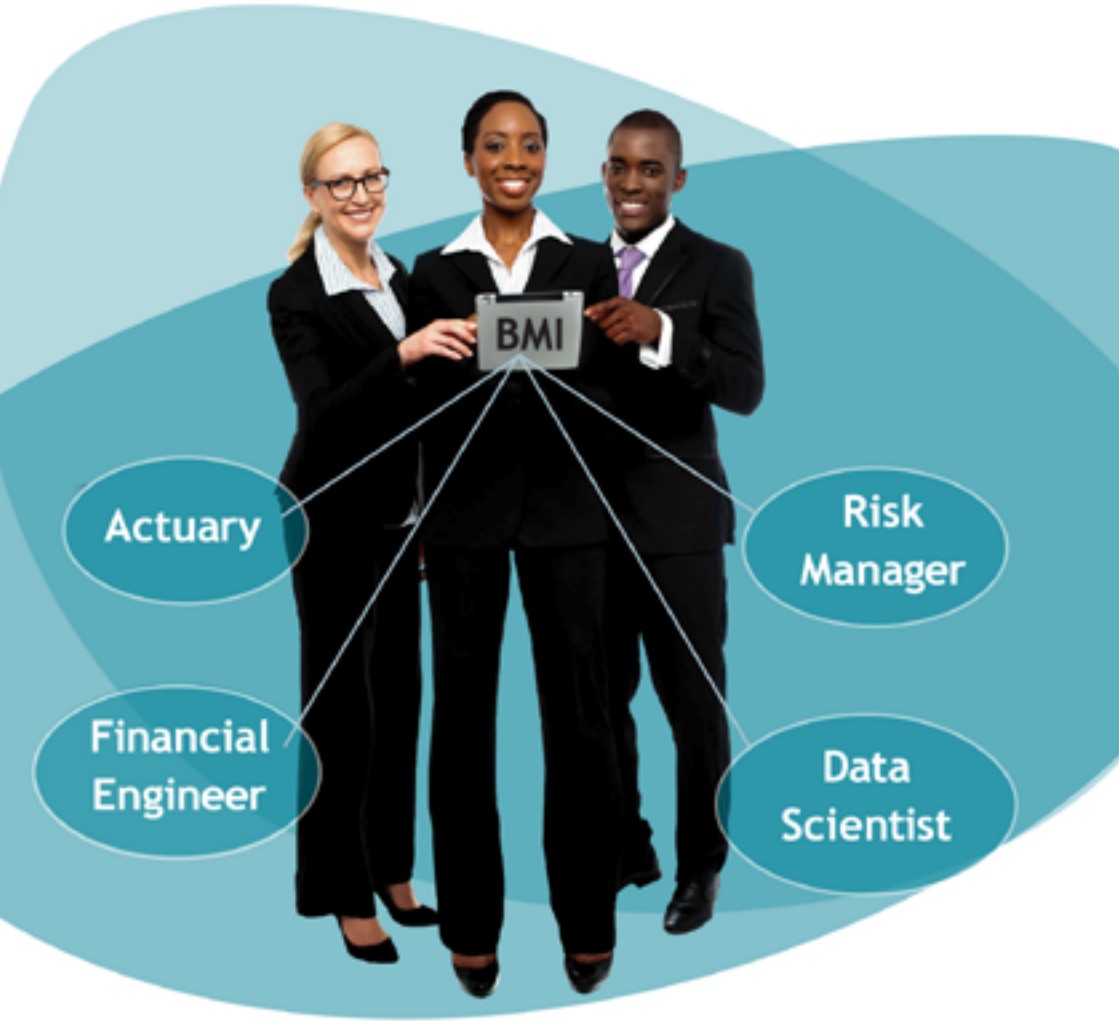
NWU®

CENTRE FOR BUSINESS MATHEMATICS AND INFORMATICS®



Consider high paying and in demand careers

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DO YOU LIKE MATHS?

