Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT

Science
EyeNzululwazi ngezeNdalo
Natuurwetenskappe

Interdisciplinary BSc degree-programmes

Applied Medicinal Chemistry / Biomedical Mathematical Sciences / Biomathematics / Bioinformatics & Computational Biology

This programme leads to a BSc degree in one of the following four focal areas:

- Applied Medicinal Chemistry
- Bioinformatics and Computational Biology
- Biomathematics
- Biomedical Mathematical Sciences

Each focal area has a distinctive curriculum allowing students to pursue interdisciplinary undergraduate studies.

Focal areas	Major/s
Applied Medicinal Chemistry	Chemistry and Physiology. Postgraduate study possibilities in Chemistry or Physiological Sciences
Bioinformatics & Computation Biology	Combines Biochemistry, Bioinformatics, Computer Science and Genetics on a multidisciplinary level, with postgraduate study possibilities in Bioinformatics & Computational Biology,
Biomathematics	Applied Mathematics and Biochemistry OR Biodiversity & Ecology. Postgraduate study possibilities in mathematics (with a focus on Biomathematics), Biochemistry, or Botany and Zoology.
Biomedical Mathematical Sciences	Mathematics en Physiology. Postgraduate study possibilities in Mathematics or Physiological Sciences or a master's programme (MEngSci) and a PhD (Biomedical Engineering) at the Faculty of Engineering.

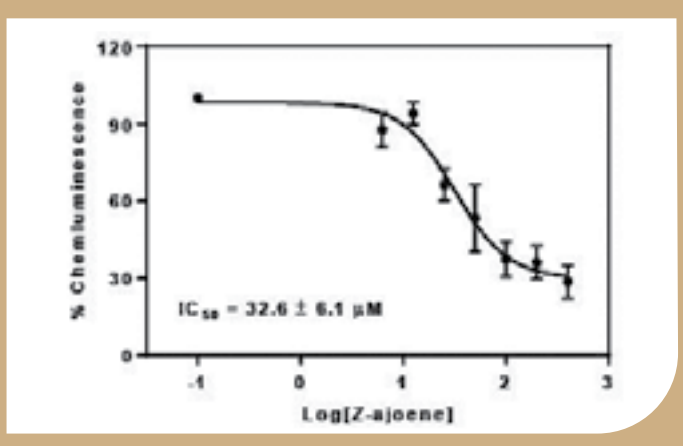
Consult the latest Faculty of Science Yearbook (Part 5) for information on subjects and modules.

Do I qualify?

Minimum admission requirements to apply

- Average (excluding Life Orientation): **65%**
- English OR Afrikaans (Home Language or First Additional Language): **50%**
- Maths: **70%**
- Physical Sciences: **50%**

TAKE NOTE: The selection criteria used for admission are higher than this.



Focal areas explained

Applied Medicinal Chemistry

The Medicinal Chemistry focal area provides a broad, multidisciplinary background in Chemistry and Physiology to prepare students for careers in the pharmaceutical, allied health and related industries. This focal area will develop your understanding of how diseases work, from their molecular basis, through the cellular level, to the effects on the body. You will also be equipped with chemical knowledge and skills that are essential for identifying, synthesizing, and developing novel treatments. This focal area leads to an honours programme in either Chemistry or Physiological Sciences.

Bioinformatics & Computation Biology

Bioinformatics and Computational Biology is a field that utilises computers to store, retrieve and analyse enormous volumes of biological data generated by highly parallelised methods used in modern biological research. The datasets can, for example, include the genome sequences of diverse organisms or human populations, the full protein complement of an organism or tissue, an extensive group of metabolites in a cell, or any other high-dimensional biological data set. Bioinformatics and Computational Biology is involved in studying biological questions using the data sets, designing databases to ease information access, or designing algorithms and software tools to analyse the data sets.

Biomathematics

There is a growing demand from fields such as molecular and systems biology, bioinformatics, and ecology for researchers with solid mathematical skills who can develop and analyse precise models for experimental data. Biomathematics is a broad interdisciplinary field where mathematical, statistical, and computing techniques are used to explain phenomena and research problems within the biological, biomedical, and environmental sciences - from predicting the influence of HIV/Aids, malaria, and tuberculosis to the effects of climate change in South Africa.

