

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.

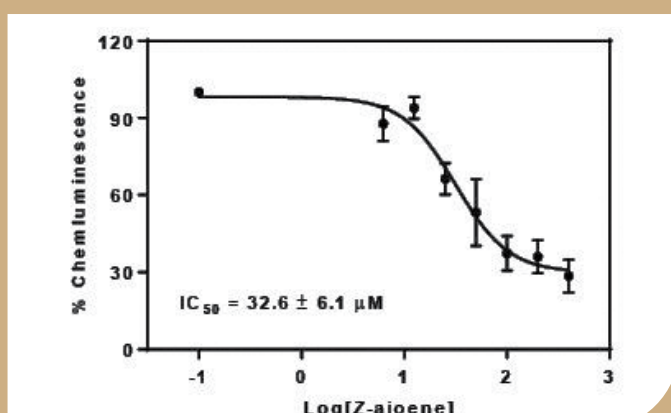
Focal areas	Major/s
Applied Medicinal Chemistry	Chemistry and Physiology. Postgraduate study possibilities in Chemistry or Physiological Sciences
Bioinformatics & Computation Biology	Combines Biochemistry, Bioinformatics, Computer Science and Genetics on a multidisciplinary level, with postgraduate study 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 and 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

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



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 & Computational 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.

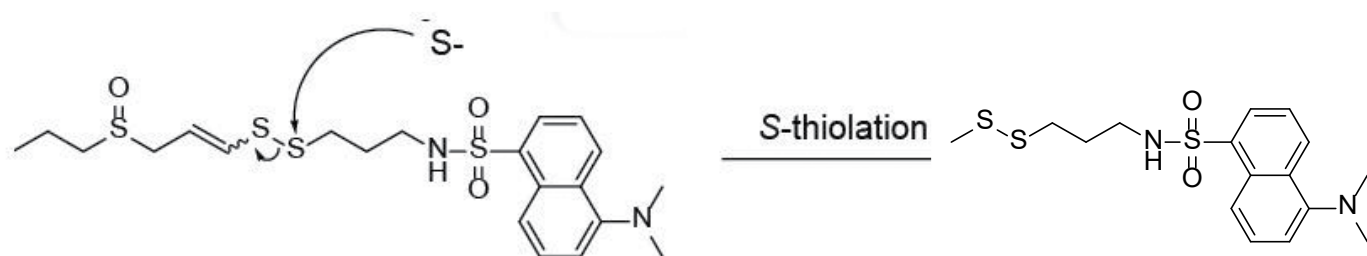
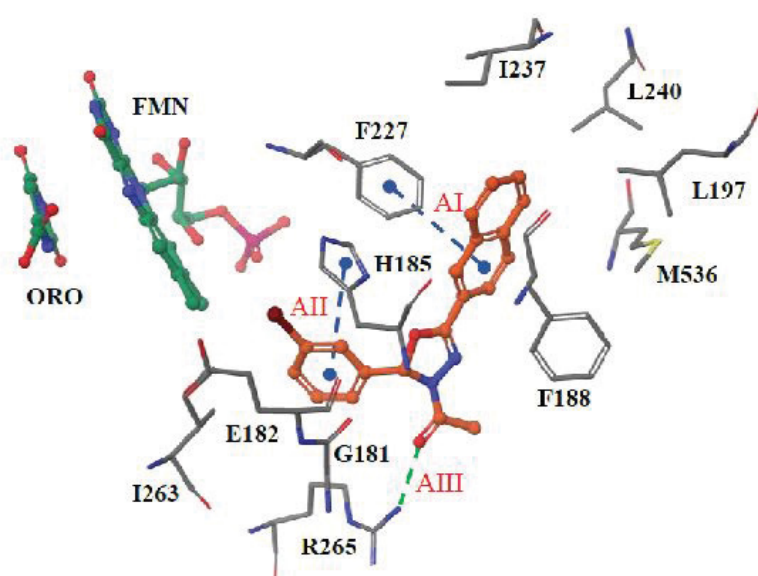
Biomedical Mathematical Sciences

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 focal area 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 course 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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Deadline: Apply with your grade 11 marks by 31 July

General selection and application criteria

www.su.ac.za/ugrequirements

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.