If mathematics is your favourite school subject, you should consider enrolling for one of the Business Mathematics and Informatics® (BMI) programmes presented by the Centre for Business Mathematics and Informatics® at the North-West University.
Currently the BMI qualifications comprise four programmes:

- Actuarial Science
- Business Analytics (also known as Data Science)
- Financial Mathematics
- Quantitative Risk Management

Duration of BMI studies:

BSc Degree	3 Years
BSc Honors Degree	1 Year
BSc MSc BMI Degree	1 Year

To become a true professional, we recommend that you complete the MSc BMI, therefore 5 years of study.

ADMISSION REQUIREMENTS

A mathematics mark above 70% (Level 6) and an APS-Score of at least 32. However, the higher your mathematics mark, the better your chances to pass the BMI courses.

What school subjects do you need?
All programmes require at least grade 12 Mathematics. Although not a strict requirement, all learners are advised to do information technology.

PROFESSIONAL QUALIFICATIONS

Professional qualifications for which you are prepared:

• FASSA - Fellow of the Actuarial Society of South Africa
• PRM - Professional Risk Manager

The BSc and BSc Hons in Actuarial Science programme of the Centre for Business Mathematicsand Informatics® (BMI) are accredited by the Actuarial Society of South Africa (http://www.actuarialsociety.org.za/) to recommend exemption from subjects A 111-A 113, A211-A214, A311 and N111. The BSc Hons in Quantitative Risk Management programme is accredited by PRMIA (USA) to give exemptions for the Professional Risk Manager Designation (PRM™) Exams I and II.

WHAT IS RISK?

Since all four BMI programmes focus primarily on risk, it is necessary to explain the basics of risk. Risk comes in many forms. Every person and organisation faces risk.

As experts in measuring and managing risk, actuaries and risk managers fulfil a significant need in our society. Their contribution to society's psychological, physical and economic wellbeing is immense.

If the risk management programmes that actuaries and risk managers develop didn't exist, our economy would not be able to grow as it does.

Consider the following:

- Would as many people be willing to own a home if fire insurance did not exist?
- Would a company build a factory that could be destroyed in an earthquake if it were not protected by insurance?
- Would people spend money today and still be confident about their future if there were no retirement programmes?
- Would the cars people drive be safe if the parts were not rigorously tested to last for many years using mathematical techniques actuaries, engineers and risk managers routinely use? Would parents enjoy risky and adventurous recreational activities such as rock climbing or skiing if their children faced financial disaster in the event of an accident?
- Would the banks (and the money deposited in them) be safe if their assets and liabilities were not carefully managed to control financial risk?
- Would the returns on our investments be high if financial institutions such as mutual funds, banks and insurance companies did not use sophisticated techniques to improve returns without taking on excessive risk.

WHAT IS ACTUARIAL SCIENCE?

The future is uncertain. Some of the events that can happen are undesirabl e. Risk is the possibility that an undesirable event will occur.

Actuaries are experts in:

- Evaluating the likelihood of future events
- Designing creative ways to reduce the likelihood of undesirable events
- Decreasing the impact of undesirable events that do occur

The impact of undesirable events can be both emotional and financial. Reducing the likelihood of these events helps relieve emotional pain. Yet some events, such as death, cannot be avoided. So, reducing their financial impact is very important. Actuaries are the leading professionals in finding ways to manage risk. It takes a combination of strong analytical skills, business knowledge and understanding of human behaviour to design and manage programmes that control risk.

Their work is intellectually challenging and they are very well paid. Actuaries are key players in the management team of the companies that employ them. In a fast-changing world, with new risks and the need for ever-more creative ways to tackle them, there are constant opportunities for personal and professional growth in an actuarial career, and the pleasure of life long learning. Most actuaries work in a pleasant environment, alongside other professionals, and enjoy the respect of their peers.

Actuaries are the analytical backbone of our society's financial security programmes. They are the brains behind the financial safeguards we have implemented in our personal lives, so we can go about our daily lives without worrying too much about what the future may hold for us. These are the safeguards that protect us from life's catastrophes. The insight into risk that actuaries have also helps to ensure that our savings are working hard for us, so that everything we love and cherish can grow and flourish. The work of actuaries benefits all of us.