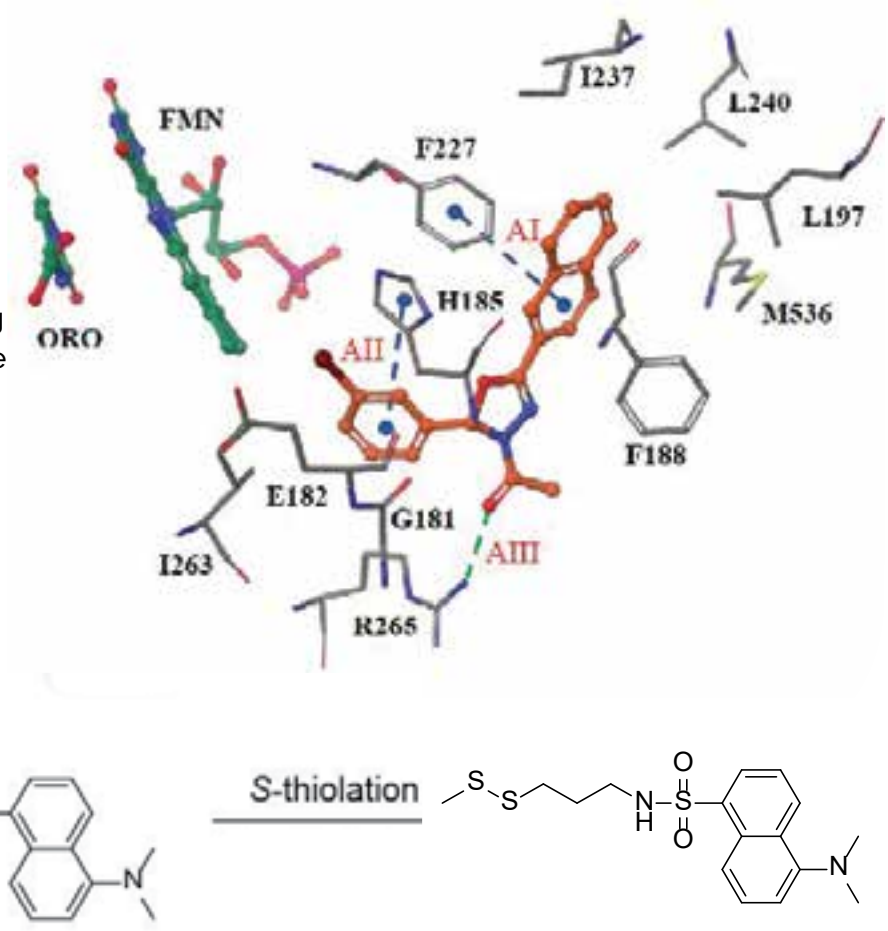
Biomedical Mathematical Sciences

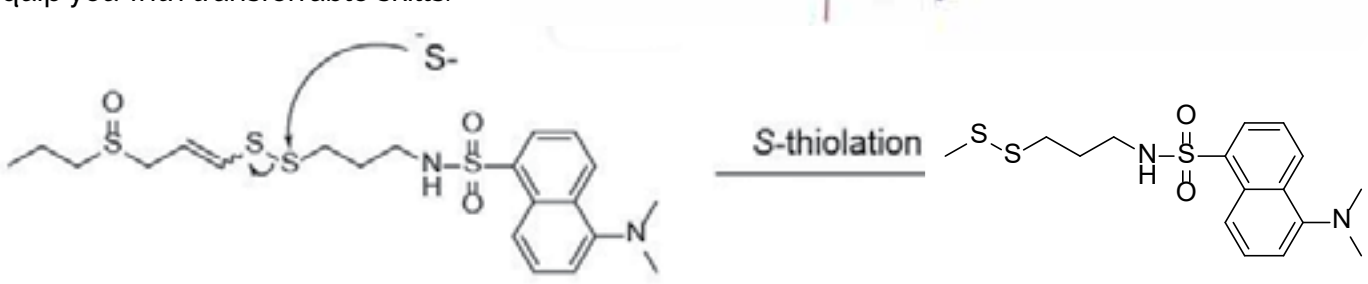
This focal area will develop your abilities to undertake advanced reflection on and develop solutions for problems that require an integration of knowledge and skills from multidisciplinary fields such as engineering, mathematics, and the natural sciences. This focal area leads to an honours programme in Physiological Sciences or in Mathematics. It could also lead to a master's degree programme in Engineering Science and a PhD in Biomedical Engineering in the Faculty of Engineering.

