Faculty of Engineering, Built Environment and Information Technology

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

DEPARTMENT OF MINING ENGINEERING

2024

Postgraduate Brochure

www.up.ac.za/mining-engineering

Last Revision: July 2023

1. INTRODUCTION

The postgraduate degree programs in the Department are open to graduates holding a recognised degree in either Engineering (BEng), Science (BSc) or technology (BTech). The courses are intended for graduates who wish to enhance their skills in Mining Engineering, or for other professionals who wish to further their academic qualifications in aspects of Mining Engineering.

The courses offer subjects in a broad spectrum, covering introductory aspects of mining engineering, through to consolidation, skills enhancement and mining research-related projects, dissertations and theses. A number of courses may be taken from other engineering disciplines if the student requires specialist knowledge not available in the Mining program (program specific). Students should refer to the appropriate Departmental brochure for further details of these courses.

Tuition is organised as self-study modules to enable you to work and study full-or part-time at your own pace, however contact sessions may be required for individual modules. Each course provides you with a full set of notes and/or lecture material. Individual lecturer contact sessions can be scheduled throughout the term where you can discuss course material on a one-to-one basis with the lecturer. Examinations are held at the department on the Hatfield campus, during **June - July** (for first semester courses) and **December - January** (for second semester courses).

With all these study opportunities to increase your knowledge and skills in contributing to the growth of our industry, country and continent I look forward to welcoming you to the program.

Prof Ronny Webber-Youngman

Head: Department of Mining Engineering
University of Pretoria
Email: ronny.webber@up.ac.za
"Educating and leading mining engineers to become Imagineers"
#UPMiningMatters

2. GENERAL

a. Yearbooks

This information brochure should be read in conjunction with the following Yearbook of the (EBIT Faculty) University of Pretoria. Please follow the website link mentioned herewith: http://www.up.ac.za/yearbooks/home

Irrespective of any comments contained in this brochure, the following will apply:

- General Regulations, Rules & Glossary of Terms;
- Faculty of Engineering, Built Environment and Information Technology Yearbook

Note that the academic status of degrees obtained at other universities, especially graduates from overseas Universities, need to be clarified with the Student Administration Offices. Refer also to the Regulations G.29-G.38 part 1, of the relevant year(s) of registration.

Although every attempt was made to ensure that this brochure is correct and up to date at the time of publishing, the Department reserves the right to make changes without prior notice and without prejudice.

b. UP Policies

Please click the link here to see the latest UP related policies.

c. clickUP

clickUP is the online learning management system of the University of Pretoria that acts as a virtual classroom. All Postgraduate students will have access to clickUP once **registered**.

clickUP can be accessed directly at https://clickup.up.ac.za/ or you can login via "MyUP Login" from the Homepage on the University of Pretoria's 

website. Sign on to www.up.ac.za, and click this icon on the top of the page.

For help accessing the UP Student Portal, visit https://www1.up.ac.za/uplogin/faces/docs/UPPortal-Help-UPLogin.pdf or click on 'Need help' on the UP Student Portal login page.

Students will then be navigated to the "UP Student Portal" where his/her registered modules will be listed. Each module has a unique site that contains lecturer details, study guide, prescribed material, and announcements. It also hosts facilities to conduct e-mail communication(s). Since clickUP is the official means through which lecturers communicate to all students, students must visit clickUP regularly and ensure that their latest e-mail addresses are registered in clickUP.

Additional information may be obtained from the Student Help Desk at:

- E-mail: studenthelp@up.ac.za
- Tel: +27 12 420 3837
- Mondays – Fridays 07:00 – 16:30

d. Administrative contact information

Further enquiries with regard to all **applications, registrations and administration** of the student's application, please contact the following persons:

General Administration *(Applications, registrations & administrations)* **(EBIT Student Administration, Engineering I building, level 6)**			
Honours	Mr Roy Mashiloane	012 420 5656	roy.mashiloane@up.ac.za
Masters	Mr Edward Masemola	012 420 5619	te.masemola@up.ac.za
PhD	Mr Kenneth Nkanyana	012 420 6735	kenneth.nkanyana@up.ac.za

e. Department contact information

For any **departmental or subject related enquiries**, please contact the following persons:

