

# Data Science, Statistics, Mathematics and Applied mathematics, Operations Research, and Astronomy @ Unisa

A complete guide to preparing  
yourself for career opportunities

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*The information in this document was correct as on 27 February 2018. Visit the Directorate: Counselling and Career Development website (<http://bit.ly/2ux94B5>) for the latest version of this document.*

# How will this brochure help me?

- It will provide you with some insight into what studying in the fields of data science, statistics, mathematics, applied mathematics, astronomy, and operations research involves.
- It will help you gain more information about the skills needed to explore careers related to data science, statistics, mathematics, applied mathematics, astronomy, and operations research.
- It will help you point out possible career fields related to data science, statistics, mathematics, applied mathematics, astronomy, and operations research.
- It will assist you in finding Unisa qualifications related to data science, statistics, mathematics, applied mathematics, astronomy, and operations research.

## Data Science

### What is data science?

Data Science is the competency to make sense of, and find useful patterns within data to better support decision-making. The profession of data scientist is one that requires expertise in multiple technical disciplines, including computer science, analytics, mathematics, modelling, and statistics. It involves analysing massive data sets for meaningful insights, and then communicating these insights to an organisation's management team (University of Pretoria, <http://bit.ly/293x4C7>).

## What do data scientists do?

Data scientists solve complex business problems through analysis of many sources of big sets of data and then make recommendations regarding best approaches to solve specific problems. Some questions that data scientists would try to answer include “What are people saying on social media about Candidate X for the next election?”, “How do our customers use their smart phones to interact with us?”, “How can we recommend relevant products to users on our website?”, “How can we predict where crime will occur?”, and “How can we optimize routes for our trucks to deliver products?”, and “How can we predict whether a premature baby will develop an infection”. For more examples of the applications of data science, you can start with this article: <http://bit.ly/2926pYT>.

A data scientist is someone who can do undirected research and tackle open-ended problems and questions. Data scientists typically have advanced degrees in a quantitative field, like computer science, physics, statistics, or applied mathematics, and they have the knowledge to invent new algorithms to solve data problems (<http://bit.ly/296Odfp>).

Data scientists add value to an organisation by “wrangling” the huge amounts of data related to normal business operations. The data scientist can help organisations to gain insights from all the data and identify further business opportunities, make business processes more efficient, and attract and retain more customers. Data scientists also contribute to solving problems in areas such as health care, government services, agriculture, and sustainable development. For a more in-depth analysis of the value of big data for different industries, read the McKinsey Big Data report (<http://bit.ly/292Q9Dd>).

## Training as a data scientist

Data scientists need to have three broad skills sets: mathematics expertise, hacking skills, and business thinking. An inquisitive mind set enables the data scientist to solve complex problems (<http://bit.ly/298aPOx>).

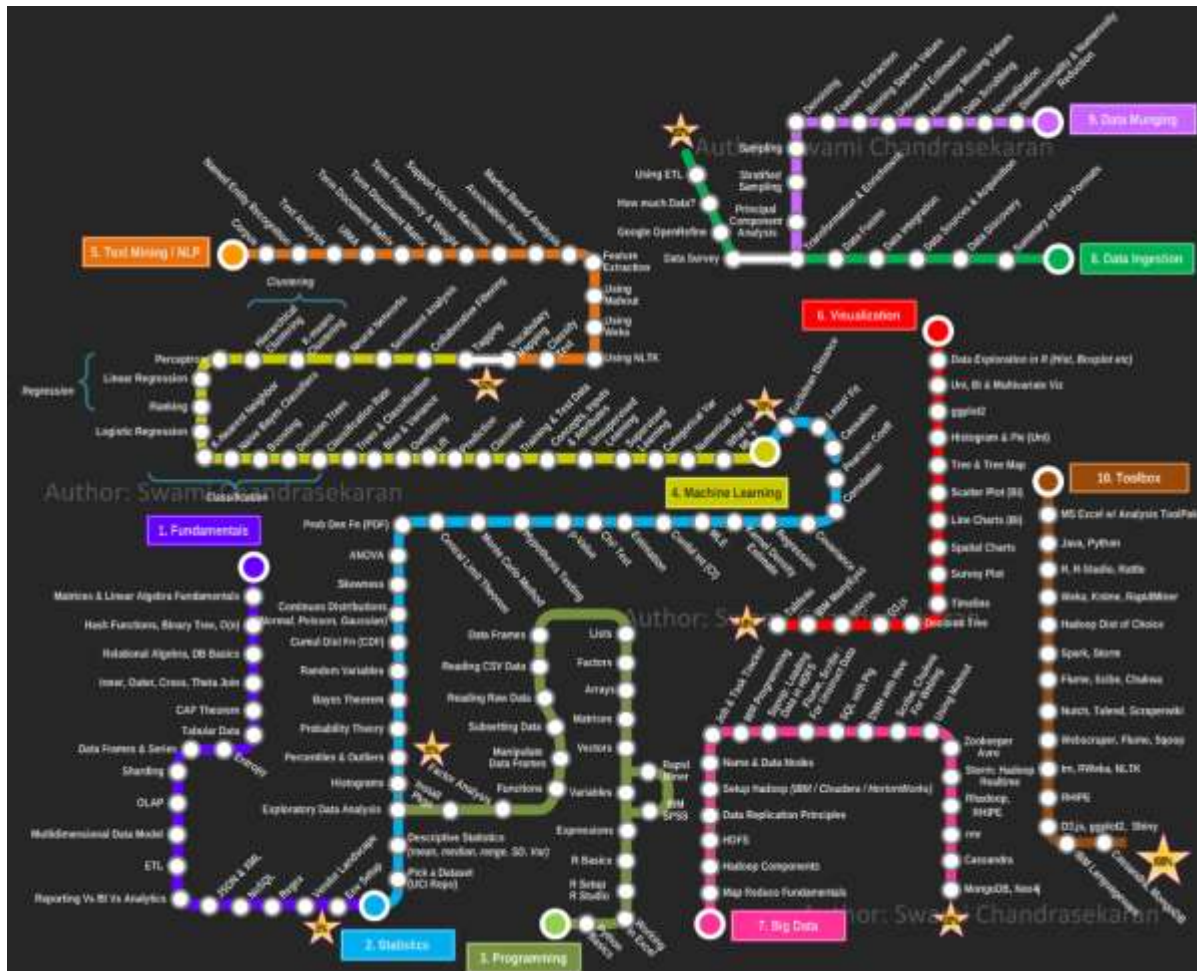
Data scientists would normally work in multi-disciplinary teams. This means that you would normally develop an area of expertise and then work in a team to solve problems. There is no one qualification path that will enable you work as a data scientist. For example, some data scientists have a statistics or mathematics academic background, whereas others have combined statistics with computer science and computer programming. Data scientists would often have training in mathematics and statistics, modelling, and computer science and then learn specific technology skills and programming languages to be able to complete data analysis tasks.