What makes Actuarial Science unique at the NWU?

The Actuarial programme at the NWU is closely entwined with the Business Mathematics and Informatics® (BMI) programme. The BMI programme is well known in the financial industry and is supported financially by Absa, SAS and FirstRand. The best achievers in the Actuarial Sciences programme can also apply to enrol for the Masters degree in BMI. It is a unique programme, concentrating on the needs of the industry and also providing the students with unique career opportunities, especially in the financial sector.

The focus of the Actuarial programme at the NWU is on Enterprise-wide Risk Management, while other universities focus on specialist areas such as pensions, health or life insurance. This focus was chosen because it connects with the BMI risk management and risk analysis focus areas. Students who intend to enrol for the BMI Masters Degree are eligible for Absa bursaries in every study year depending on their academic performance.

What exemptions does the NWU offer?

The NWU is currently accredited by the Actuarial Society of South Africa (ASSA) to provide exemption recommendations for subjects A111-A113, A211-A214, A311 and N111.

ASSA has launched another fellowship principle subject in Enterprise-wide Risk Management. This is currently a focus area in the BMI Masters degree and although the subject does not lead to exemption, it has been designed to prepare students for the equivalent professional exam, which ultimately leads to the actuarial CERA designation.

Typical jobs would be the following:

- Actuarial Consultant
- Banking Actuary
- Enterprise Risk Management Actuary
- Health Actuary
- Investment Actuary
- Life Actuary
- Pension Actuary
- Risk Manager
- Short term Actuary

Where am I going to work?
Mainly in the financial sector. Industries such as:

- Banking (e.g. Absa, FirstRand)
- Consulting (e.g. Deloitte, Ernst&Young)
- Credit bureaus (e.g. TransUnion, Vericred)
- Education (e.g. Universities, Schools)
- Government Agencies (e.g. Reseve Bank, Treasury)
- Insurance (e.g. Sanlam, Momentum)
- Investment Managers (e.g. Investec, Ashburton)
- Mining (e.g. Anglo Goldfields)
- Retail (e.g. Truworths, The Foschini Group)
- Telecommunications (e.g. MTN, Telkom

WHAT IS DATA SCIENCE?

Data Science at the Centre for BMI primarily focuses on solving business problems in the financial sector. Therefore, Data Science and Business Analytics are used interchangeably.

Business Analytics is a fast developing fields with applications covering a wide range of industries. The field is ideally suited for those students who have an aptitude for mathematics and keen interest in computer programming. Currently, numerous job opportunities exist in various industry sectors, e.g., financial, industrial, communications, retail and mining.

Business Analytics refers to the skills, technologies, applications and practices for continuous iterative exploration and investigation of very large data sets in order to gain insight and drive business planning. Business Analytics software is usually based on mathematical algorithms which were developed to analyse large data sets stored in various formats (frequently referred to as Big Data). It allows users to analyse data from many different dimensions or angles, categorise it, summarise the relationships identified and use it for predictive analytics.

Business Analytics is primarily used today by companies with a strong consumer focus - retail, financial, communication and marketing organisations. It enables these companies to determine relationships among “internal” factors such as price, product positioning, and “external” factors such as economic indicators, competition, market events, and customer demographics. It enables them to predict the impact of certain actions or events on sales, customer satisfaction, and corporate profits. With business analytics, a retailer could use point of-sale records of customer purchases to send targeted promotions based on an individual’s purchase history. Linking social media data to customer records can enable a telecommunications company to predict which customers might move to their competitors.

Business Analytics at the NWU covers a full range of topics in mainstream business analytics and its applications. The integrated curriculum includes, for example, practical data mining, statistical time series analysis, survival analysis, statistical model building, neural networks, multi-criteria decision making, data management as well as other statistical and information technology subjects of relevance. This includes practical analyses with state-of-the art software packages such as SAS, R and Python

Career opportunities in Data Science?