Departmental Contacts		
Administration enquiries	Ms Marietha Hicks *marietha.hicks@up.ac.za*	012 420 3196
Coordinator for postgraduate studies; curriculum structure, all postgraduate degrees	Mr Jannie Maritz	012 420 4571

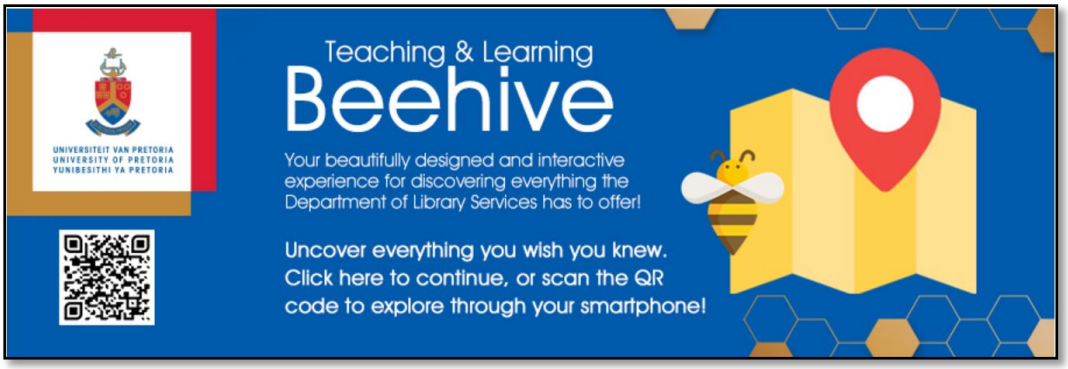
f. Plagiarism - http://www.library.up.ac.za/plagiarism/index.htm

Students who commit plagiarism will lose all credits obtained in the plagiarised work. The matter shall also be referred to the Disciplinary Committee (Students) for a ruling. Plagiarism is regarded as a serious contravention of the University's rules and can lead to expulsion from the University.

Please refer to Plagiarism Prevention Policy available at the following website:
https://www.up.ac.za/article/2754069/up-policies-and-other-important-documents

Also see all training opportunities available regarding plagiarism, referencing and software available for your studies - http://www.library.up.ac.za/training/index.htm

