MASTER OF SCIENCE DEGREE SPECIALIZING IN MINERAL RESOURCE MANAGEMENT

Postgraduate Information Introduction Pack 2026

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

Table of Contents:

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 is accredited by the Council for Higher Education.

The complexity of operating mines is rising as the mining industry faces 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, internal mining factors are affected, as each reserve is more difficult to mine and most high-grade ore has already been extracted. As a result, cost-control models and reductions in specialized staff are implemented to curtail expenditure and 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-conscious and more productive, and remain cost-effective, while recognising 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 that involves synchronizing and balancing the material flow and product Payability attributes of the mining material flow.

2. The purpose of MRM

The MRM principles enable students to optimise ore utilisation and product delivery, thereby understanding and improving 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 and employees in exploration, mine planning, scheduling, and production management. Admission requirements include:

a) Any 4-year technical or scientific degree, or postgraduate diploma, equivalent to NQF (National Qualifications Framework) level 8
b) At least 2 years of 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 postgraduate MRM qualification is structured into four phases. Students must 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 to meet the degree requirements.

Each module comprises 120 notional hours and is worth 12 credits; 12 modules in total are required, totalling 144 credits. The mini dissertation contributes 60 of the 204 required credits. The total of 204 credits must be accumulated over 2 years.

A typical module will comprise a period of self-study, followed by a two-day workshop, a ten-day assignment, and time to study for the exam. This will enable learners to study without leaving 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
	GLGB7923: 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: Organizational Leadership	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, as the programme does not use pre-recorded content.

4.2 Overview of modules within the degree

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

GLGA7933: Mineral Resource Management I (Methodology): Highlights the principles and methodology of MRM through the identification and quantification of process variables. The focus is on understanding the Theory of Constraints in mining and on developing a business process concept emphasising product flow across the strategic, tactical, and operational environments.

GLGA7953: 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 have a critical influence on product delivery and profit.

GLGA7983: 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 on condition-driven standards.

GLGB7923: 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. Optimal plant efficiency and maximum resource return 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 to address challenges in implementing MRM in a mining operation.

GLGC7933/43: MRM Information Practices: This module investigates the availability of the flow of information as an important component for sustainable MRM practices. This module will examine all the key elements of data structures, artificial intelligence, and digitisation applications at 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 able to identify critical performance areas in change management, design a basic change management strategy, and learn how to execute it.

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. This module also focuses on applying risk management principles to the minerals industry in economic evaluation studies.

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-making model to calculate net profit, along with basic simulation scenarios for investment ranking.

GLGE7923: Organisational Leadership: The module focuses on leadership and management development, equipping learners with the tools to become successful leaders in their workplaces.

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 to practically apply the principles taught over the two years.

4.3 Student evaluation

Evaluation is affected by examinations and assignments. Learners will be expected to take either a written or an oral examination, or to 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 draws on industry professionals (Table 2) to ensure that the content is relevant and that lecturers can add the maximum value to each module taught.

Table 2: External lecturers and examiners partnered with for the MRM degree

Lecturer	Short CV
Ettienne Bergh	Ettienne completed his pre-graduate studies in Industrial Engineering at TUT and UNISA, and then obtained a master's degree in MRM from the UFS and an MBA from Strayer University in the USA. He has 25 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.
Marelize du Toit	Marelize du Toit is skilled in process design, simulation, optimisation, 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 18 years of experience. Marelize is a registered chemical engineer with ECSA and holds an MSc in MRM from the UFS.
Karien van der Merwe	Karien van der Merwe is a professionally registered I/O Psychologist with 20 years' experience in team development and coaching. She focuses mainly on team development and coaching, and on facilitating roles and responsibilities, while offering diversity and inclusion workshops. She has extensive experience in conflict resolution, learnership training and Organisational Change and Effectiveness within the mining industry.
Ryno Kruger	Ryno has more than 20 years of experience across the full spectrum of the mining industry, from exploration, mining, and beneficiation to management and 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 been part of the development team at HCL, developing world-class mining optimisation systems.

