



Stellenbosch

UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

SCIENCE

EYENZULULWAZI NGEZENDALO

NATUURWETENSKAPPE

BDE (Biodiversity & Ecology) 254 Vertebrate Life 2023

Short description of the module

The module primarily focuses on various aspects of vertebrate life. This includes the origin and diversification of the major vertebrate lineages: fishes, amphibians, reptiles, birds, and mammals. As indicated in the calendar topics covered include characteristic features of vertebrates and their body plans; the broad pattern of the evolutionary relationships of vertebrates; ontogeny of vertebrates and the evolutionary implications of developmental mechanisms; basic anatomy, physiology and evolution of vertebrate organ systems; reproductive biology and strategies. All these aspects are discussed in a phylogenetic framework, and where possible the course is presented following Charles Darwin's perspective about the History of Life.

BDE (Biodiversiteit & Ekologie) 254 Welwerdierlewe 2023

Kort beskrywing van die module

Die module fokus hoofsaaklik op verskeie aspekte van werweldierlewe. Dit sluit die ontstaan en diversifikasie van die belangrikste gewerwelde stamlyne in: visse, amfibieë, reptiele, voëls en soogdiere. Soos in die kalender aangedui, sluit onderwerpe wat gedek word in: onderskeidende kenmerke van gewerwelde diere en hul liggaamsbouplanne; die breë patroon van die evolusionêre verhoudings binne die vertebrate; ontogenie van vertebrate en die evolusionêre implikasies van ontwikkelingsmeganismes; basiese anatomie, fisiologie en evolusie van werweldier-organstelsels; voortplantingsbiologie en -strategieë. Al hierdie aspekte word in 'n filogenetiese raamwerk bespreek, en waar moontlik word die kursus aangebied na aanleiding van Charles Darwin se perspektief oor die Geskiedenis van Lewe.

Module summary

Name	BDE254
Duration	2nd Semester
Academic commitment*	16 credits = 6 contact hours per week
Scheduled learning opportunities	3 lectures per week 1 practical per week
Assessment option	Option 4 (continuous assessment)
Language option	Option 3
Mode of offering	Face-2-Face
Corequisites / Prerequisites / Pass prerequisites**	Biology 124 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 254
Duur	2de semester
Akademiese verbintenis*	16 krediete 6 kontakure per week
Geskeduleerde leergeleenthede	3 lesings per week 1 prakties per week
Assesseringsopsie	Opsie 4 (deurlopende evaluering)
Taalopsie	Opsie 3
Modus van aanbieding	In persoon
Nowereveistes / Voorvereistes / Slaagvoorvereistes**	Biologie 124 of 154 en finale punt van 40% 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 the module students will be expected to have knowledge of the origins and evolutionary history of vertebrates. Students will be able to:

- Discuss the adaptation of vertebrates to aquatic environments (cartilaginous and bony fish)
- Understand the interaction between environment and animals through comparison of the cost of life in terrestrial vertebrates (low cost in amphibians and high cost in birds and mammals).
- Explain the evolution of vertebrate form and function (relationship between morphology and ecology) using bony skeleton specimens.

Uitkomst

Aan die einde van die module sal daar van studente verwag word om kennis te hê van die oorsprong en evolusionêre geskiedenis van werwelidre. Studente sal in staat wees om:

- Die aanpassing van gewerwelde diere by akwatiese omgewings te bespreek (kraakbeen- en beenvisse)
- Die interaksie tussen omgewing en diere verstaan deur die lewenskoste by landwerwelde diere te vergelyk (lae koste by amfibieë en hoë koste by voëls en soogdiere).

Die evolusie van werwelidervorm en -funksie (verwantskap tussen morfologie en ekologie) te verduidelik, deur gebruik te maak van beenskelette.

Scheduled learning opportunities

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

Lectures

All lectures will be presented as live Powerpoint presentations, and these slides (non-narrated) will be made available on SunLearn for study purposes.

Practicals

All practical sessions and discussion/guest lectures are compulsory and may not be missed without excuse.

Geskeduleerde leergeleenthede

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

Lesings

Alle lesings sal as in persoon Powerpoint voordragte aangebied word, en hierdie notas (sonder stemopnames) sal op SunLearn beskikbaar gestel word vir studie doeleindes.

Praktika

Alle praktiese sessies en besprekings / gaslesings is verpligtend en mag nie gemis word sonder 'n verskoning nie.

Study material

The recommended Textbook for this module is **Vertebrate Life**. 10th Edition. Pough F & Janis C 2019. This will be supplemented with relevant journal scientific articles which will be shared with students on the SunLearn platform (<http://learn.sun.ac.za>). It is expected that students will use the resources provided to them.

Studiemateriaal

Die aanbevole handboek vir hierdie module is: "Vertebrate Life" 10de uitgawe, deur Pough F & Janis C (2019). Dit sal aangevul word met relevante wetenskaplike vaktydskrif-artikels wat met studente op die SunLearn-platform (<http://learn.sun.ac.za>) gedeel sal word. Daar word verwag dat studente die hulpbronne wat aan hulle verskaf word, sal gebruik.

Lecturers

Dr RV Rambau (VR) – Course coordinator;
rvr2@sun.ac.za; 021 808 2862; Room 4005, Natural Sciences Building.