g. Library - www.library.up.ac.za

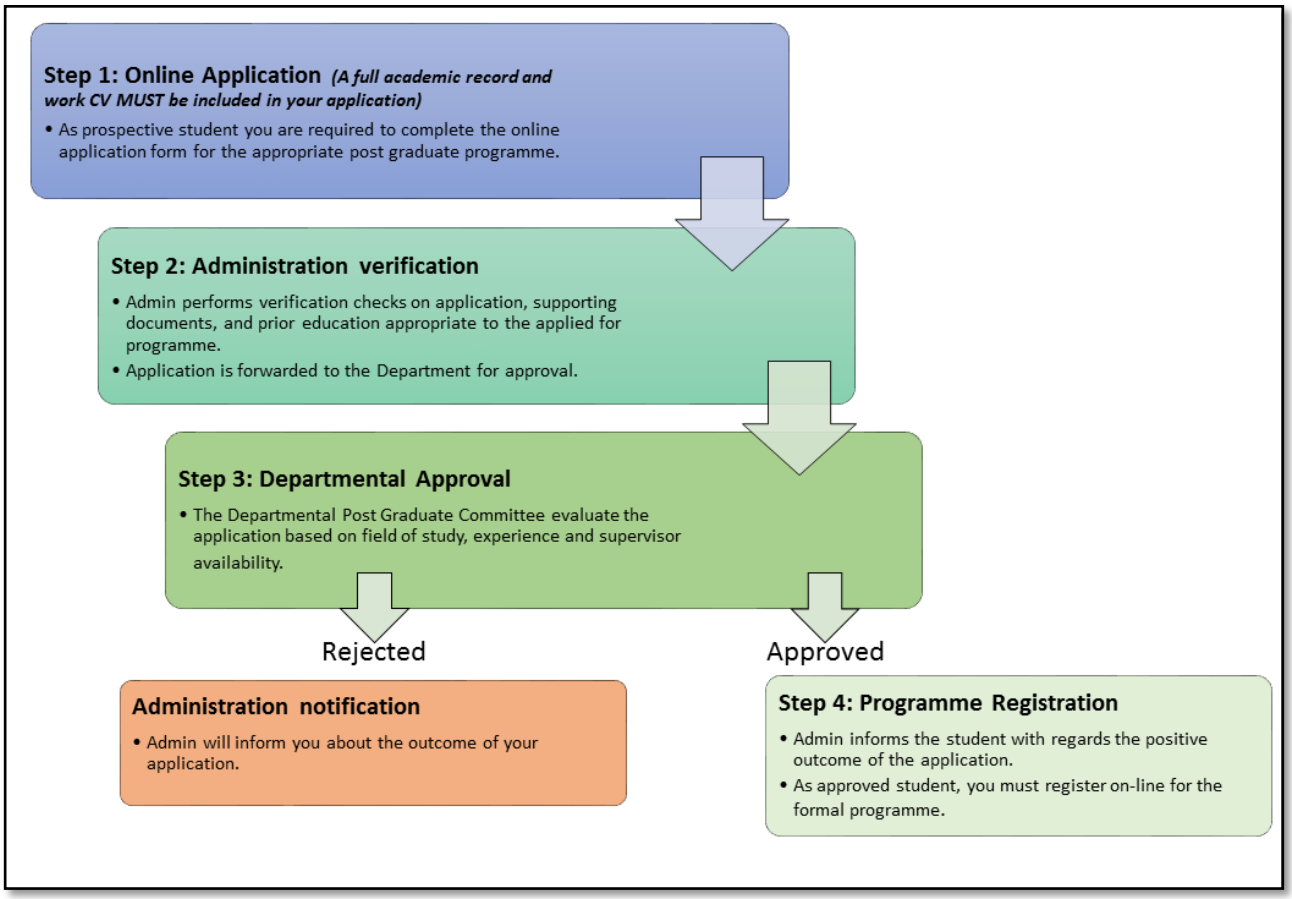


A Graduate Research writing module in clickUP is a support module and has been setup for postgraduate students. This module is a space for students to upload copies of their papers or dissertations through Tii for their own use.

To register for this module, download the step sheet on the Library Services homepage/services/plagiarism /Turnitin/Turnitin for post graduates.

