, critical and creative thinking, with an aptitude for continued self-directed learning.</li> <li>• Sense of intellectual curiosity.</li> <li>• Sense of intellectual integrity and ethics of scholarship.</li> <li>• Writing, problem-solving and communication skills.</li> <li>• Ability to learn in a range of ways, including through information and communication technologies.</li> <li>• Capacity to confront unfamiliar problems.</li> <li>• Ability to evaluate and synthesise the research and professional literature.</li> <li>• Ability to develop models of practical applications and evaluate their performance by rigorous analytical means and by programming computer simulations.</li> <li>• Capacity to manage competing demands on time, including self-directed project work.</li> </ul> |
| <b>Notes:</b>             | Students will need access to PC/laptop.   |
| <b>Related Course(s):</b> | Graduate Certificate in Engineering (Environmental Engineering)<br>Master of Mining Engineering<br>Postgraduate Certificate in Engineering  |