Why study an interdisciplinary BSc degree?

The aim of the multidisciplinary Applied Medicinal Chemistry stream is to provide opportunities for students to study drug synthesis in chemistry, and also to educate them in the physiological and pathophysiological basis of diseases. This will equip them with the necessary knowledge for synthesizing novel targeted drugs and to test these in cell and animal models.

An interdisciplinary degree will open the door to a world of possibilities, provide you with a solid education in the pure and applied sciences, and equip you with transferrable skills.





What can I do with an interdisciplinary BSc degree?

- Bioinformatics scientist
- Biomedical engineer
- Clinical trial associate
- Data analyst
- Data scientist
- Medical epidemiologist
- Personalised medicine analyst
- Pharmaceutical scientist
- Pharmacovigilance officer
- Quality assurance specialist
- Senior medicinal chemist

"It is a challenging, multidisciplinary programme that focuses on the student's level of understanding rather than just absorbing and memorising information."

– undergraduate BSc student

Contact details

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Coordinator Academic and Student Affairs
Faculty of Science
Tel: (021) 808 3931
E-mail: aatika@sun.ac.za

Contact our recruitment officer

at science@sun.ac.za

Deadline: Apply with your grade 11 marks by 31 July

General admission and selection criteria

https://www.sun.ac.za/english/maties

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Interdissiplinêre BSc-graadprogramme

Toegepaste Medisinale Chemie / Biomediese Wiskundige Wetenskappe / Biowiskunde / Bioinformatika & Berekeningsbiologie

Hierdie programme lei tot 'n BSc-graad in een van die volgende vier fokusareas:

- Bioinformatika en Berekeningsbiologie
- Biomediese Wiskundige Wetenskappe
- Biowiskunde
- Toegepaste Medisinale Chemie

Elke fokusarea het 'n eiesoortige kurrikulum wat studente toelaat om interdissiplinêre voorgraadse studies te onderneem.

Fokusareas	Hoofvakke
Bioinformatika en Berekeningsbiologie	Kombineer Biochemie, Bioinformatika, Rekenaarwetenskap en Genetika op 'n multidissiplinêre vlak, met nagraadse studiemoontlikhede in Bioinformatika en Berekeningsbiologie
Biomediese Wiskundige Wetenskappe	Wiskunde en Fisiologie
Biowiskunde	Toegepaste Wiskunde en Biochemie OF Biodiversiteit en Ekologie. Nagraadse studiemoontlikhede in Wiskunde (met n fokus in Biowiskunde), Biochemie, of Plant- en Dierkunde
Toegepaste Medisinale Chemie	Chemie en Fisiologie. Nagraadse studiemoontlikhede in Chemie of Fisiologiese Wetenskappe

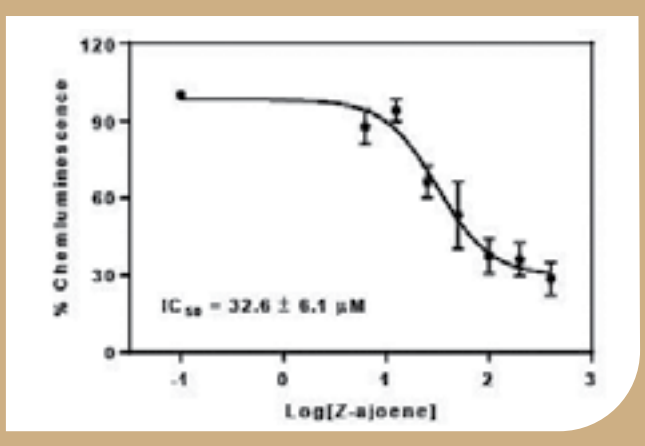
Raadpleeg die nuutste Jaarboek van die Fakulteit Natuurwetenskappe (Deel 5) vir inligting oor vakke en modules.

Voldoen ek aan die vereistes?