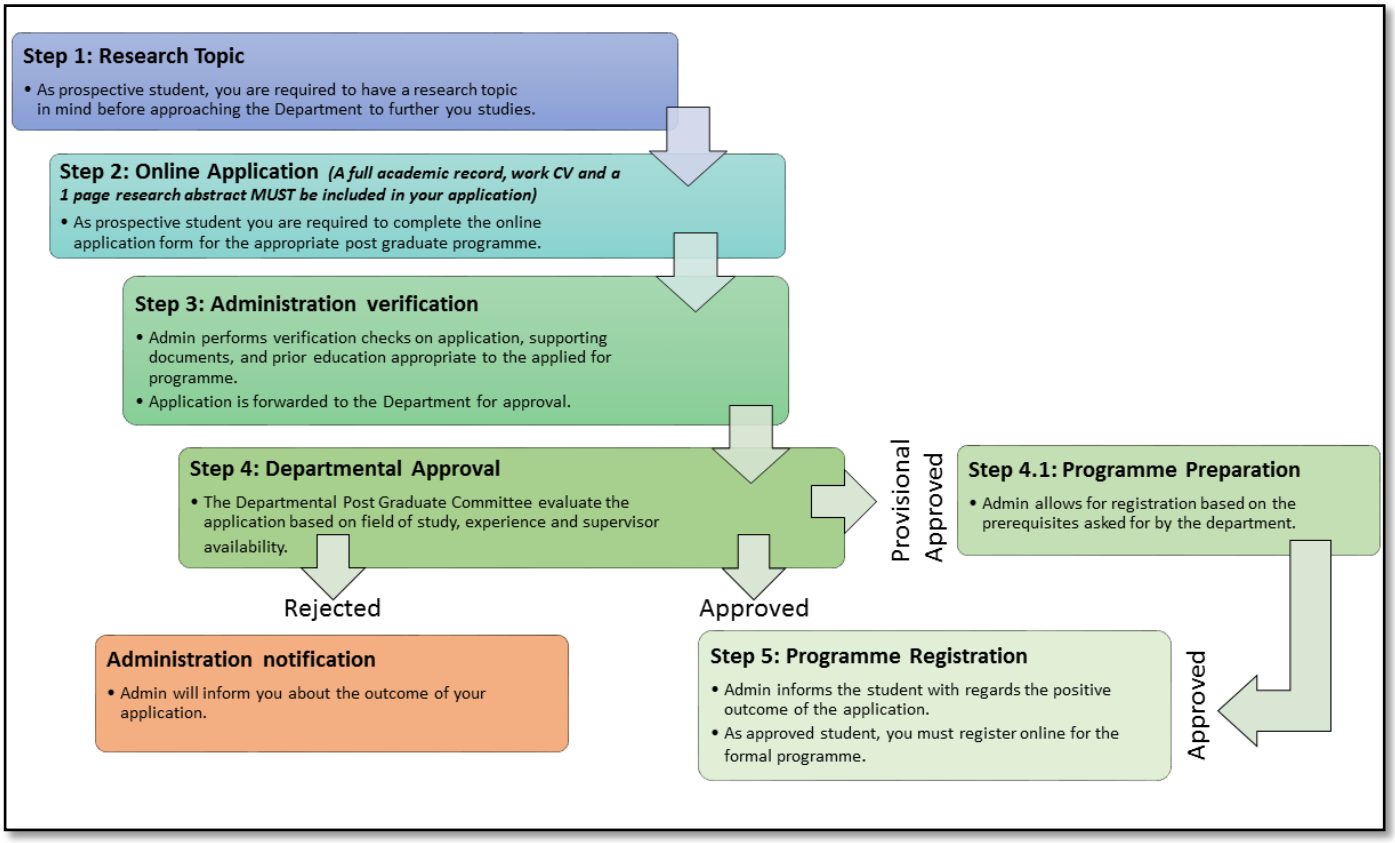
3. Application Process

a. Honours applications



NOTE: All Honours applications **MUST** include a full **Academic Record** and **Curriculum Vitae** that contains all the relevant work experiences.

b. Masters and PhD applications



NOTE: All Masters and PhD applications MUST include a full academic record, Curriculum Vitae, a research topic together with a research abstract (1 page only).

c. Closing dates

The closing dates for applications for admissions are:

- For Honours studies – 31st of October of each year
  NO late applications for Honours studies will be accepted after this date
- Master's and Doctorate studies – At the discretion of the department

The departmental committee meet every quarter for scrutiny of all applicants. This will take place in March, June, September and November. Depending on the date of application, feedback will be available after the scheduled meeting.

All applications must be online at https://www.up.ac.za/online-application

Once your application has been submitted, you may however contact the Student Service Centre in writing at ssc@up.ac.za if you wish to add any additional information, or make any changes to your application.

To check your application status, please refer to:
https://www.up.ac.za/online-application/article/2746918/application-status

d. International Students

UP registrations for the 2024 academic year are fully online.

- International students need to comply with immigration requirements. For assistance and enquiries, email isd@up.ac.za.
- The registration guidelines show you step by step how to register successfully. In case of difficulties, contact the online registration help desk on telephone +27 (0) 12 420 5347 or email us at registration@up.ac.za.
- Various holds may prevent you from registering successfully. Please check for holds on the UP Student Centre.
- Consult the Yearbooks for information on which modules to choose and curriculum.

