



Stellenbosch

UNIVERSITY  
IYUNIVESITHI  
UNIVERSITEIT

SCIENCE

EYENZULULWAZI NGEZENDALO

NATUURWETENSKAPPE

## BDE 224: Diversity and Function of Invertebrates

### Short description of the module

BDE 224. : In this course we will explore historic and current classifications and phylogenetic relationships among the major invertebrate groups and focus on unique aspects of their ontogeny and physiology This course aims to provide the student with a comprehensive knowledge of the diversity of invertebrate form and function and to depict particular examples that have been shaped by ecological and/or evolutionary constraints. Students will be expected to understand how morphology and physiology of invertebrate phyla differ between aquatic and terrestrial modes of life.

## BDE 224: Diversiteit en Funksie van Invertebrata

### Kort beskrywing van die module

BDE 224. In hierdie kursus sal ons historiese en huidige klassifikasie en filogenetiese verwantskappe tussen die groot invertebraatgroepe ondersoek en op unieke aspekte van hul ontogenie en fisiologie fokus. Die verdere doel van hierdie kursus is om die student te voorsien van 'n omvattende kennis van die diversiteit van invertebraatvorm en -funksie en spesifieke voorbeelde wat gevorm is deur ekologiese en / of evolusionêre beperkings uitbeeld. Ons verwag dat studente sal verstaan hoe morfologie en fisiologie van invertebraat filums verskil tussen akwatiese en terrestriële lewensvorme.

## Module summary

Name	BDE 224
Duration	1 <sup>st</sup> semester
Type	Compulsory in all BSc programmes
Academic commitment*	16 credits = 160 notional hours 12 hours per week for lectures, tutorials/practicals and studying.
Scheduled learning opportunities	3 lectures per week 1 practical per week
Assessment option	Option 5: Practical mark + A1 and A2 that each cover different parts of the syllabus; A3 covers part of the syllabus.
Language option	Option 3
Mode of offering	Face-2-Face
Corequisites/ Prerequisites/Pass prerequisite	Pass Biology 144 or 154 and a final mark of at least 40% in the other Biology module

*\*Notional hours are the learning time that it would take an average learner to meet the outcomes of the module.*

*\*\*The onus is on the students to ensure that they meet the prerequisites of the module.*

## Module-oorsig

Naam	BDE 224
Duur	1 <sup>st</sup> semester
Tipe	Verpligtend in alle BSc-programme
Akademiese verbintenis*	16 krediete- 160 veronderstelde leerure 12 ure per week vir lesings, tutoriale/praktika en studeer.
Geskeduleerde leergeleenthede	3 lesings per week 1 prakties per week
Assesseringsopsie	Opsie 5: Praktiese punt + A1 en A2 wat elk verskillende dele van die sillabus dek; A3 dek deel van die sillabus.
Taalopsie	Opsie 3
Modus van aanbieding	In persoon
Newevereistes / Voorvereistes / Slaagvoorvereistes**	Slaag Biologie 144 of 154 en 'n finale punt van <b>ten minste 40%</b> in die ander Biologie module

*\*Veronderstelde leerure is die tyd wat die gemiddelde leerder aan die module sal moet spandeer om aan die uitkomst van die module te voldoen.*

*\*\*Die onus rus op die studente om te verseker dat hulle aan die voorvereistes van die module voldoen.*

## Outcomes

At the end of this course, students must

- Demonstrate an understanding of the most recent phylogenetic relationships among and within invertebrate taxa
- Demonstrate an understanding of physiological processes in different phyla
- Critically evaluate the evolutionary and environmental processes and constraints that may have driven evolution of phylogenetic relationships and physiological processes
- Critically evaluate the processes that contributed to the ability for some taxa to have invaded freshwater and terrestrial environments
- Practically assess physiological conditions in selected invertebrate groups.

## Uitkomst

Aan die einde van hierdie kursus moet studente

- Begrip van die mees onlangse filogenetiese verwantskappe tussen en binne ongewerwelde taksa demonstreer
- Begrip van fisiologiese prosesse in verskillende filums demonstreer
- Die evolusionêre en omgewingsprosesse en -beperkings wat evolusie van filogenetiese verwantskappe en fisiologiese prosesse gedryf het, krities te evalueer
- Die prosesse wat bygedra het tot die vermoë vir sommige taksa om varswater en terrestriële omgewings binne te dring krities te evalueer
- Fisiologiese toestande in geselekteerde ongewerwelde groepe prakties te assesseer.