Minimum toelatingsvereistes om aansoek te doen

- 'n NSS-gemiddeld van **65%** (Lewensoriëntering uitgesluit)
- Engels OF Afrikaans: (Huistaal of Eerste Addisionele Taal) **50%**
- Wiskunde: **70%**
- Fisiese Wetenskappe: **50%**

NEEM KENNIS: Die keuringskriteria wat vir toelating gebruik word, is hoër.



Fokusareas uiteengesit

Bioinformatika en Berekeningsbiologie

Bioinformatika en Berekeningsbiologie is 'n vakgebied waar rekenaars gebruik word om enorme volumes biologiese data te stoor, te herwin en te ontleed. Dié data word gegenereer deur 'n groot aantal gelyklopende metodes wat in moderne biologiese navorsing gebruik word. Die datastelle sluit byvoorbeeld in, die genoomvolgorde van diverse organismes of menslike populasies, die volledige stel proteïne wat 'n organisme of weefsel bevat, 'n uitgebreide groep van metaboliete in 'n sel, of enige ander veelvoudige dimensionele biologiese datastel. Bioinformatika en Berekeningsbiologie is gemoeid met die bestudering van biologiese vraagstukke deur die gebruik van datastelle, die ontwerp van databasisse om toegang tot inligting te vergemaklik, of die ontwerp van algoritmes en sagteware om die datastelle te analiseer.

Biomediese Wiskundige Wetenskappe

Hierdie fokusarea sal jou vermoë ontwikkel om op gevorderde vlak te reflekteer oor, en oplossings te ontwikkel vir probleme wat vereis dat kennis en vaardighede uit multidissiplinêre velde soos ingenieurswese, wiskunde en die natuurwetenskappe geïntegreer word. Hierdie fokusarea lei tot 'n honneursprogram in Fisiologiese Wetenskappe of in Wiskunde. Dit kan ook lei tot 'n meestersgraadprogram in Ingenieurswese en 'n PhD in Biomediese Ingenieurswese in die Fakulteit Ingenieurswese.

Biowiskunde

Daar is toenemend aanvraag uit velde soos molekulêre en sisteembiologie, bioinformatika, en ekologie na navorsers met sterk wiskundige vaardighede wat akkurate modelle vir eksperimentele data kan ontwikkel en analiseer. Biowiskunde is 'n breë interdissiplinêre veld waar wiskundige, statistiese en berekeningstegnieke gebruik word om fenomene en navorsingsprobleme binne die biologiese, biomediese en omgewingswetenskappe te verduidelik – van die voorspelling van die invloed van MIV/vigs, malaria en tuberkulose, tot die uitwerking van klimaatsverandering op Suid-Afrika.