For more information on above, please go to:
https://www.up.ac.za/online-registration/article/2398818/international-students

e. Fees and Funding

Once you have been accepted to study the programme of your choice, fees are payable.

NOTE that the Mining Department are NOT responsible for ANY funding.

Click on the link for the Postgraduate fee structure:
https://www.up.ac.za/article/2749200/fees-and-funding

Financial Enquiries	
Ms Komane Lehong	komane.lehong@up.ac.za
Mr Frans Mothogoane	frans.mothogoane@up.ac.za
Ms Rose Malinga	rose.malinga@up.ac.za

f. Module changes and terminations of studies

See link to module changes and termination of studies. If a student decide during the academic year to discontinue any modules for which he/she enrolled, a form should be obtained, completed and submitted at Student Administration.

Please NOTE that late cancellations will result in payment of full fees. Refer to University Calendar for details of latest date to cancel without penalties (http://www.up.ac.za/calendars).

To discontinue studies, a student should refer to the Student Service Centre (ssc@up.ac.za). Should a student wish to change module(s) after registration, he/she must complete the official "Change of Subject/Module" form and submit to Head of Department for approval.

4. Registration Process

a. General

- Students will register online on the UP portal.
- Before a student will be able to register, a contract needs to be concluded between the student and the University of Pretoria. Students must access the contract online on the UP Portal, Student Centre, at http://www.upnet.up.ac.za/.
- The student's registration must be renewed annually until the degree requirements have been complied with.
- Candidates who fail to renew their registration or who interrupt their studies are liable for the full tuition fees when the study is recommenced.
- Online registrations take place in the beginning of the year.
- A student can only register after he/she has been admitted to the programme and their registration fees has been paid.
- International students need to ensure that their study permits are valid before registration.

b. Problems with online registrations

If a student experience problems with the online registration system, he/she should contact the relevant person, see Administrative contact information, at the EBIT Student Administration at Engineering Building I, level 6. Examples of such problems are:

- If the student submitted a late application, he/she may not be able to register online.
- The online registration closes at some point in time in the first quarter. After that time, the Student Administrator will assist the student if he/she still needs to register.

c. Student Cards

After registration you will be able to print a proof of registration on the UP Portal. You need to present your proof of registration at the Client Service Centre (CSC) on campus (at some convenient time) to have your student card issued. You will need your student card to enter the campus and access the library. It is essentially your campus ID and you should have it with you at all times when on campus.

5. Study Options

Postgraduate studies at the Mining Engineering department are structured as follows:
Prospective students with a BEng (or equivalent) degree at a university that is accredited for this purpose in terms of the Washington Accord).

- BEngHons Mining Engineering (128 credits)
- MEng Mining Engineering (180 credits)
- PhD Mining Engineering (360 credits)

All other prospective students will follow the Applied Science route

- BScHons Applied Science Mining (128 credits)
- MSc Applied Science Mining (180 credits)
- PhD Mining (360 credits)

NOTE: All subjects are fully online, but compulsory contact sessions could be scheduled if and where necessary per module. These sessions will be communicated timeously.

6. Admissions Requirements and programme information

HONOURS DEGREES: (minimum duration: 1 year - NQF level 8)

a. BEngHons (Mining Engineering) - 12240072:

1. BEng (Mining) degree awarded by the University of Pretoria or relevant 4-year bachelor's degree in engineering that the Engineering Council of South Africa (ECSA) regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer
2. A weighted average of at least 60%
3. A minimum of 2 years mining work experience
4. An entrance examination may be required
5. Comprehensive intellectual CV

The following modules are offered in the various programs. Students should be aware that even if a module is listed, only those modules, for which there is sufficient demand, will be offered each year. Students must also confirm during registration that the modules are being offered and in which semester. NO semester changes will be accommodated.

A minimum of 32 credits should be accumulated per year and the programme should be completed within two years. For the BEng Hons plan, a student is allowed to take 4 modules that have a 16-credit bearing, from another engineering discipline, subjected to the department's approval. At least 50% of the 128 credits must be taken at the Mining department with PSS700 as mandatory.