## Scheduled learning opportunities

The official timetable indicating all scheduled learning opportunities and their allocated venues can be accessed via [MySUN](#).

### Lectures

This course consists of 37 lectures, presented face to face, unless indicated otherwise. Lectures are held on Tuesday (9:10-10:00, Room 1030), Wednesdays (11:10-12:00, Room 1030) and Fridays (12:10-13:00, Room 1030) in the Natural Science Building

### Practicals

This course consists of 11 compulsory, face to face practicals. Official practicals are on Mondays (14:10-17:00) in room 2025

## Geskeduleerde leergeleenthede

Die amptelike rooster wat al die geskeduleerde leergeleenthede en die toegewysde venues aandui, is beskikbaar by [MySUN](#).

### Lesings

Die kursus bestaan uit 37 lesings in persoon aangebied sal word, tensy anders aangedui. Lesings vind plaas op Dinsdag (9: 10-10:00, Kamer 1030), Woensdae (11:10-12:00, Kamer 1030) en Vrydae (12:10-13:00, Kamer 1030) in die Natuurwetenskappe-gebou.

### Praktika

Die kursus bestaan uit 11 verpligtende praktika (in persoon aangebied). Amptelike praktika is op Maandae (14: 10-17: 00) in kamer 2025

## Study material

Recommended book is available on short loan in the library. Additional textbooks and published literature have been consulted for this course. Where relevant, students will be able to obtain copied material from the relevant sources (book chapters, manuscripts) from the respective lecturers.

SUNLearn is the official learning management platform of Stellenbosch University. Each module has a dedicated page on this platform which can be accessed via this link: <https://learn.sun.ac.za/>

## Studiemateriaal

Die aanbevole boek is beskikbaar op kort lening in die biblioteek. Addisionele handboeke en gepubliseerde literatuur is geraadpleeg vir hierdie kursus. Waar van toepassing, sal studente in staat wees om gekopieerde materiaal van die onderskeie dosente te verkry uit die relevante bronne (boekhoofstukke, manuskripte).

SUNLearn is die amptelike leerbestuursplatform van die Universiteit Stellenbosch. Elke module het 'n toegewysde blad op hierdie platform met toegang via hierdie skakel: <https://learn.sun.ac.za/>

## Lecturers

### Course coordinator:

Prof. Carol Simon (CS), rm 2044 Natural Sc.Building, [csimon@sun.ac.za](mailto:csimon@sun.ac.za)

### Lecturers:

Prof. S. Daniels (SD), rm 4006\_Natural Sc.Building, [srd@sun.ac.za](mailto:srd@sun.ac.za)

Dr N. Peer (NP), rm 2048 Natural Sc.Building, [npeer@sun.ac.za](mailto:npeer@sun.ac.za)

### Course Assistant:

Mr J Williams, rm 2057 Natural Sc.Building, [jpw@sun.ac.za](mailto:jpw@sun.ac.za)

Details regarding peer-to-peer facilitators will be announced on SUNLearn.

## Dosente

### Kursuskoördineerder:

Prof Carol Simon (CS), kamer 2044 Natuurwetenskappegebou, [csimon@sun.ac.za](mailto:csimon@sun.ac.za)

### Dosente:

Prof. S. Daniels (SD), rm 4006\_Natural Sc.Building, [srd@sun.ac.za](mailto:srd@sun.ac.za)

Dr N. Peer (NP), rm 2046 Natural Sc.Building, [npeer@sun.ac.za](mailto:npeer@sun.ac.za)

### Kurses Assistent:

Mr J Williams, kamer 2057 Natuurwetenskappegebou, [jpw@sun.ac.za](mailto:jpw@sun.ac.za)

Besonderhede rakende eweknie-fasiliteerders sal op SUNLearn aangekondig word.

## Assessment

The dates for all centrally scheduled assessments are published on [My.SUN](#). This module follows assessment option 5. Please see the [Faculty of Science's assessment guidelines](#) for more details.

The module is assessed through two scheduled invigilated, written assessments; the A1 and A2 assessments. These assessments contribute 50% to the final mark. The remaining 50%, known as the 'practical mark', comprises quizzes, worksheets and practical assessments (on SUNLearn or face-to-face).