In every business sector, managers have to face the challenges of very large data sets and they need people with advanced analytic skills in order to exploit the business opportunities hidden in these data sets. Individuals having advanced analytics skills are currently in high demand.

Typical jobs would be the following:

- Analytics Analyst
- Credit Risk Analyst/Manager
- Data Mining Analyst
- Data Scientist
- Database Marketing Analyst
- Decision Support Analyst
- E-Commerce Business Analyst
- Financial Statistician
- Fraud Analyst
- Quantitative Strategist
- Strategic Business Analyst

Where am I going to work?

Mainly in the financial sector. Industries such as:

- Banking (e.g. Absa, FirstRand)
- Consulting (e.g. Deloitte, Ernst&Young)
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WHAT IS FINANCIAL MATHEMATICS?

Financial Mathematics is a flourishing area in the modern science. Its numerous applications have become vital o the day to day functioning of the world's financial institutions. As a consequence, a solid command of the principles and techniques of financial engineering is essential for a responsible approach to the trading, asset management, and risk control of complicated financial positions. Financial mathematics at the NWU covers a full range of topics in mainstream mathematical finance and its applications.

The curriculum includes, for example, derivatives pricing and hedging, asset price dynamics, risk analysis and extreme events, interest rate and foreign exchange processes, credit and inflation linked products, real options, stochastic optimisation and control, and investment decision making, as well as other mathematical subjects of relevance to practical financial modelling.
This includes practical analyses with state-of-the art software packages such as SAS, R and Python

Typical jobs would be the following:
- Financial Engineer/Mathematician
- Financial Product Developer
- Hedge Fund Portfolio Manager
- Quantitative Analyst
- Structured Financing Specialist

Where am I going to work?
Mainly in the financial sector. Industries such as:

- Banking (e.g. Absa, FirstRand)
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WHAT IS QUANTITATIVE RISK MANAGEMENT?

The importance of risk management at the highest levels of organisations is increasingly acknowledged these days, known in its broadest sense as Enterprise-wide Risk Management (ERM). The most important risk types are credit, market and operational risk.

Market risk is the risk that changes in the financial market prices and rates will reduce the value of the firm's positions. Credit risk is the risk that a change in the credit quality of a counterparty will affect the value of the bank's position. Operational risk refers to the risk of potential losses resulting from inadequate systems, management failure, faulty controls, fraud, and human errors.

Quantitative Risk Management at the NWU covers a full range of topics in mainstream risk management and analysis and its applications. The curriculum includes, for example, market risk, credit risk, operational risk, volatility modelling, default models. Basel regulations and approaches, time series analysis, statistical models and probability, derivatives pricing and hedging, asset price dynamics, risk analysis and extreme events, interest rate and foreign exchange processes, investment decision making, as well as other statistical subjects of relevance to practical financial modelling. This includes practical analyses with state-of-the art software packages such as SAS, R and Python

Typical jobs would be the following:

- Commercial Banker
- Corporate Banker
- Decision Support Analyst
- Financial Engineer
- Financial Model Developer
- Investment Analyst
- Market or Credit Risk Analyst
- Risk Analyst/Manager
- Treasury Analyst

Where am I going to work?

Mainly in the financial sector. Industries such as:

- Banking (e.g. Absa, FirstRand)
- Consulting (e.g. Deloitte, Ernst&Young)
- Credit bureaus (e.g. TransUnion, Vericred)
- Education (e.g. Universities, Schools)
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WHAT DO INDUSTRY SAY ABOUT BMI?