Click here for the descriptions of all the modules

Year Module	Code	Credits
Research Project 700	PSS 700	32 [C]
Semester 1 Module		
Advanced Mine Design	PMZ 780	16 [E]
Strata Control: Hard rock	PSZ 786	16 [E]
Semester 2 Module		
Advanced Explosives Engineering	PRX 785	16 [E]
Open-pit Mining	POY 783	16 [E]
Financial Mine Valuation	PFZ 780	16 [E]

[C]: Modules are Core / Compulsory [E]: Modules are Elective

MLR780, Air Conditioning and Refrigeration, is a 16-credit module taught by Professor Jaco Dirker in the Mechanical Engineering department. If you're considering PKB711 & PKB 712, this module serves as an excellent alternative.

It remains the student's responsibility to confirm presentation of a module in the selected department.

---

b. BScHons (Applied Science) (Mining) - 12243035:

1. 3-year BSc (or equivalent) degree (in Natural Sciences) with a cumulative weighted average of at least 60% for the degree
2. relevant BTech qualification excluding the National Diploma; i.e.one offered by a department of civil engineering at a university of technology in South Africa with a cumulative weighted average of at least 75% for the degree and no modules failed in the BTech degree
3. 4-year engineering-based university degree not recognised by ECSA for registration as a professional engineer or BEng degree awarded by the University of Pretoria
4. relevant 4-year bachelor's degree in engineering that the Engineering Council of South-Africa (ECSA) regards as acceptable for registration as a candidate engineer and for eventual registration as a professional engineer
5. A minimum of 5 years' mining experience
6. An entrance examination may be required
7. Comprehensive intellectual CV is compulsory

A minimum of 32 credits should be accumulated per year and the programme should be completed within 2 years. Only Mining Engineering modules may be taken for this plan.

Year Module	Code	Credits
Research Project 700	PSS 700	32 [C]
Semester 1 Module		
Underground Mining Methods	PMY 701	32 [C]
Explosive Engineering	PRX 701	16 [C]
Surface Mining	PMY 703	16 [C]
Semester 2 Module		
Basic Mine Ventilation Engineering	PKB 701	16 [C]
Basic Rock Mechanics	PSZ 703	16 [C]

[C]: All Modules are Core / Compulsory

MASTER'S DEGREES: (minimum duration: 1 year - (NQF level 9)

The Master's program is a part time program with no course work, only a dissertation

c. MEng (Mining engineering) – 12250072

For students who have obtained a BEng (Hons) Mining Engineering degree or accredited equivalent.

1. BEngHons degree awarded by the University of Pretoria (or equivalent) with a cumulative weighted average of at least 65%
2. The applicant must also meet the admission requirements for the BEngHons degree

Year Module	Code	Credits
Dissertation: Mining Engineering 890	PYI 890	180 [C]

---

d. MSc (Applied Science) (Mining) - 12253072:

For students who have obtained a BSc Hons (Applied Science) degree or accredited equivalent.

1. Relevant BScHons degree awarded by the University of Pretoria (or equivalent)
2. Cumulative weighted average of at least 65% for the honour's degree
3. Evidence of knowledge of research methodology
4. Comprehensive intellectual CV
5. An entrance/admissions examination may be required

NOTE: Additional work/modules may be required in order to reach the desired level of competency

Year Module	Code	Credits
Dissertation 891	PYI 891	180 [C]

DOCTORATE DEGREES: (minimum duration of 2 years - NQF level 10)

e. PhD (Mining Engineering) - 12263062:

1. MEng degree awarded by the University of Pretoria or research-based master's degree in engineering awarded by another university and comply with the admission requirements for the BEngHons degree
2. Copy of the research master's dissertation
3. Comprehensive intellectual CV
4. An entrance/admissions examination may be required

Year Module	Code	Credits
Thesis: Mining Engineering 990	MYI 990	360 [C]

---

f. PhD (Mining) - 12263192:

1. Relevant research-based master's degree
2. Copy of the research master's dissertation
3. Comprehensive intellectual CV
4. An entrance/admissions examination may be required

NOTE: Additional modules may be required in order to reach the desired level of competency

As per discretion of the Mining Research Committee and the appointed supervisor, the module Introduction to research, EIN 732, or equivalent module might be required to be completed before admissions to the Masters and PhD Mining programme will be considered.