There are different approaches to becoming a data scientist and it can be quite confusing once you start reading and talking to people about what matters. The following list of core skills areas is intended as a map to the various skills sets:

1. Fundamentals (including mathematics, data modelling)
2. Statistics (including probability theory, exploratory data analysis, hypothesis testing and regression)
3. Programming (Computer programming languages such as Python, statistical programmes such as R and commercial packages such as SPSS, and Hadoop)
4. Machine Learning (knowing which techniques to apply using Python and R)
5. Text Mining / Natural Language Processing (text analysis, packages such as WEKA)
6. Data Visualization (using statistical packages to visualise and present data)
7. Big Data (including Hadoop)
8. Data Ingestion (including data formats, data discovery, and data integration)
9. Data Munging (knowing how to clean data to be able to analyse)
10. Toolbox (the programmes and packages you should be familiar with)

Within each of these areas, there are specific techniques you have to learn. The map below provides a visual overview of these techniques (increase the viewing % on your screen to see the details, or click on this link to open the map online:

<http://bit.ly/294fFWL>):



Source: Swami Chandrasekaran (<http://nirvacana.com/thoughts/becoming-a-data-scientist/>)

Since data scientists solve complex problems, they also have to have strong business skills – they need to be able to link problems with the data, and then recommend specific approaches to solving these problems. Some refer to this as “telling the story of the data”.

## Some aspects to consider related to training as a data scientist

1. You may not really need a degree in data science – you will need a good foundation in core areas such as mathematics, computer science, statistics, and applied mathematics.
2. Data science involves multiple disciplines – as you probably noticed from the map on the previous page, data scientists need to be able to integrate a variety of techniques from different subject areas.
3. Degree or no degree – don't forget about the soft skills – as a data scientist, you will need to be able to manage teams, consult with clients, and formulate and present solutions to problems.

## Awareness of ethical aspects related to big data

You will also need to be aware of the ethical aspects related to the growth of big data. Some of these aspects include:

- Privacy breaches and embarrassments. An example of this is congratulating a woman on being pregnant by utilising the data related to her shopping habits, whereas she may not have told her family about this.
- Anonymization could become impossible. Rules are needed to ensure that shared data can be kept anonymous.
- Unethical actions based on interpretations. An example of this is using student learning data to categorise underperforming students, whereas there is the possibility that the analytics used are not 100% accurate
- Discrimination. Data analytics may not be truly objective. For example, when additional data about a job candidate is scraped from social media and used to make the hiring decision, or a bank uses additional data to infer a person's sexual orientation in order to approve a bank loan.
- Few (if any) legal protections exist for the involved individuals. There are many data protection laws, such as the Protection of Personal Information (POPI) Act in South Africa, but these do not necessarily protect privacy while using big data analytics.



Source and further reading:

<http://privacyguidance.com/blog/10-big-data-analytics-privacy-problems/>

## Careers in data science

There may be many different job titles related to data science, but it would seem that there are three broad categories: data scientists, data engineers, and data analysts.

The table below provides a comparison of these titles.