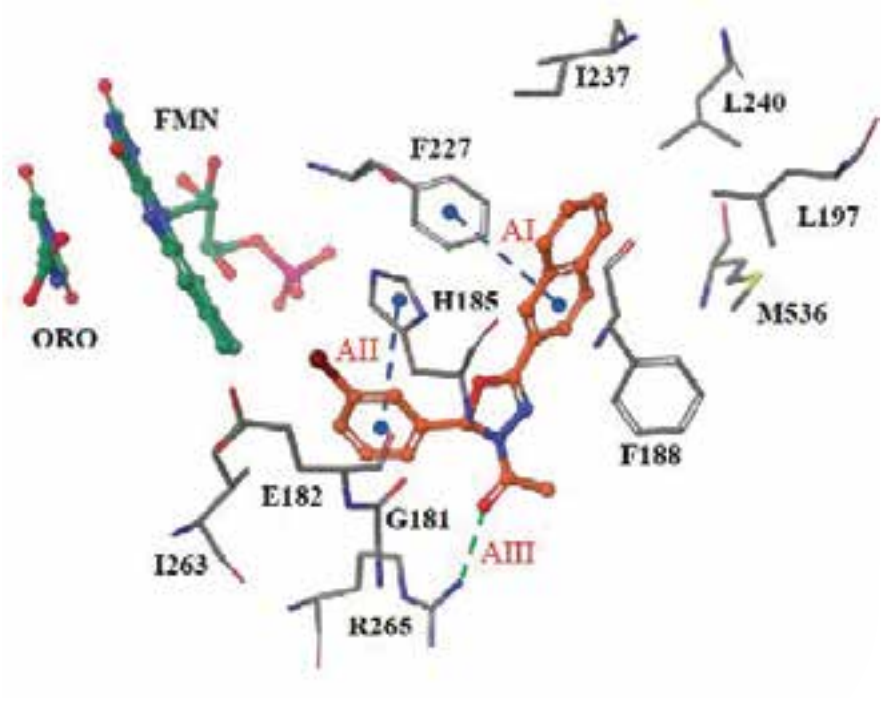
Toegepaste Medisinale Chemie

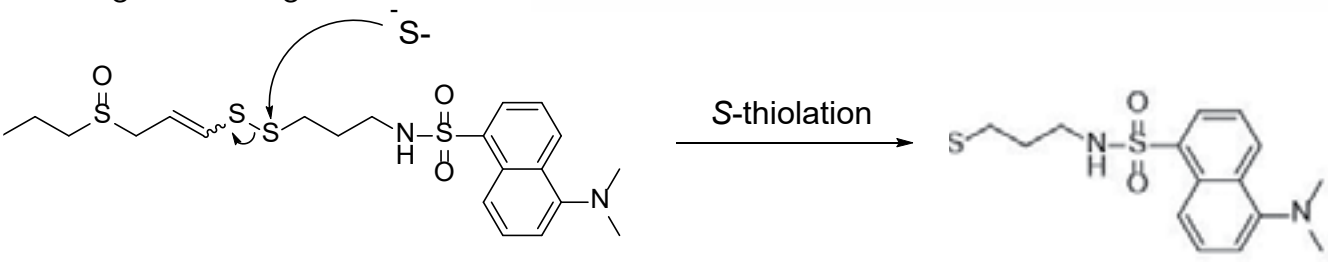
Die Medisinale Chemie-fokusarea verskaf 'n algemene, multidissiplinêre agtergrond in Chemie en Fisiologie om studente voor te berei vir loopbane in die farmaseutiese, aanvullende gesondheidsindustrieë en ander verwante industrieë. Hierdie fokusarea sal jou begrip ontwikkel van hoe siektes werk: van hul molekulêre basis deur die sellulêre vlak tot by die uitwerking daarvan op die liggaam. Jy sal ook toegerus word met chemiese kennis en vaardighede wat noodsaaklik is vir die identifisering, sintese, en ontwikkeling van nuwe behandelings. Hierdie fokusarea lei tot 'n honneursprogram in óf Chemie óf Fisiologiese Wetenskappe.

Waarom 'n interdissiplinêre BSc-graad?

Die doel van die multidissiplinêre Toegepaste Medisinale Chemie-fokusarea is om geleenthede te bied vir studente om geneesmiddelsintese in chemie te leer, en hulle ook te onderrig in die fisiologiese en patofisiologiese basis van siektes. Dit sal hulle met die nodige kennis toerus om nuwe geteikende geneesmiddels te ontwikkel wat hul dan in sel- en diermodelle kan toets.

'n Interdissiplinêre graad maak deure na 'n wêreld van moontlikhede oop, gee aan jou 'n stewige grondslag in die suiwer en toegepaste wetenskappe, en rus jou toe met oordraagbare vaardighede.





Wat kan ek doen met 'n interdissiplinêre BSc-graad?

Bioinformatika-wetenskaplike
Biomediese ingenieur
Kliniese navorsingsgenoot
Data-analis
Datawetenskaplike
Mediese epidemioloog
Verpersoonlikte geneesmiddel-analis
Farmaseutiese wetenskaplike
Gehalteversekeringspesialis
Mediese chemikus

"Dit is 'n uitdagende multi-dissiplinêre kursus wat fokus op die student se vlak van begrip, eerder as die blote inneem en memorisering van inligting."
– Voorgraadse BSc-student

Kontak ons

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Koördineerder Akademiese- en Studentesake
Fakulteit Natuurwetenskappe
Tel: (021) 808 3931
E-pos: aatika@sun.ac.za

Kontak ons werwingsbeampte

by science@sun.ac.za

Sperdatum: Doen aansoek met jou graad 11-punte teen 31 Julie

Algemene toelatings- en keuringskriteria

https://www.sun.ac.za/afrikaans/maties