The A3 assessment is optional, and will serve as a sickness test for the A2 assessment if missed with an appropriate excuse and for students who achieved a final mark of 50% and higher, but less than 45% for the A2 assessment. The A3 covers the same material as A2 (the sicktest for A1 is scheduled as needed).

## Calculation of final marks

To pass the module you need a final mark of 50% AND achieve a minimum of 45% for the A2 assessment.

The assessments are weighted as follows:

Quizzes and spot tests:	5%
Practical reports and worksheets:	25% (spread equally across assessments)
Class Test 1 (SD):	26%
Class Test 2 (CS, NP):	44%
Final mark:	100%

## Assesserings

Die datums van alle sentraal geskeduleerde assesserings word op [My.SUN](#) gepubliseer. Hierdie module volg assesseringsopsie 5. Raadpleeg die [Fakulteit Natuurwetenskappe se assesseringsriglyne](#) vir meer besonderhede.

Die module word geassesseer deur twee geskeduleerde geskrewe assesserings onder toesig; die A1- en A2-assesserings. Hierdie assesserings dra 50% by tot die finale punt. Die oorblywende 50%, bekend as die 'praktiese punt', bestaan uit vasvrae, werkstukke en praktiese assesserings (op SUNLearn of in persoon).

Die A3-assessering is opsioneel, en sal dien as 'n siektetoets vir die A2-assessering indien dit gemis word met 'n gepaste verskoning en vir studente wat 'n finale punt van 50% en hoër, maar minder as 45% vir die A2-assessering behaal het. Die A3 dek dieselfde materiaal as A2 (die siektoets vir A1 word geskeduleer soos nodig).

## Berekening van finale punte

Om die module te slaag benodig u 'n finale punt van 50% EN 'n minimum van 45% vir die A2-assessering.

Die assesserings word soos volg geweeg:

Vasvrae en koltoetse:	5%
Praktiese verslae en werkstukke:	25% (versprei eweredig oor assesserings)
Klas toets 1 (SD):	26%
Klas toets 2 (CS, NP):	44%
Finale punt:	100%

Method of assessment	Description	#	Allocated marks	Criteria	Dates
Spot tests in class or online	Spot tests help students to gauge whether or not they understand the related content (SD,NP,CS)		20 to 30		12 Feb-17 May
Practical report	Arthropod model (SD)	1	30	Compulsory	11 April 16:00
Worksheet	Worksheet completed in practical sessions (SD)	2	20	Compulsory	
Practical Reports	Locomotion (NP)	3	-15	Compulsory	27 March 16:00
	Respiration (NP)	4	-15	Compulsory	18 April 16:00
	Sea Urchin Embryology (CS)	5	30	<b>Any of the 2 of the 3 for CS are Compulsory</b>	23 April 16:00
	Regeneration (CS)	6	30		07 May 16:00
	Sensory perception (CS)	7	30		07 May 16:00
A1 assessment	Scheduled semester test		100		25 April 17:30
A2 assesment	Scheduled semester test		100	<b>Subminimum - 45%</b>	29 May 09:00
A3 assessment	Scheduled semester test (Sick test)		100		tbc

Please see the assessments and promotion chapter in the [SU Calendar Part 1 \(General\)](#) for institutional rules regarding assessments.

Metode van assessering	Beskrywing	#	Punte toegeken	Kriteria	Datums
Koltoetse in klas of aanlyn	Koltoetse om die studente te help om te bepaal of hulle die verwante inhoud verstaan (SD,NP,CS)		20 - 30		12 Feb - 17 Mei
Praktiese verslae	Artropod model (SD)	1	30	Verpligtend	11 April 16:00
Werkstuk	Werkstuk in praktiesesessie (SD)	2	20	Verpligtend	
Praktiese verslae	Voortbeweging verslag (NP)	3	-15	Verpligtend	27 Maart 16:00
	Respirasie verslag (NP)	4	-15	Verpligtend	18 April 16:00
	See kastaing embriologie verslag (CS)	5	30	<b>Enige 2 van die 3 vir CS is verpligtend</b>	23 April 16:00
	Regenerasie (CS)	6	30		07 Mei 16:00
	Sensoriese Persepsie verslag (CS)	7	30		07 Mei 16:00
A1 assessering	Geskeduleerde assessering		100		25 April 17:30
A2 assessering	Geskeduleerde assessering		100	<b>Subminimum - 45%</b>	29 Mei 09:00
A3 assessering	Geskeduleerde assessering		100		tbc

Raadpleeg die hoofstuk oor assessering en promovering in [Deel 1 \(Algemeen\)](#) van die [US Jaarboek](#) vir institusionele reëls oor assesserings.