	Data Analyst	Data Scientist	Data Engineer
<b>What they do</b>	Also referred to as a junior data scientist.  Data analysts acquire, process, and summarise data; manage data scraping, packaging data in narrative or visual form.	Sometimes interchangeably used with data analyst, but data scientists requires more sophisticated skills, specifically tackling open-ended questions and dealing with higher volumes of data.  Data scientists essentially leverage data to solve business problems. They interpret, extrapolate from, and prescribe from data to deliver actionable recommendations. A data analyst summarizes the past;	A data engineer supports the functions of the data analyst and scientist by compiling and installing database systems, writing complex queries, scaling to multiple machines, and putting disaster recovery systems into place.

	Data Analyst	Data Scientist	Data Engineer
		a data scientist strategises for the future.	
<b>Skills needed</b>	Programming, statistics, machine learning, data munging, and data visualisation; attention to detail: and ability to present results	Whereas a data analyst might look at data from only a single source, a data scientist explores data from many different sources. Data scientists use tools like Hadoop (the most widely used framework for distributed file system processing), they use programming languages like Python and R, and they apply the practices of advanced math and statistics.	Hadoop-based technologies like MapReduce, Hive, and Pig; SQL based technologies like PostgreSQL and MySQL; NoSQL technologies like Cassandra and MongoDB; and Data warehousing solutions
<b>Typical Majors in Studies</b>	Statistics, Mathematics, Business Management, Computer Science	Data scientists typically have advanced degrees in a quantitative field, like computer	Computer science, engineering

Data Analyst	Data Scientist	Data Engineer
	<p>science, physics, statistics, or applied mathematics, and they have the knowledge to invent new algorithms to solve data problems.</p>	

Source: <http://bit.ly/296Odfp>

## Learn more about data science

- Data Science Africa (<http://www.datascienceafrica.org/>). Data Science Africa aims to create a hub in the network of data science researchers across Africa by providing an index of researchers and practitioners in the field of Data Science in Africa; lectures and notes; links and sources of information and potential data sources; and an online presence for data science conferences and workshops.
- Use Quora ([www.quora.com](http://www.quora.com)) to search for topics related to data science (for example, data science jobs and careers). You can also type in specific questions such as “Which degree is best for data science?” or “Which programming languages should I learn for data science?”
- Kaggle (<https://www.kaggle.com/>) to learn how to do data science.
- Big data made simple (<http://bigdata-madesimple.com/>) for articles related to data science.
- Search for data science courses on open learning platforms such as Coursera, eduX, Udemy, and FutureLearn, MIT OpenCourseWare, and iTunesUniversity.

# Statistics

## What is statistics?

Without realising it, you have probably made some statistical statements in your everyday conversation or thinking. Statements such as “I sleep an average of eight hours a night” and “You are more likely to pass the exam if you start preparing earlier” are actually statistical in nature. Statistics is a discipline that is concerned with the following:

- Designing experiments and other data collection
- Summarising information to aid understanding
- Drawing conclusions from data
- Estimating the present or predicting the future

Examples of problems where Statistics plays an important role can be found in almost all spheres of science:

- The study of the occurrence and spread of disease, and of the effective treatment of diseases, cannot be undertaken without a statistician's inputs.
- The development of new farming methods relies heavily on statistical techniques.
- When designing and testing new machinery, engineers make extensive use of statistical principles.
- In collecting information about the quality of life of a country's population, the planning, implementation and processing of nationwide surveys rest largely with the statistician.

- Both long-term and short-term insurance are extremely dependent on the correct use of statistics.

## What fields employ statisticians?

One advantage of working in statistics is that you can combine your interest with almost any of the following fields in science, technology or business: agriculture, insurance, biology, law, chemistry, manufacturing, computer science, marketing, economics, public health, education, sports, engineering, telecommunications, epidemiology, finance and genetics.

## Possible job titles

Business analyst, investigator, professor, environmental scientist, economist, pharmaceutical engineer, software engineer, researcher, mathematician, data analyst, risk analyst, project manager, quality analyst, manager

## Getting started

Recruitment to the profession of statistician is usually at graduate level, so for most people the first step towards the profession is to obtain a degree in Statistics or in a joint subject such as Mathematics and Statistics that has a high statistical content.

Source: The South African Statistical Association: “You, Statistics, and your career”. Retrieved from <http://www.sastat.org.za/>

## Professional organisation

- Statistical Society of South Africa (<http://www.sastat.org.za/>)
- South African Council for Natural Scientific Professions (<http://www.sacnasp.org.za/new-submissions/fields-of-practice.html>)

# Mathematics and Applied Mathematics

## What are mathematics and applied mathematics?

A mathematician creates, investigates and analyses mathematical structures in order to solve and understand mathematical problems. The mathematician tries to find solutions to problems within the medical, agricultural, engineering, industrial, genetic, financial and ecological fields. The work of the mathematician can be divided into two broad categories:

- Theoretical Mathematics demands abstract thinking for the development of mathematical theories and methods.
- Applied Mathematics involves mathematical modelling, numerical analyses and operational research. It forms a bridge between theory and practice and concentrates on solving problems.

## Emerging fields in Applied Mathematics

There are various exciting emerging fields in the application of mathematics to real-world problems:

- **Computational Biology:** including bioinformatics, genomics, systems biology, protein structure prediction and structural genomics, computational biochemistry and biophysics.
- **Data Mining:** used in customer relationship management; sciences, such as genomics, astrophysics, and chemical engineering; e-commerce; computer security; financial data analysis; medical research and health management; and forensics and fraud investigation.