Michelle Dimmick-Touw	Michelle Dimmick-Touw is Programme Director of the MSc in Mineral Resource Management at the University of the Free State, with a background combining academic leadership and over 15 years of international experience in technical and management roles within the mining industry. She holds an MSc in Mineral Resource Management and a master's degree in education, and specialises in integrating practical mining value chain insight with postgraduate education and mentoring to develop industry-ready professionals.
Marina Pretorius	Marina Pretorius is an Independent Industrial & Organisational Psychologist with extensive experience in organisational development, change management, and HR strategy across leading organisations, including Exxaro and Anglo American. She specialises in leadership development, coaching, and large-scale transformation initiatives, combining behavioural insight with practical business application to drive performance and organisational effectiveness. She holds cum laude qualifications in Industrial Psychology and is HPCSA-registered for independent practice.
Tumelo Diale	Mr Tumelo Diale is a mining and finance specialist currently serving as Executive: Mining and Metals at Standard Bank Group, with extensive experience in strategy, deal structuring, and resource-sector transactions. His expertise includes financial modelling, credit risk assessment and the application of the Theory of Constraints to optimise mining value chains. They hold a Master of Management in Finance and Investments from the University of the Witwatersrand and an MSc in Mineral Resource Management from the University of the Free State, combining deep technical insight with advanced financial and strategic capability in the resources 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 an educator, coach, and mentor to help people think and then act by seeing their potential, developing their vision, and supporting them to exceed. His clients get rapid results through unrelenting focus on maximising 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 is a geologist and mining professional with over 15 years of experience in coal and iron ore exploration across South Africa and Africa, currently serving as Manager: Exploration & Commodity at Exxaro Resources. He has held a range of technical and leadership roles, specialising in exploration management, mineral resource estimation, and strategic planning, while also contributing to safety leadership and stakeholder engagement. He holds an MSc in Mineral Resource Management (cum laude) and an MBA in Energy and Sustainability from the University of Cumbria, combining strong technical expertise with commercial and sustainability-focused insight.
Barry Steenkamp	Barry Steenkamp is a mineral resource specialist and geologist with over a decade of experience in the mining industry, primarily within chrome operations at Samancor Chrome. He has progressed through roles from exploration geology to Mineral Resource Specialist, with expertise in resource estimation, geological modelling, and mineral resource management. His experience includes coordinating geological functions to support operational and strategic planning. He holds an MSc in Mineral Resource Management from the University of the Free State and a BSc Honours in Geology from the University of Pretoria, combining strong technical capability with applied resource management insight.
Gunn Ndebele	Gunn Ndebele is a mining professional with extensive experience spanning coal geology, project development, and strategic business leadership. He has held senior roles within major organisations, where he contributed to exploration and project geology, and later transitioned to executive-level positions focused on business

	development and strategy, including at Overlooked Group. His expertise lies in integrating technical geological insight with commercial and strategic decision-making to drive project value and organizational growth. With a career that bridges operational geology and high-level leadership, he brings a holistic understanding of the mining value chain and resource development.
Hanri van Wyngaard	Hanri van Wyngaard is a metallurgist and chemical engineer with extensive experience across mineral processing, advanced process control, and consulting within the mining and resources sector. She has held senior technical roles at organisations where she led and executed advanced control and optimisation projects across mineral processing operations in Africa. She applies her strong technical foundation to advisory and consulting environments, bridging engineering expertise with strategic and operational business solutions. She holds a BEng in Metallurgical Engineering from the University of Pretoria and brings a well-rounded perspective that integrates process optimisation, project execution, and value-driven decision-making within complex industrial systems.
Barry Urban	Barry Urban is a Chartered Accountant and registered Business Rescue Practitioner with extensive board-level financial and consulting experience across manufacturing and the public sector. A long-standing practitioner of the Theory of Constraints (TOC), he has been actively involved in TOC implementation, training, and consulting since the early 1990s, including advanced training through the Avraham Y. Goldratt Institute. As owner of TOCE Consulting, he has led holistic improvement initiatives across operations, supply chains, project management, and strategic planning in diverse industries, including mining, agriculture, and government. His international work includes capacity-building projects in Africa and strategic advisory to the Kenyan government, and he has contributed to TOC knowledge through conference presentations and ongoing training programmes.
Maenge Shipiki-Kali	Maenge Shipiki-Kali is a seasoned mining professional and metallurgist with over 30 years of experience in the diamond and broader mining industry, currently serving as Chief Operating Officer at Debmarine Namibia. She has held a range of operational, technical, and leadership roles across Namdeb, De Beers, Anglo American, and Debmarine, with international experience spanning Africa, Canada, and Brazil. Her expertise includes metallurgical operations, vessel and mining operations management, business optimisation, and the implementation of safety and operating models. She holds an MSc in Mineral Resource Management and a BSc in Mineral Processing, and is recognised for her strong leadership, strategic capability, and contribution to large-scale operational improvement initiatives.
Sean Mowatt	Sean Mowatt is a Partner and Productivity Science Practice Lead at Business Science Corporation with more than 14 years of experience applying data analytics, simulation modelling, artificial intelligence, and optimisation to improve operational performance. He specializes in mining and mineral resource management, leading the development of digital operating models, predictive simulation tools, value stream models, and decision-support systems that enable mining organisations to optimise productivity and make data-driven operational decisions. He holds an MSc in Engineering from the University of the Witwatersrand and has extensive experience across mining, mineral processing, manufacturing, logistics, and related industries.

6. Cost of the course

An estimate breakdown of the costs of the course are obtainable from the Senior Assistant Officer: Charlene van der Vyver E-mail: vandervyverc@ufs.ac.za Tel: 051 401 2393.

7. The application processes

Prospective students should contact Charlene van der Vyver and send their supporting documents with the application through the department application form before 30 October.

a) All online applications open on 1 April and close on 30 October

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

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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