Acceptance to any of the relevant routes are subjective to minimum requirements. The departmental Postgraduate Committee reserves the right to make a thorough assessment of the Applicant's academic transcript and CV, and to decide if the applicant is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

Year Module	Code	Credits
Thesis: Mining 990	MYL 990	360 [C]

******* Selection process of all postgraduate studies *******

The departmental Postgraduate Committee reserves the right to make a thorough assessment of the applicant's academic transcript and CV, and to decide if the application is suitable for postgraduate studies. This assessment may include an oral or written entrance examination.

7. MODULE DESCRIPTIONS

Research Project – PSS700

The general objective with this module is to develop the student's research skills and documentation thereof. In this it is expected that the student will identify a project or potential research topic within his/her immediate working environment and apply all the necessary engineering and other acquired skills to solve the problem or conclude the research topic identified. It is therefore expected of the students to identify a project or research topic that can and will have immediate implementation value for his/her organisation and therefore will also prove the feasibility of implementation during his/her oral examination pertaining to the investigation. The department will identify a suitable supervisor (also incorporating industry-knowledgeable members) to help and guide the student with the project. The subject is ultimately a self-study research-based subject that is created, with the main objective to enhance your ability to perform a Masters and later a PhD investigation with much more ease. It is therefore also a requirement that the student will pursue the potential of a publication on the research findings/project implementation in a peered reviewed accredited journal as co-author with his immediate supervisor.

This is a compulsory research module.

Advanced Mine Design – PMZ780

This self-study module is aimed at the development of problem solving, understanding and critical thinking skills, rather than memorising in order to stimulate creative thinking and the development of innovative skills amongst students in the field of engineering. A problem-driven approach to learning is followed, while the module is student-centered. Guidance and co-operative learning methods are applied to develop the above skills, as well as to stimulate the development of communication skills and interpersonal skills.

The learner should show the ability to identify, describe and analyse a problem. The candidate should be able to use their knowledge and experience to assess, evaluate, synthesise and recommend suitable or profitable solutions, taking cognisance of the relevant status and laws impacting on the resource.

Strata Control: Hard Rock – PSZ786

This module concentrates on the tabular orebodies that occur in South Africa, with particular emphasis on the gold-bearing orebodies in the Witwatersrand Basin and platinum bodies of the Bushveld-complex. It addresses in-situ stresses in rock masses, and their measurement, the occurrence of mining induced seismicity, seismic source parameters, ground deformation, seismology and rockbursts, rockburst control and prediction, stability pillars, and the theoretical determination of seismic potential for mine design. Therefore, mining layouts and support strategies are covered, investigative techniques and considerations of surface effects.

Advanced Explosives Engineering – PRX785

An understanding of explosives engineering is essential for the mining engineer. As well as an understanding of the factors impacting drilling, explosives, techniques and equipment is critically important for the efficient blast and management of mining operations, so as to ensure sustainability and profitability. In the study of this module, skills are developed which will enable the learner to understand the fundamentals that govern the fragmentation of rock in conjunction with the design and operation of the mine. Firstly from a point of view of drilling and rock cutting method selection and secondly, from the point of view of the impact of explosives used to break the rock. The student will be able to use the basic knowledge assess, evaluate, synthesise and recommend blast design, taking cognisance of the relevant laws impacting on the use of explosives. The student will also be able to recognise practical engineering-related mining problems and associated drill and blast and propose suitable solutions derived from the application of this knowledge.

Open-pit Mining – POY783

An understanding of surface mining methods, techniques and equipment is critically important for the safe and efficient design and management of mines. In studying this module, skills are developed which will enable the learner to understand the fundamentals that govern the design and operation of surface mines. Firstly, from the point of view of method selection and secondly, from the point of view of equipment selection and management. The learner will be able to use the basic knowledge to evaluate, synthesize, design and recommend suitable mining and equipment systems for mines, and therefore be able to recognise practical engineering-related mining problems and propose suitable solutions derived from the application of this knowledge.