- **Neuroscience:** investigating the central and peripheral nervous system of biological organisms. This field expanded by the application of mathematical principles to investigate phenomena.
- **Materials Science:** making use of mathematical models and computational tools to design and analyse materials. Materials scientists work in the manufacturing industry, research institutions, the aerospace industry and the engineering industry.
- **Computer Animation and Digital Imaging:** The field of computer animation and digital imaging relies heavily on concepts from mathematics and applied mathematics. People in this field usually work in teams that could include mathematicians, graphic designers, computer scientists, physicists and anatomists. This field has applications within entertainment (e.g. movies and video games), as well as in medical diagnostics and fine arts (dancing, sculpture and painting).

## Possible job titles

Actuary, analyst, business intelligence developer, business planner, broker's assistant, collections strategist, credit risk manager, data analyst, derivatives trader, investment consultant, investment clerk, lecturer, marketing analyst, market research analyst, process analyst, quantitative analyst, risk analyst, researcher and teacher

## Getting started

A Bachelor's degree with Mathematics and/or Applied Mathematics provides a starting point for further studies in these fields.

## Professional organisations

- South African Mathematical Society (<http://www.sams.ac.za/>)
- Association for Mathematics Education of South Africa (<http://www.amesa.org.za/>)
- Southern Africa Mathematical Sciences Association (<http://samsa-math.org/>)

# Astronomy

## What is astronomy?

Astronomers work to increase our understanding of how the Universe began, how it has evolved and how it will evolve. They study how interstellar dust, gas clouds, planets, stars, galaxies and clusters of galaxies came to exist and how they work. To do this the only tools available are light, physics and mathematics. The dim 'light' from distant objects (including all wavelengths from gamma rays to radio) is carefully collected using satellites, earth-based optical instrumentation, gamma-rays, radio telescopes, etc. and then analysed with the aid of computers, mathematical modelling and the latest in theoretical physics. In some cases, the conditions needed to test recent ideas in physics are not available on earth, and astronomical tests are the only ones possible. Modern astronomy is essentially such a branch of physics that the terms “astronomy” and “astrophysics” have become almost interchangeable.

Collecting astronomical data (at the telescope or satellite ground station) usually occupies much less of the astronomer's time than analysing it in the office and/or at the computer. The completed analysis will usually be sent to one of the scientific journals that publish astronomical articles. What we understand of the universe today is the composite of many thousands of research publications in print. The hours an astronomer spends working to collect data will depend considerably on his/her field of research. Theoretical astronomers typically work rather normal hours. Radio astronomers may find themselves gathering data at any hour of the day or night, but many of the telescope's functions may be pre-programmed so that the astronomer's constant presence isn't essential. Optical and infrared astronomers will often work from sunset to sunrise (no breaks for weekends either). As telescopes are often in remote areas, considerable travel to obscure desert or Island Mountains may be necessary.



## What do I need to a career in astronomy?

Astronomers must have a serious interest in physics and mathematics. Above-average aptitude for these subjects is essential, as are computer skills. Research projects often involve long-term, organised efforts, either alone or with a small number of colleagues. Perseverance, individual initiative, patience and the ability to handle disappointment are vital. Astronomers are normally expected to be able to speak effectively about their research and to work with advanced students, teaching the next generation of researchers. An ability to communicate effectively with the public is a valuable asset for any astronomer.

## What should I study?

### Undergraduate

The Astronomical Observatory recommends that the undergraduate degree ideally include far more physics than astronomy. Other subjects which should be included in the first degree are Mathematics, Applied Mathematics, Computer Science, Statistics and Electronics. Unisa offers a BSc General degree. Some practical experience of astronomical research work is available to a limited number of university students for about four weeks each January at the South African Astronomical Observatory.

### Postgraduate

A fundamental prerequisite for almost all professional positions in astronomy is a PhD, usually in Astronomy, Astrophysics or Physics (with Astronomy). Please contact various universities to find out what specialisations they offer. The National Astrophysics and Space Science Programme (NASSP) is a cooperative, combined graduate programme launched by the South African astronomical community and a number of South African universities. It currently offers Honours and Master's programmes in Astronomy/ Astrophysics and Space Science. The Honours programme extends over one year and the Master's programme covers up to two years. Students are supervised by scientists from universities and the specialist research organisations doing work in astronomy such as the South African

Astronomical Observatory (SAAO) in Cape Town and the Hartebeesthoek Radio Astronomy Observatory (HartRAO) in the west of Gauteng. Selected students are offered bursaries to study astronomy at Honours and Master's levels. Refer to the NASSP website for more information at <http://www.star.ac.za> Other postgraduate bursaries are available from the National Research Foundation (<http://www.nrf.ac.za/>), the South African Astronomical Observatory ([www.saa.ac.za](http://www.saa.ac.za)), and through Universities offering training in astronomy.

