MASTER OF SCIENCE DEGREE IN MINERAL RESOURCE MANAGEMENT

Post graduate information Introduction pack 2024 / 2025

UFS·UV

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA

Developed with Industry Partners and Implemented by the University of the Free State

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1. Introduction

The MRM Master of Science Degree is presented by the Geology Department in the Faculty of Natural and Agricultural Science at the University of the Free State and accredited by the Council for Higher Education.

The complexity of operating mines is increasing as the mining industry faces and increase in internal and external challenges. The external mining environment impacts mining throughput and profitability as the focus on safety, technology, environmental legislation and sustainable mining has a lasting effect on profitability and productivity. Similarly, the internal mining factors are affected as each reserve is more challenging to mine as most high-grade ore is already mined out. As a result, cost control models and reduction in specialized staff are applied to curtail expenditure to increase profitability.

The capability to manage the mining environment systemically increases the pressure for the performance of operating mines. Working smarter has become crucial to ensure that businesses optimise the use of their resources, become more safety conscience, more productive and to remain cost-effective, while recognizing the importance of sustainable mining now and in the future.

These drivers and demands are recognized by The University of the Free State and in partnership with industry partners developed the Mineral Resource Management (MRM) post-graduate qualification to enable students to meet the challenges in mining. The MRM practice is based on the amalgamation of mining industry principles and improvement methodologies including, Theory of Constraints (TOC), Net present value (NPV) optimisation, Product Payability, Geometallurgy, Value chain optimisation, integration and synchronization, and mining mineral and product throughput optimisation. MRM is a business practice involving the synchronization and balancing of material flow and product payability attributes of the mining material flow.

2. The purpose of MRM

The MRM principles enable students to optimise ore-utilization and product delivery and thus understand and optimise the profitability of the mining company. The purpose of the post-graduate programme is to equip students with the:

a) Ability to identify the dependencies, interdependencies and variability that impact flow performance
b) Ability to use the TOC thinking logic processes
c) Exposing learners to the theory, case studies and discussions of the detailed complexity of mining and other related disciplines that impact the mining value chain.

3. Admission requirements

The ideal candidates for enrolment in the course are individuals who wish to understand and develop the knowledge of how to synchronise and improve the throughput of their organisation. Candidates include technical mining professionals, exploration, mine planning, scheduling and production management employees. Admission requirements include:

a) Any 4-year technical or scientific degree, or post graduate diploma, equivalent to NQF (National Qualifications Framework) level 8
b) At least 2 years relevant mining experience.
c) Recognition of Prior learning (RPL) is considered through the RPL office provided applicable mining industry related experience is enough.

4. Curriculum

The post graduate MRM qualification course structure is divided into four phases. The first-phase modules are mandatory for all candidates. In addition to the first-phase, post-graduate candidates must complete at least 5 of the second-phase modules and two from phase 3, as well as a research essay in phase four. Students need to successfully complete all modules in Phase 1 as well as GLGD7913 in Phase 2 before registering for the research essay. In total the qualification comprises 204 credits in order to comply with the requirements of the degree.

Each module constitutes 120 notional hours which is aligned with 12 credits per module, 12 modules in total are required, which adds up to 144 credits. The mini dissertation contributes 60 credits and adds to the total of 204 credits required. This total of 204 credits must be accumulated over a period of 2 years.

A typical module will comprise a period of self-study, followed by a workshop of two days, an assignment of ten days, as well as time to study for the exam. This will enable learners to study without having to leave their workplace.

Table 1: The phases and modules of the MRM course

PHASE	MODULE DESCRIPTION	CREDITS
1	GLGA7913: Overview of business processes	12
	GLGA7933: Mineral Resource Management Methodology	12
	GLGA7953: Applied Geology	12
	GLGA7983: Applied Mining	12
	GLGA7923: Applied Metallurgy	12
2	GLGC7913: MRM Implementation practices	12
	GLGC7943: MRM Information practices	12
	GLGC7963: MRM Organizational change practices	12
	GLGC7973: Virtual Mining Simulation and Optimisation	12
	GLGD7913 Mineral Resource Management Advanced	12
3	GLGE7923: Throughput Thinking (Capita Selecta)	12
	GLGE7943: Mining Throughput Accounting and modelling	12
4	GLGD7900: MRM Research mini dissertation	60

4.1 Delivery of MRM modules

The programme is a fully online course allowing for more frequent contact sessions with students. The virtual classes are compulsory to attend as the programme does not make use of pre-recorded content.

4.2 Overview of modules within the degree

GLGA7913/23: Overview of geology, mining, metallurgy and business processes: The objective is to introduce learners to the different functional disciplines through an overview of the important principles MRM in strategic, tactical and operational environments, within each functional area.

GLGA7933/43: Mineral Resource Management I (Methodology): Highlights the principles and methodology of MRM through the identification and quantification of process variables. The focus is on the development of a business process concept with an emphasis on product delivery, cost, income and market demand for the strategic, tactical and operational environments.