## Absenteeism (Missed opportunities)

- Reports must be handed in by 16:00 on the day of the deadline. Each lecturer will inform you of how and where they are to be submitted.
- Reports handed in late will have marks deducted at a rate of 5% per day. Reports handed in a week or more late will not be marked.
- In instances where a deadline or practical is missed, an original doctor's certificate must be submitted to Mr Williams within a week.
- If a practical is missed for medical reasons, the student still needs to complete the practical in their own time. If you are unable to make scheduled deadlines you should contact Prof. Simon or the lecturer in charge in advance to make alternative arrangements.

Please see the section 11 of the [SU Calendar Part 1 \(General\)](#) for the institutional rules regarding absence from classes and or tests.

Take note that for any absence from the university *for more than one* teaching, learning or assessment opportunity, for whatever reason, students need to apply for leave of absence from the Registrar's office. If you are absent for exactly one teaching, learning or assessment opportunity you need to consult your lecturer immediately and provide the appropriate evidence as stipulated in the calendar.

## Afwesigheid (die misloop van 'n leergeleentheid)

- Verslae moet ingehandig word teen 16:00 op die dag van die sperdatum. Elke dosent sal u inlig oor hoe en waar verslae ingedien moet word.
- Laat inhandiging sal met 5% per dag beboet word. Praktiese wat 'n week laat ingehandig word sal nie gemerk word nie.
- Indien u afwesig is van 'n prakties, toets of 'n sperdatum mis, sal daar van u verwag word om binne 'n week 'n geldige dokters sertifikaat na Mr. Williams aan te stuur.
- Indien praktika gemis word a.g.v mediese toestande, word daar nog altyd van u verlang om dit in u eie tyd af te handel. Kontak Prof. Simon of die dosent in beheer, vir alternatiewe reëlings, indien sperdatums nie bereik kan word nie.

Raadpleeg asseblief afdeling 11 in [Deel 1 \(Algemeen\) van die US Jaarboek](#) vir die institusionele reëls met betrekking tot afwesigheid van klasse en of toetse.

Neem kennis dat studente by die Registrateur moet aansoek doen vir verlof tot afwesigheid, vir watter rede ook al, van *meer as een* onderrig-, leer-, of assesseringsgeleentheid,

Indien jy afwesig is van presies een onderrig-, leer-, of assesseringsgeleentheid, moet jy die betrokke dosent onmiddellik kontak en die toepaslike bewys van rede tot afwesigheid inhandig, soos uiteengesit in die Jaarboek.

## Communication

The **announcement forum on the SUNLearn module page** is the only official platform that will be used to make announcements relevant to this module. Please check this regularly.

For communication with individual students, lecturers, support staff and peer-to-peer facilitators will only use students' official SUN email addresses.

Students are also requested to use their official **SUN email addresses** for all academic related communication to: **csimon@sun.ac.za**

## Kommunikasie

Die **aankondigingsforum op die SUNLearn moduleblad** is die enigste amptelike platform wat gebruik sal word om aankondigings, wat relevant is vir hierdie module, te maak. Kontroleer dit asseblief gereeld.

Vir kommunikasie met individuele studente, sal dosente, steunpersoneel en eweknie-fasiliteerders slegs studente se amptelike SUN-e-posadresse gebruik.

Studente word ook versoek om hul amptelike **SUN-e-posadresse** vir alle akademiese verwante kommunikasie te gebruik na: **csimon@sun.ac.za**

## Addressing challenges

For any complaints, the first port of call is the class representative or the lecturer. If not satisfactorily resolved, it can be escalated to the Head of Department or [Coordinator: Academic and Student Affairs](#).

## Hantering van uitdagings

Vir enige klagtes, is die klasvertegenwoordiger of dosent die eerste plek om hulp te soek. Indien die probleem nie bevredigend opgelos word nie, kan dit na die Departementshoof of [Koördineerder: Akademiese- en Studentesake](#) verwys word.

## Academic Misconduct

Academic misconduct includes plagiarism, collusion, cheating and fabrication as stipulated in the [Disciplinary code for students of Stellenbosch University](#).