## Who employs astronomers?

Graduates in astronomy are equipped to conduct research at the cutting edge of astrophysics and space science and have the broad science skills needed in any modern technological society. They would usually find employment at astronomical research facilities (e.g. HartRAO, SAAO) or universities. Opportunities in South Africa are especially good with two multimillion-rand astronomy projects: the Southern African Large Telescope (SALT) and the Karoo Array Telescope (KAT). However, astronomers' abilities, especially their scientific approach to problem solving, are also highly valued in almost all fields including aerospace, financial services and telecommunications. Alternatives to a salaried post are rather limited. Some astronomers have become free-lance astronomy or general science writers, especially overseas, and a few have written successful science fiction.

Source: Astronomy as a career. Astronomical Society of Southern Africa. Retrieved from: <https://assa.saa.ac.za/astronomy-in-south-africa/astronomy-as-a-career/>

## Professional organisation

- Astronomical Society of South Africa (<https://assa.saa.ac.za/>)

# Operation research

## What is operations research?

Operations Research (OR) is a systematic and rational approach to problem-solving and decision-making in situations of complexity, uncertainty and conflict. In short, quantitative (i.e. mathematical or numerical) models and techniques are used to find the optimal (best) solutions to quantifiable problems. The multi-disciplinary, computational and systems approach of OR is also known in the business world as Quantitative Management (QM), Management Science (MS), Decision Science, or Operations Management.

## What are the tasks of people in this occupation?

Operations Researchers use quantitative techniques and models to find answers for financial, economic and management problems. The aim is to develop alternatives from which the best solution to the problem can be chosen.

In the widest sense, an operations researcher gives support with decision-making problems in just about all fields. The type of problems an operations researcher deals with, can vary from decision-making on a national or international level to the day-to-day management of a small business or factory. On a national level, operations researchers have been involved in the following activities: planning of the 1994 election; determining the optimal use of water resources assisting government in planning educational, manpower and development policies; assessing conservation and management policies for game parks. Other applications are in mining, banking and other industries.

## What are the employment opportunities?

You can work as an operations research specialist within a company. This usually involves general operations research or operations research directed at the

company's specialisation area. Examples would be operations research divisions at mining houses, large banks, production companies and even research institutions. Operations researchers are also employed at research and training institutions.

### **What personal qualities are required?**

You should have a mathematical aptitude and be interested in its practical application. You should be able to think clearly and logically and approach a system systematically. Creativity, resourcefulness and initiative are also important qualities. If you have a critical and enquiring attitude and practical insight, then you will enjoy this career. A wide general knowledge and interest in a wide variety of subjects would be an advantage. You must be able to work on your own as well as within a team. It is essential that an operations researcher can grasp a problem and explain solutions in practical, everyday language as well as in mathematical 'jargon'.

### **How can one be trained for this occupation?**

The minimum requirement is a B-degree in a mathematical discipline and preferably an honours-degree in Operations research or a related subject.

### **Professional organisation**

- The Operations Research Society of South Africa  
(<http://www.orssa.org.za/wiki/>)

# Identify opportunities with career research

## **How do you identify opportunities?**

Your career research will connect you to others who will help you to: answer questions you have with relation to your career choice; expand your understanding of the opportunities related to your career vision; identify “hidden” career paths that you did not think of previously; and think about how you could plan to pursue specific opportunities.

## **Prepare**

Think about what you still need to find out: what questions do you have? You will use these questions as a starting point to structure your research. Examples of questions include: “What can I do with a major in...”, “How much do statisticians earn?” or “What must I study to be ..?”

## **Keep track of information**

Keep track of your research by making notes about what you learn and what you still need to find out.

## **Evaluate**

Evaluate the information that you are finding: Who wrote the information (person/ organisation)? Which country does the information relate to? When was the information last updated? After you have visited a number of websites, you could compare your notes about the information you found – what are the similarities and differences? What else do you need to find out?

## Further ways to do career research

### 1 Online search

Use a search engine such as Google to search for information related to your questions. For example, you need to find out about career opportunities related to data science. You could start with using keywords such as “careers in data science”, or “careers in operations research” and then to further contextualise your findings, you could search keywords such as “careers in data science Africa” and “careers in data science South Africa”. Scan the brief descriptions of the first ten results and decide which website you would want to explore first. Skim read through the information on the website (start with the headings) to get an understanding of the content of the page and to find information related to your question. Also check whether there are links to other websites that you could further explore. As you are reading, make a summary of the information. You could use the information you find to make lists of job titles related to your field of study, organisations that employ individuals in these fields and professional organisations.

Remember to bookmark pages that you would want to return to and make notes about what you find and what you would still like to find out about. Use online services or apps such as Evernote (<http://www.evernote.com>), Diigo (<http://www.diigo.com>) or Google Bookmarks (<http://www.google.com/bookmarks/>) to keep track of your research online.

### Activity

Use Google to find specific job titles related to your subject of interest as a major. The following are some search terms you could consider: “job titles data science”; “job titles statistics”; and “job titles data science graduates south africa”.