GLGA7953/63: Applied Geology: Enables students to understand and identify the influence of geological variables in the MRM environment in terms of exploitation needs in the long-term and production environments. To enable the learner to determine and quantify variables of ore and ore- body morphology that has a critical influence on product delivery and profit.

GLGA7973/83: Applied Mining: Includes the application of variables and condition-driven standards in mine planning, scheduling and production management and control. Methods to determine the influence of “run-of-mine” quality on plant efficiency and product delivery. Included are the effects of maintenance performance and strategy in terms of condition-driven standards.

GLGB7913/23: Applied Metallurgy: The influence of plant conditions and standards on the long-term and production environments, with focus on product range, will be examined using MRM principles. The optimal plant efficiency and maximum return on resources will be elaborated on.

GLGC7913/23: MRM Implementation Practices:

The applicability of project management as a major critical performance area in sustainable MRM will be examined and discussed. The module will emphasize the practical application of TOC thinking processes in structuring projects on how to deal with the challenges in

implementing MRM in a mining operation.

GLGC7933/43: MRM Information Practices: This module investigates the availability of flow of information as an important component for sustainable MRM practices. This module will examine all the key elements of data structures and digitization applications in the dawn of the fourth industrial revolution.

GLGC7953/63: MRM Organisational Change Practices: This module equips learners to understand the broad change management issues applicable when implementing MRM. The learner will be enabled to identify critical performance areas of change management, to design a basic change management strategy and learn how to execute that strategy.

GLGC7973/83: Virtual Mining Simulation and Optimisation: This module covers the design of a cost and production simulation model based on the total production process. Strategic, tactical and operational planning and budgeting will be addressed in terms of the variables and condition-driven standards, as well as the application of the model in an operational management and control environment.

GLGD7913/23: Mineral Resource Management II: This module equips the learner to identify the critical business process variables through evaluation of a production process and to design and implement suitable business changes to enhance value. To evaluate the influence on the final product and production cost in the production process.

GLGE7933/43: Mining Throughput Accounting and Modelling: The learner will understand how to calculate and make operational financial decisions that guarantee/deliver the required financial returns. This will create a relevant operational financial decision model which can be calculated into a net profit, with some basic simulation scenarios for investment ranking.

GLGE7923: Throughput Thinking Capita selecta: This module focuses on the application of risk management principles as applied to the minerals industry in terms of economic evaluation studies. In addition, the module focuses on leadership and management development to equip the learner with the tools to become a successful leader in their workplace.

GLGD7900: Research Dissertation: The subject of the research essay will be chosen in consultation with the course coordinator. The candidate must carry out a research task under supervision and present a research essay.

4.3 Student evaluation

Evaluation is affected by examination and assignments. Learners will be expected to do either a written or an oral examination or hand in an extended assignment for examination purposes. Open and closed-book examinations will be taken. Exams may be written in Bloemfontein (no exam fees applicable) or at a more convenient UFS external venue for a fee.

5. Partnerships with industry professionals as lecturers

The MRM degree makes use of industry professionals (Table 2) to ensure that the content is relevant and that lecturers have the maximum value to add to each module taught.

Table 2: Lecturers partnered with for the MRM degree

Lecturer	Short CV
Ettienne Bergh	Ettienne completed his pre-graduate studies in Industrial Engineering at the TUT and UNISA before obtaining a Masters' Degree in MRM from the UFS. He has 22 years of experience in mining, of which he spent 16 leading strategic and tactical MRM and mine planning support teams. He has been a manager of multi-disciplinary teams supplying MRM services to mining operations with various operational research & productivity studies in support of ground level & tactical improvement initiatives in simulation modelling and systems and process analyses. In recent years he has broadened his exposure to consulting, entrepreneurship, and education. He is currently studying towards an online MBA with the Jack Welch Management Institute, hosted by Strayer University in the USA.
Marelize du Toit	Marelize du Toit is skilled in process design, simulation, optimization, and team leadership. She is a process engineer with Wood Mining and Minerals and her ability to think strategically has helped her to solve complex problems in the mining and minerals industry. She understands the mine development life cycle from concept studies to commissioning in ferrous and non-ferrous minerals with more than 16 years of experience. Marelize is a registered chemical engineer with ECSA and has completed the MSc MRM degree at the UFS.
Karien van der Merwe	Karien van der Merwe is a professionally registered I/O Phycologist with 20 years' experience in team development and coaching. She focuses mainly on team development and coaching and the facilitation of roles and responsibilities while offering diversity and inclusion workshops. She has extensive experiences in conflict resolution, learnership training and Organizational Change and Effectiveness within the mining industry.
Ryno Kruger	Ryno is a Chief Iron Ore Geologist and Technical Manager with more than 20 years extensive experience in the complete spectrum of the mining industry from exploration, mining, beneficiation, management to international marketing. He completed the UFS MRM degree in 2005. He has international experience as Technical Marketing Manager for Kumba Hong Kong in the Asian market and applies Systemic Thinking within MRM as a Value Chain specialist. He has bene part of the development team at HCL developing world class mining optimisation systems.