Financial Mine Evaluation – PFZ780

An understanding of the factors impacting the profitability of the mining, like methodology, techniques and equipment is critically important for the efficient design and management of mines, so as to ensure sustainability and profitability. In the study of this module, skills are developed which will enable the learner to understand the fundamentals that govern the profitability of the reserve in conjunction with the design and operation of the mine. Firstly, from the point of view of resource and mining method selection and secondly, from the point of view of the impact of equipment utilized. The learner will be able to use the basic knowledge to assess, evaluate, synthesise and recommend profitable resources for mining, taking cognisance of the relevant status and laws impacting on the resource. The learner will also be able to recognise practical engineering-related mining problems and associated financial risk and propose suitable solutions derived from the application of this knowledge.

Underground Mining Methods – PMY701

This self-study module provides an overview of underground mining by covering the following subject matter: Underground mining methods, shaft sinking, mine infrastructure and tunnelling, plan reading and surveying.

The learner should be able to describe and define general mine layouts, shaft and infrastructure development, electricity supply, transportation systems, orepass systems, water management systems and mine fires. The learner should also be competent in mine plan reading and drawing of sections.

Explosives Engineering – PRX701

An understanding of drilling and blasting and in particular the required outcomes of the blast is critical for the efficient and safe operation of a mine, either an underground or a surface mine. In the study of this module, skills are developed which will enable the student to understand the fundamentals of drilling and blasting. The quality of drilling, the blast design, the explosives selected and the timing design all play an important role in the successful outcome of the blast result. A thorough understanding of the geological structures and properties will need to be considered in the final blast design. The 'negative' consequences during the sudden energy release during blasting has to be channelled away from sensitive structures and areas. The holistic approach and concept of 'Mine to Mill' will be illustrated through case studies. The student will be able to use the basic knowledge to evaluate, synthesise, design and recommend suitable blast designs, and therefore be able to recognise practical engineering-related blasting problems and propose suitable solutions derived from the application of this knowledge.

Surface Mining – PMY703

An understanding of surface mining methods, techniques and equipment is critically important for the safe and efficient design and management of surface mines. In the study of this module, skills are developed which will enable the learner to understand the fundamentals that govern the design and operation of surface mines. Firstly from the point of view of method selection and secondly, from the point of view of equipment selection and management. The learner will be able to use the

basic knowledge to evaluate, synthesize, design and recommend suitable mining and equipment systems for mines, and to therefore be able to recognize practical engineering-related mining problems and propose suitable solutions derived from the application of this knowledge.

Basic Mine Ventilation Engineering – PKB701

Mine ventilation methods; primary and secondary ventilation methods, ventilation strategies for coal and hard rock mining environments including base metal mines. Mine development ventilation methods, mine air control, different types of fans including fan performances and air dilution calculations. Refrigeration: Elementary refrigeration principles, including concepts and methods, chilled water systems, including cooling distribution methods. Elementary mine ventilation planning, basic planning parameters and elementary mine ventilation economics and the impact of incorrect design and applications on safety and health. Mine gases, their origin and gas/coal dust explosions. Aspects of the Mine Health and Safety act are also dealt with.

Basic Rock Mechanics – PSZ703

An understanding of rock behaviour and stress influences on the rock mass is essential for the mining engineer and it is required to have a basic knowledge of rock mechanics in order to design a safe working environment. The student will be able to use the basic knowledge to evaluate, synthesize, design and recommend suitable mining layouts and support systems for underground mines, and to therefore be able to recognize practical engineering-related strata control problems and propose suitable solutions derived from the application of this knowledge. As in all the engineering disciplines, CAD software packages are part of the skills base of the Rock Engineer. During this module, you will also have the opportunity to be introduced to numerical modelling codes used in industry to gain insight into the day-to-day task of the typical underground Rock Engineer.

Follow us on:

#UPMiningMatters