Job title	Website
Example:	

Job title	Website
Data scientist	Quintcareers.com

## 2 Occupational information websites

The following websites will help you to learn more about specific job titles:

Website	Description
Unisa Counselling & Career Development <a href="http://bit.ly/careerareas">http://bit.ly/careerareas</a>	This website provides more information about opportunities related to qualifications at Unisa.
Kheta (from SAQA) <a href="http://ncap.careerhelp.org.za/occupations">http://ncap.careerhelp.org.za/occupations</a>	Search for information about specific job titles.
Career Planet <a href="http://www.careerplanet.co.za/">http://www.careerplanet.co.za/</a>	Learn more about career areas such as IT, tourism, engineering and more. The website also contains information about learnerships and student finance
O*Net <a href="http://www.onetonline.org/">http://www.onetonline.org/</a>	Explore job titles related to different categories such as your interests, skills, values, typical work activities, and more. You could also browse through groups of occupations related to specific industries or economic sectors.

<p>Prospects</p> <p><a href="http://www.prospects.ac.uk/">http://www.prospects.ac.uk/</a></p>	<p>Explore different job titles related to job sectors, as well as what you could do with your major subject.</p>
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### 3 Job-search portals

Another type of website that is useful in terms of researching specific job titles linked to different industries is job search portals. Finding jobs advertisements that interest you is a worthwhile activity, even if you are not currently applying for jobs. You may not yet be eligible to apply for your dream job, but you can still gain a lot of information that can be applied to your career planning. For example, you are interested in data science, statistics, mathematics, astronomy or operations research, but you are not sure which specific job titles are linked to this field; or you want to know what kind of qualifications and skills are needed to be a statistical analyst at a bank.

You can use this information to make career goals, and think strategically about how you can develop experiences that will help you meet more of the selection criteria in the future.

Job search sites include

- PNet (<http://www.pnet.co.za>)
- Careerjunction (<http://www.careerjunction.co.za>)
- Careers24 (<http://www.careers24.com/>)
- Indeed (<http://www.indeed.co.za>)
- Government positions (<http://www.gov.za/aboutgovt/vacancies.htm>)

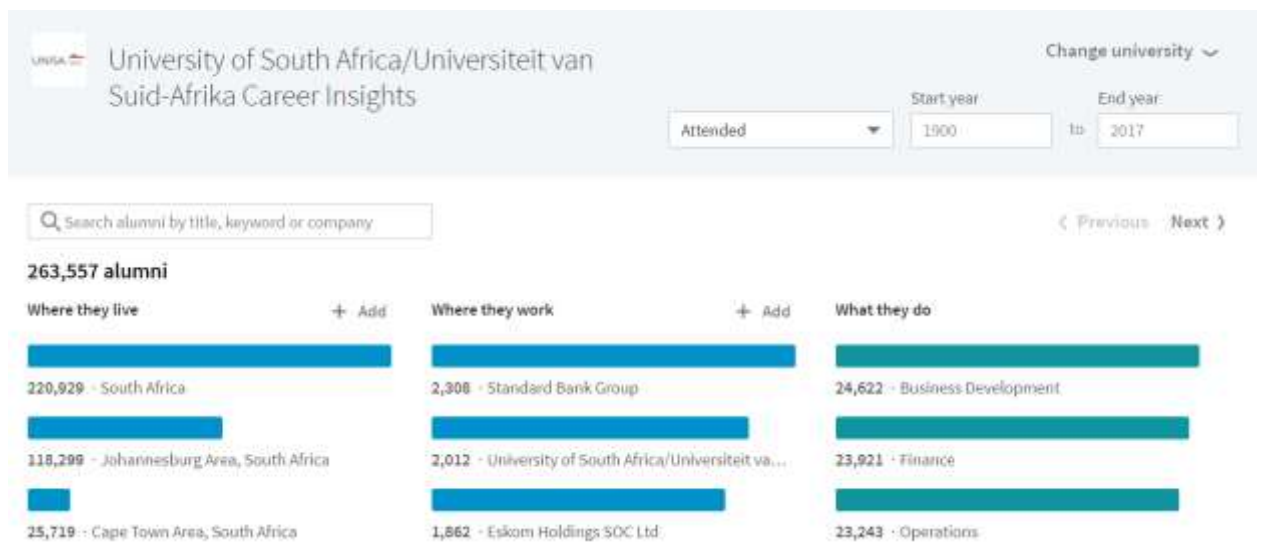
### 4 LinkedIn

If you have not done so already, start building your network on LinkedIn (<http://www.linkedin.com>) today!



Register for a free account and start connecting with your network online. Join groups relevant to your career field so that you could participate in discussions, ask questions and provide answers about specific topics and search for people, organisations and jobs in your field of interest. Do research about companies and employees to help you identify opportunities. To learn more about using LinkedIn effectively, go to <http://bit.ly/HpXqi8>.

1. Go to [www.linkedin.com](http://www.linkedin.com) and sign in to your LinkedIn account. If you do not have an account yet, then create one.
2. Make sure that you have captured your current or previous studies at Unisa on your LinkedIn profile.
3. Once you are signed in, go to the University of South Africa page at <https://www.linkedin.com/school/12049/>.
4. Click on the “See alumni” button.
5. You will now be presented with a page with Headings and graphs beneath the headings (e.g. Where they live, Where they work, What they do).