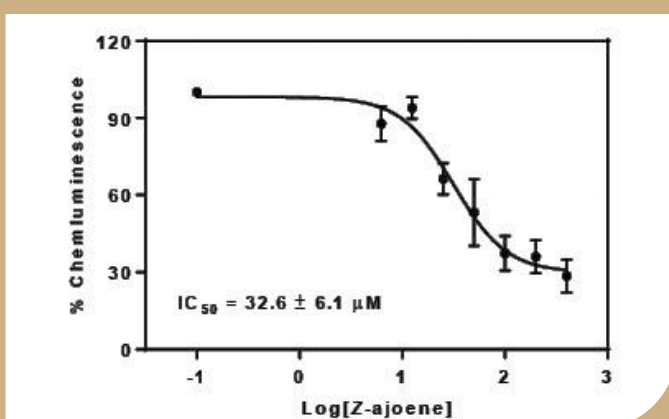
Fokusareas	Hoofvakke
Bioinformatika en Berekeningsbiologie	Kombineer Biochemie, Bioinformatika, Rekenaarwetenskap en Genetika op 'n multidissiplinêre vlak, met nagraadse studiemoontlikhede in Bioinformatika en Berekeningsbiologie
Biomediese Wiskundige Wetenskappe	Wiskunde en Fisiologie. Nagraadse studiemoontlikhede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

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



Fokusareas uiteengesit:

Bioinformatika en Berekeningsbiologie

Bioinformatika en Berekeningsbiologie is 'n vakgebied waar rekenars 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 proteïene 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 sisteembioë, 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 verskynsels 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.

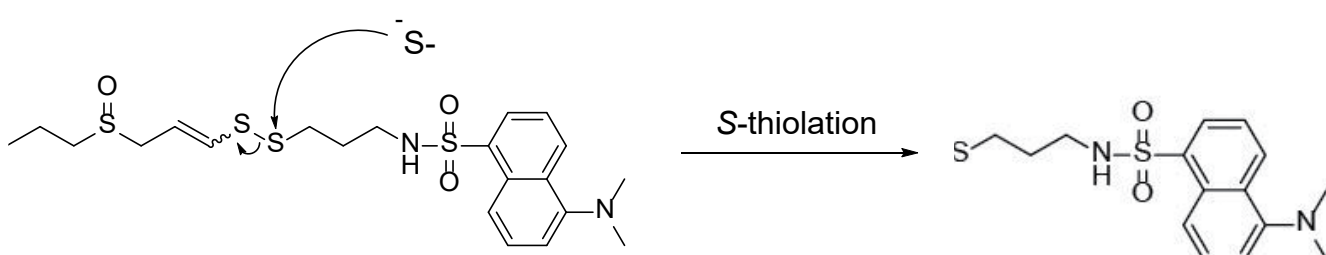
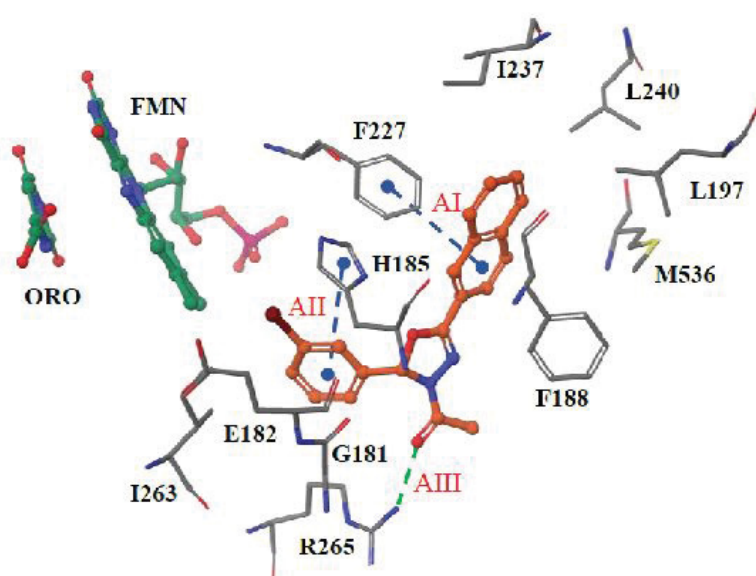
Toegepaste Medisinale Chemie

Die Medisinale Chemie-fokusarea verskaf 'n algemene, multidissiplinêre agtergrond in Chemie en Fisiologie om studente voor te berei vir loopbane in die farmaseutiese, aanvullende gesondheidsindustriële en ander verwante industriële. 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 studente die geleentheid te bied om geneesmiddelsintese in chemie te leer, en hulle 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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E-pos: laureno@sun.ac.za

Kontak ons Koördineerder:

Studente- en Akademiese Sake

by scienceadmin@sun.ac.za

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

**Algemene toelatings-
en keuringskriteria**

www.su.ac.za/ugrequirements