Michelle Dimmick-Touw	Michelle Dimmick-Touw has completed the MSc MRM degree at the UFS and has a master's degree in education focusing on open and distance learning. She has 15 years international industry experience in management and technical geological roles in various commodities. She has been a part of integrated mentoring programs which identify and develop the potential within individuals.
Mark Burnett	Mark completed his BSc (Hons) in Geology from University of Witwatersrand and his prost graduate diploma at NWU. Since then, he has completed his citation in Applied Geostatistics in 2011 from the University of Alberta and Graduate certificate in Geostatistics in 2012 from Edith Cowan University. Mark Completed the MSc MRM in 2016 and is also an honorary lecturer of the University of Exeter and an executive committee member of the Pan European reserves and Resources Reporting Committee. He has technical and management experience form AngloGold Ashanti, Harmony gold, Snowden and AMC consultants.
Tumelo Diale	Mr. Tumelo Diale is currently a doctor philosophy candidate with his field of study in finance, he completed a Master of Management in Finance & Investments from the University of the Witwatersrand as well as the MSc in mineral resource management form the University of the Free State. He has 15 years of experience in the South African mining and financial sector
Philip Viljoen	Managing Director at RuZults Education, Philip has taught and developed people in Theory of Constraints thinking and applications throughout Southern Africa. He practices as educator, coach and mentor to cause people to think and then act through seeing their potential, developing their vision and supporting them to exceed. His clients get rapid results through unrelenting focus on maximizing flow. He has been part of Dr. Eli Goldratt's inner circle for many years and uses the Theory of Constraints as the basis of his thinking and practice.
Mark Dimmick-Touw	Mark Dimmick-Touw has 10 years' experience in coal and iron ore mine and exploration geology in both Africa and South Africa and currently works as a geologist in the coal mining industry. Mark holds a degree and honours degree in geology and completed his MSc Mineral Resource Management in 2018. He is currently completing his MBA with a focus on renewable energy and sustainability at the University of Cumbria.
Barry Steenkamp	Barry is a Mineral Resource Specialist at Samancor Chrome, he has 13 years' experience in the mining industry with a keen interest in Economic Evaluations of the resource. Barry holds and MSc MRM degree from the University of the Free State which he completed cum laude in 2019.

6. Cost of the course

The registration fee and module cost for the following year will only be finalized in December each year. See the estimate below from Table 3.

Table 3: Estimated tuition fees for MRM

ESTIMATE TUITION FEES MRM 2024				
	South African Citizens	International Citizens	International Citizens	Remarks
		Non-SADEC	SADEC	
Registration Fees	R1940	R1940	R1940	Included in "Amount paid before Registration"
International Fee	-	3070	3070	Included in "Amount paid before Registration"
Amount paid before Registration	R 8 770	R35 770	R17470	Subtracted from tuition fees
Tuition fees	R10 030 x 6 = R60 180	R15 050 x 6 = R90 300	R10 030 x 6 = R60 180	6 Modules per year x R10030 per module
Dissertation	R11 740	R11 740	R11 740	GLGD7900 a year module, enrol in second year
Exam Fees (6 Modules)	R660 x 6 = R3960	R660 x 6 = R3960	R660 x 6 = R3960	R660.00 per module if you write at an external venue
Books	R 2 500	R 2 500	R 2 500	Depends on the modules taken
Sub-total/year	**R 80 320**	**R 113 510**	**R 83 390**	
SADEC Countries: Angola, Botswana, DRC, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Rwanda, Seychelles, Swaziland, Tanzania, Zambia, Zimbabwe				

31 January: Your registration fee should be paid before you would be able to register.
31 March: Your first semester tuition fees should be paid.
30 June: Tuition fees should be paid in full by all International students.
31 August: Your second semester tuition fees should be paid.

7. The application processes

Prospective students should apply online as well as on the Departmental application form.

a) All online applications open 1 April and close 30 November

b) To apply online. Visit https://apply.ufs.ac.za

c) Students should apply online for the MRM plan code: BC470178 and program code: B4740

d) Contact Charlene van der Vyver (vandervyverc@ufs.ac.za) for the Departmental application form and procedure. This will be distributed in July each year. Submit the application form and supporting documentation to her before 31 October.

8. Contact information

Should you have any queries regarding the MRM program please contact the members below.

Programme Director: Michelle Dimmick-Touw

Email: Steenkampme@ufs.ac.za

Tel: 0823375201

Senior Assistant Officer: Charlene van der Vyver

E-mail: vandervyverc@ufs.ac.za

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