Plagiarism is regarded as a serious offence. More serious cases are handled as set out in the [Stellenbosch University procedure for the investigation and management of allegations of plagiarism document](#). Less serious cases are dealt with by the module coordinator and respective department as set out by the procedures of the faculty.

## Akademiese Wangedrag

Akademiese wangedrag sluit plagiaat samespanning, bedrog en versinsel in, soos bepaal in die [Dissiplinêre kode vir studente van die Universiteit Stellenbosch](#).

Plagiaat word as 'n ernstige oortreding beskou. Ernstiger gevalle word hanteer soos uiteengesit in die [Universiteit Stellenbosch se dokument oor die prosedure vir die ondersoek en bestuur van bewerings van plagiaat](#). Minder ernstige gevalle word deur die modulekoördineerder en betrokke departement hanteer soos uiteengesit in die fakulteitsprosedures.



## Repeaters

Repeaters are expected to attend all practical classes and submit all assignments/practical reports. Exemption from pracs may be granted at the discretion of individual lecturers and confirmed with the module coordinator, **but BEFORE commencement of the sub-module in question.**

## Herhalers

Daar word van herhalers verwag om alle praktiese klasse by te woon en alle werkopdragte/praktiese verslae in te dien. Vrystelling van praktiese klasse kan na goeë dunnke van individuele dosente toegestaan word en met die modulekoördineerders bevestig, **maar VOOR die aanvang van die betrokke sub-module.**

## Lecture programme:

Week	Date	Topic	Lecturer
1	13/02	Environmental considerations, organismic organisation; bilaterally symmetrical animals; proto- and deuterostome animals; interrelationships of phyla & classifications/phylogenies	SD
	14/02		SD
	16/02	Protozoa	SD
2	20/02	Porifera	SD
	21/02	Cnidaria & Ctenophora	SD
	23/02	Platyhelminthes & Nemertea	SD
3	27/02	Lophophorates	SD
	28/02	Mollusca	SD
	01/03	Annelida	SD
4	05/03	Nematoda	SD
	06/03	Arthropoda	SD
	08/03	Tardigrada & Onychophora	SD
5	12/03	Echinodermata	SD
	13/03	Hemichordata and Chordata	SD
	15/03	Intro_Functional diversity	NP
6	19/03	Locomotion	NP
	20/03	Locomotion	NP
	22/03	Locomotion	NP
7	26/03	Respiration	NP
	27/03	Respiration	NP
	29/03 Good Friday		

## RECESS

RECESS			
8	09/04	Respiration	NP
	10/04	Feeding	NP
	12/04	Feeding	NP
9	16/04	Feeding	NP
	17/04	Excretion, ionic & osmotic regulation	SS/CS
	19/04	Regeneration	CS
10	23/04	Reproduction	CS
	24/04	Reproduction (+ collecting data for Regeneration prac)	CS
	26/04	Reproduction (+ collecting data for Regeneration prac)	CS
11	30/04	Development (+ collecting data for Regeneration prac)	CS
	<b>01/05</b>	<b>WORKER'S DAY</b>	
	03/05	Development (+ collecting data for Regeneration prac)	CS
12	07/05	Control systems: nervous system, chemical communication, endocrine system (+ collecting data for Regeneration prac)	CS
	08/05	Control systems: nervous system, chemical communication, endocrine system	CS
	10/05	Control systems: nervous system, chemical communication, endocrine system	CS
13	14/05	Defence	CS
	15/05	Defence	CS
	17/05	Defence	CS

## Practical programme:

Week	Date	Topic	Lecturer
1	12/02	Course admin & David Attenborough video: First life	JPW & CS
2	19/02	Cnidaria + Ctenophora and Porifera (drawings and dissections)	SD
3	26/02	Platyhelminthes and Nematodes (slides) and Annelida dissection	SD
4	04/03	Mollusca - dissections	SD
5	11/03	Arthropod phylogenies - comparative dissection + Echinodermata	SD
6	18/03	Functional diversity - online prac	NP
7	25/03	Locomotion	NP
<b>RECESS</b>			
8	08/04	Respiration	NP
09	15/04	Sea Urchin	CS
10	22/04	Regeneration	SS/CS
11	29/04	Sensory Perception	CS
12	06/05	No formal prac. Complete final practical reports.	CS
13	13/05	No prac	