- Click on the “Next >” link to go to the next set of headings (What they studied, What they are skilled at, and How you are connected).



- Click on “+Add” next to the heading “What they studied”
- Type in Data Science or Statistics or Mathematics, Astronomy, or Operations research in the Search box.
- Choose one of those options that you would want to explore.
- You will notice that the graphs for the different headings adjust. You have now filtered the information to contain information about Unisa graduates who work in the field you searched for.
- You can now see how many graduates in these fields are on LinkedIn, where they work, what they do, what they’re skilled at, etc.
- You are also able to view the profiles of alumni who meet the criteria you searched for. For example, you can filter your search results to those alumni who indicated that they studied statistics, and work at FNB.

## 5 Talk to others (informational interviewing)

Once you have done some research about specific options, your next step is to talk to individuals in the type of

job/ industry that you are interested in. The goal of these conversations is to explore your career options, to expand

your network, to build confidence, to access information and to identify your own strengths and areas of development. For example, you read an article about how a bank is using big data to predict customer behaviour and you feel curious about how the researchers went about developing this model. You could contact one of the authors of the article to ask if they would be willing to share how they went about developing this model. Before you interview someone, do research about what you would want to discuss with them – you could ask this person to “fill in the gaps” for you. Start with people you already know: friends, family, neighbours, colleagues,

lecturers, tutors and fellow students. Use online social networks such as LinkedIn to further identify potential people. For more information on how to go about this and suggestions for questions that you might want to ask, visit [http://bit.ly/info\\_interviews](http://bit.ly/info_interviews). Also, watch this video to learn more: The Dos and Don'ts of Informational Interviews: <http://youtu.be/ixbhtm8l0sl>.

Remember to keep track of the information you have gathered and how you make sense of this. Also, track the questions you still have and how you think you would be able to get answers to these questions.

### **Activity**

Write a list of any people you know who might work in the fields you are interested in. For instance, do any of your parents' friends work in any of the fields you are considering? And write a list of those people who could give you information about any careers you are considering.

You may have identified a lot more people than you thought! Imagine how much information you can gather about the career you are interested in just by talking to these people. Each person will give you fresh insights opinions and valuable information about the careers you are considering, whether they are currently working in that field or are only remotely related to or associated with it.

## 6 Attend a careers fair event

Attending a careers fair event gives you the opportunity to speak to people from different industries. You may be studying a qualification that does not seem to have a direct link to the exhibitors or the presenters, but they have one thing in common: they employ people, who work in organisations, who do business with all kinds of suppliers and services. Somewhere in this value chain your qualification will find a place to fit – either as a customer or as an employer or employee.

### Preparation

- Think about what you will wear.
- Practice your handshake and introduction - how will you introduce yourself to recruiters?
- Update your CV and prepare to answer questions about yourself, your career and your studies.
- Do research about the participating organisations (start with the organisation's website).
- Prepare questions that you would want to ask recruiters - use your research about an organisation to inform your questions (for example: What kind of person are you seeking for this position? What particular skills do you value most?). See <http://bit.ly/126tLBw> for more questions.

### During

- Make an effort to speak to all the exhibitors and presenters and keep a note of who they are and what their companies do – remember to introduce yourself.
- Speak clearly and confidently – it may be noisy, so remember to speak up if necessary.
- Be ready to take notes: Carry a notebook and pen with you, or do it on your cellphone/ tablet.

- Network with other students at the Careers Fair (but not at the expense of talking to employers!)
- Don't ask about: Information you could have easily learned on the employer's website or salary and benefits.

After

- Make notes about the various people you spoke to and the information you would want to follow up.
- Connect with company representatives that you met on-line (for example, through LinkedIn)
- Reflect on your experience: How did you use this opportunity? Could you link your skills and qualification to what was offered at the Fair?
- Update your career portfolio with what you learnt at the Careers Fair.

The annual Unisa Careers Fair usually takes place in July and August at various venues. Go to <http://www.unisa.ac.za/counselling> for more information.

## 7 Experience studying topics related to your field of interest

Explore what data science, statistics, mathematics, and operations research are by watching and listening to on-line lectures and reading free open textbooks on a variety of topics related to data science, mathematics, applied mathematics, astronomy, statistics, and operations research. These resources will enhance your understanding of data science and the various opportunities related to this field.

Search for courses and open textbooks on these sites:

- Khan Academy (<https://www.khanacademy.org/>)
- Coursera.org (<http://www.coursera.org/>)
- Udemy (<http://www.udemy.com/>)
- Saylor Academy (<http://www.saylor.org/books/>)

- Open Textbook Library (<http://open.umn.edu/opentextbooks/>)
- College Open Textbooks (<http://www.collegeopentextbooks.org/textbook-listings/textbooks-by-subject/>)
- MITOpenCourseware (<http://ocw.mit.edu/index.htm>)
- Open Culture (<http://www.openculture.com/freeonlinecourses>)
- iTunes university (<http://www.apple.com/education/itunes-u/>)
- YouTube education (<http://www.youtube.com/education?b=400>)
- FreeVideoLectures (<http://freevideolectures.com/>)