"My experience of BM/ graduates is that they compare favourably with the best graduates that we employ from Universities in the UK."
- Ian Wilson
Head of Wholesale Credit Risk Measurement: Group Risk, Barclays, London

"SAS Institute believes that the world leading programmes at BM/ deliver superior professionals to our customers. The core of this success is found in the quality of their students, teaching and leadership."
- Murray de Villiers
General Manager: Middle East & Africa Regional Academic Program

"I have had the pleasure of appointing BM/ graduates in previous years, and all of them have turned out to be superstars!"
- James Sutherland
Manager: Analytical Intelligence (AI), Absa Group Information Management

"/ believe that this programme has bridged a significant cap between very theoretical research and business reality. The success of candidates in getting jobs with the institutions with whom they have done their research projects clearly indicates how institutions value the project output but just as importantly that they know that they are employing individuals who can add value from day one."
- David Hodnett
Deputy CEO: Barclays Africa Group

"The Centre for BM/ hits the sweet spot between academic excellence and practical business skills. Due to this mix we find that BM/ graduates are not only bright but hit the ground running with practical business skills. In short, industry enjoy excellent productivity from day one and BM/ graduates an accelerated career path."
- Pravin Burra
(FASSA) Director Capital Markets, Deloitte & Touche

WHAT DO ALUMNI SAY ABOUT BMI?

"A BM/ graduate's first competitive advantage is obvious - a deep understanding of the mathematics behind business problems and the ability to model these, A second competitive advantage is less obvious - "the BM/ way of doing things". This entails critical reasoning (challenging the status quo), creative problem solving (as opposed to prescriptive problem solving), excellent communication, and thorough documentation . The best way to explain the "BM/ way" is that I perceive very few of the "professionals" around to be professional after receiving my BM/ training. The Centre for BM/ sets a benchmark that is unrivaled by the internationally trained professionals that I have come across."
- Steyn Krouse (BMI MSc 2011)
Actuary at Stenham in London

"The MSc in BM/ with specialisation in Business Analytics is the first of its kind in South Af ri ca. The degree specializes in the exciting new field of data science and big data with the main focus on problem solving in the financial sector. I found the course to be intellectually stimulating and very challenging. But with the excellent assistance provided by the academic staff of the Centre for BM/, I could easily master complex concepts. In the end, the course and lessons learnt , opened up a vast number of new career opportunities and equipped me for the challenges I subsequently faced in the professional working environment. I highly recommend this excellent course to mathematically talented students who are looking for exciting and well -paying new career opportunities."
- Babette Roberts (BMI MSc 2014)
Data Analyst at 2U in Cape Town

"My role fits quite well with the background provided by the BM/ qualification, in the sense that I get to be involved in applying the knowledge I've acquired across different risk types. The BM/ qualification gives one an edge in the risk management environment, especially in the financial services in dustry. The in-depth knowledge that one acquires from the BM/ programme is invaluable in the working environment and in managing different risk types. I would therefore strongly recommend the BM/ programme to anyone who wants to be a recognised as a well-rounded risk profession."
- Phathu Mutheiwana (BMI MSc 2011)
Risk and Capital Analyst at FirstRand.

"BM/ is recognised as one of the best degrees to have in the financial indust ry. Candidates with a BM/ degree are highly sought after because of their versatility due to BM I' s well rounded programme. The BM/ programme allows exposure to multiple fields in industry and does not limit its graduates to a specific area. One of my favourite aspects of BM/ is that all students and graduates are part of a bigger BM/ family. The number of BM/ Alumni in industry is outstanding and the success of these Alumni speak volumes of the BM/ programme."
- Mishka Mohamed (BMI MSc 2012)
Risk Analyst at Abs a.

LANGUAGE POLICY OF NWU

Some of the under-graduate lectures on the Potchefstroom campus are presented in Afrikaans with real-time interpreter services into English. Several under-graduate modules have paralleled classes in English and Afri kaans. The study material, tests and exam papers for all modules are available in English and Afrikaans.

The BMI under-graduate classes are presented in English at the Vaal Triangle campus. To prepare students well for industry , all post-graduate courses are presented in English.

BURSARIES AVAILABLE?

NWU Merit Bursaries:

Merit bursaries are available to students. Top academic achievers in school may qualify for up to 110% discount on class fees in their first year of study .

Administrative Official:

Undergraduate Bursaries

Tel: 018 299 4245

Absa Bursary Scheme:

An Absa Bursary scheme is also available for top academic achievers who want to study BMI courses.

Administrative Official:

Undergraduate Loans

Tel: 018 299 2193

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BMI students in HIGH DEMAND!

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