# Qualifications offered by Unisa

## Undergraduate qualifications

- [Bachelor of Science Applied Mathematics and Computer Science Stream \(98801 - AMC\)](#)
- [Bachelor of Science Applied Mathematics and Physics Stream \(98801 - AMP\)](#)
- [Bachelor of Science Applied Mathematics and Statistics Stream \(98801 - AMS\)](#)
- [Bachelor of Science Chemistry and Applied Mathematics Stream \(98801 - CAM\)](#)
- [Bachelor of Science Chemistry and Statistics Stream \(98801 - CAS\)](#)

- [Bachelor of Science General \(98801 - GEN\)](#)
- [Bachelor of Science Mathematics and Applied Mathematics Stream \(98801 - MAM\)](#)
- [Bachelor of Science Mathematics and Chemistry Stream \(98801 - MAC\)](#)
- [Bachelor of Science Mathematics and Computer Science Stream \(98801 - MCS\)](#)
- [Bachelor of Science Mathematics and Information Systems Stream \(98801 - MIS\)](#)
- [Bachelor of Science Mathematics and Physics Stream \(98801 - MAP\)](#)
- [Bachelor of Science Mathematics and Statistics Stream \(98801 - MAS\)](#)
- [Bachelor of Science Statistics and Physics Stream \(98801 - STP\)](#)
- [Bachelor of Science Mathematics and Computer Science Stream \(98801 - MCS\)](#)
- [Bachelor of Science Mathematics and Information Systems Stream \(98801 - MIS\)](#)
- [Bachelor of Science in Computing \(98906\)](#)
- [Bachelor of Science in Informatics \(98907\)](#)
- [Bachelor of Science General \(98801 - GEN\)](#)
- [Bachelor of Commerce \(Generic\) \(Generic\) \(98314 - GEN\)](#)
- [Bachelor of Business Administration Business Administration \(98316 - BBA\)](#)
- [Bachelor of Commerce in Quantitative Management Quantitative Management \(98311 - QMA\)](#)

*Note on studying astronomy:*

Astronomy is no longer offered as a major subject at Unisa. If you are interested in studying Astronomy, you could consider the following:

- General BSc and include Astronomy modules in your curriculum, together with appropriate Mathematics/Applied Mathematics and Physics modules.
- BSc specialising in Mathematics and Physics, or Applied Mathematics and Physics and complete the Astronomy modules for non-degree purposes.

## Honours degrees

- [Bachelor of Commerce Honours in Financial Modelling \(98350\)](#)
- [Bachelor of Science Honours in Applied Mathematics \(98921\)](#)
- [Bachelor of Science Honours in Mathematics \(98923\)](#)
- [Bachelor of Science Honours in Mathematics Education \(98913\)](#)
- [Bachelor of Science Honours in Statistics \(98922\)](#)
- [Bachelor of Science Honours in Statistics Education \(98916\)](#)
- [Bachelor of Science Honours in Operations Research \(90078\)](#)
- [Postgraduate Diploma in Operations Research \(98236\)](#)
- [Bachelor of Science Honours in Astronomy \(98920\)](#)

## Master's and Doctorate

Unisa offers a number of Masters and Doctoral degrees in these fields – please see:

[http://www.unisa.ac.za/qualificationsMD/Navigation/Alph\\_4\\_99.html](http://www.unisa.ac.za/qualificationsMD/Navigation/Alph_4_99.html). The research

focus areas for the various academic fields of study can be found in this document:

[http://www.unisa.ac.za/contents/colleges/col\\_science\\_eng\\_tech/docs/focus-areas/Unisa-focus-areas-CSET.pdf](http://www.unisa.ac.za/contents/colleges/col_science_eng_tech/docs/focus-areas/Unisa-focus-areas-CSET.pdf).



## Short Learning Programmes (SLPs)

Unisa offers a number of SLPs that people could look at completing. It is important to remember that a SLP is not a formal qualification and will not allow you to qualify for a formal qualification. For more information visit: <http://brochure.unisa.ac.za/slp/>

# Counselling and career development services at Unisa

The Unisa Directorate for Counselling and Career Development offers career-, academic- and personal counselling services to Unisa students and the broader community. You can talk to a counsellor about:

- **Career decisions.** I am not sure which career path to follow; I don't know which qualification would be best; I want to change my career direction...
- **Career information.** How can I find out more about a career in ...
- **Employability.** How do I market myself to employers? How can I look for work? How can I compile an effective CV? How do I go about networking with others? How do I put together my career portfolio? How can I meet potential employers? How can I improve my interview skills?)
- **My studies at Unisa.** How can I get started with my studies? How do I plan my studies? How can I study more effectively? I don 't feel motivated to continue with my studies... I feel worried about preparing for/ writing the exams. I failed my exams – what now? I need to improve my reading/ writing/ numeracy skills
- **Personal issues.** How can I have better relationships with others? How can I cope more effectively with issues that impact on my studies?

Visit our website at <http://www.unisa.ac.za/counselling> to access many self-help resources, or talk to a counsellor by e-mail to [counselling@unisa.ac.za](mailto:counselling@unisa.ac.za).