Dr AF Flemming (AF); aff@sun.ac.za; Room 1040, Natural Sciences Building

Course assistant

Ms Shula Johnson, shulaj@sun.ac.za, 021 808 3231; Room 2018, Natural Sciences Building.

Dosente

Dr RV Rambau (VR) – kursus koördineerder;
rvr2@sun.ac.za; 021 808 2862; Kamer 4005, NatWet gebou.

Dr AF Flemming (AF); aff@sun.ac.za; Kamer 1040, NatWet gebou

Kursus assistent

Ms Shula Johnson, shulaj@sun.ac.za, 021 808 3231; Kamer 2018, NatWet gebou

Assessment

The dates for all centrally scheduled assessments are published on [My.SUN](#). This module follows assessment option 4 (continuous assessment) . Please see the [Faculty of Science's assessment guidelines](#) for more details.

Method of assessment	Description	Allocated marks	Dates	Criteria
A1 Summative assessment, (SA)	Test on fish biology covered in lectures by RV	15%	29 Aug 14:00 or 17:00	All tests and assignments must be written and handed in AND have FINAL mark of 50% and above to pass the module.
<i>A1 Summative assessment</i>	<i>Test on mammalogy covered in lectures by RV</i>	15%	TBD 18 Sept ??	
A2 Summative assessment)	Test in the "exam period" from lectures covered by AF	20%	15 Nov 09:00	
Video Practical 1 Quiz (Formative assessment, FA)	Video FISH body plan RV	5%	28 Jul 14:00	
Practical 2 and short quiz (FA)	FISH head plan RV-	5 %	4th Aug 14:00	
Seminar 1 (FA)	Fish Ecology- Dr Andriotti	0%	11 Aug 13:00	
Interactive Video (FA)	Video on Mammal Form and Function RV	5%	18 Aug 14:00	
Practical 3 and short quiz (FA)	Mammalian Skeleton – Cranial RV	7.5%	25 Aug 14:00	
Tutorial Assignment / Seminar 2	Review Paper / Dr Leigh Richards	0%	1 Sept 13:00	
Practical 4 and short quiz (FA)	Mammalian DentitionRV	7.5%	8 th Sept 14:00	
Seminar 3	Seminar Dr C Truter (AF)	0%	22 Sept	
Practical 5	Avian bauplan AF	5%	6 th Oct 14:00	
Practical 6+7(FA)	Amphibian bauplan I and II- AF	15	13 & 20 Oct 14:00	

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

Assesserings

Die datums van alle sentraal geskeduleerde assesserings word op [My.SUN](#) gepubliseer. Hierdie module volg assesseringsopsie 4. (deurlopende assessering) Raadpleeg die [Fakulteit Natuurwetenskappe se assesseringsriglyne](#) vir meer besonderhede.

Metode van Assessering	Beskrywing	Punte toegeken	Datums	Kriteria
A1 Summatiewe assessering, (SA)	Toest oor visbiologie soos behandel deur by RV	15%	29 Aug 14:00 or 17:00	Alle toetse en opdragte moet geskryf en ingehandig word EN JY MOET 'n FINALE punt van 50% hê om die module te slaag.
<i>A1 Summatiewe assessering</i>	<i>Toets oor soogdiere soos behandel deur RV</i>	15%	TBD 18 Sept??	
A2 Summatiewe assessering	Toest in die "eksamen-periode" oor lesings behandel deur AF	20%	15 Nov 09:00	
Video Prakties 1 met vasvrae (Formatiewe assessering, FA)	Video oor VIS liggaamsplan RV	5%	28 Jul 14:00	
Prakties 2 met kort vasvrae (FA)	Vis-skedel bouplan RV	5 %	4th Aug 14:00	
Seminaar 1 (FA)	Vis-ekologie- Dr Andriotti	0%	11 Aug 13:00	
Interaktiewe Video (FA)	Video oor Soogdier vorm en - funksie RV	5%	18 Aug 14:00	
Prakties 3 en kort vasvrae (FA)	Soogdier-skelet – kranium RV	7.5%	25 Aug 14:00	
Tutoriaal opdrag / Seminaar 2	Oorsigartikel / Dr Leigh Richards	0%	1 Sept 13:00	
Prakties 4 en kort vasvrae (FA)	Soogdier – Gebit RV	7.5%	8 th Sept 14:00	
Seminaar	Seminaar Dr C Truter (AF)	0	22 Sept	
Prakties 5	Amfibiëer bouplan AF	5	6 th Oct 14:00	
Prakties 6+7 (FA)	Reptiel bouplan I en II- AF	15	13 & 20 Oct 14:00	

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

Calculation of final marks

A1 Class test (RV) 1: 15%
 A1 Class test (RV) 2: 15%
 A2 Class test (AF) 3: 20%

Rambau Practical Reports 30% (5x3 + 7.5x2)

Flemming Practical Reports 20% (5%+15)

Final mark -----
100%

Berekening van finale punte

A1 Klastoets (RV)1: 15%
 A1 Klastoets (RV)2: 15%
 A2 Klastoets (RV)3: 20%

Rambau Praktiese Verslae 30 % (5x3 + 7.5x2)

Flemming Praktiese Verslae 20% (5%+15)

Finale punt -----
100%

Absenteeism (Missed opportunities)

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.

All practical sessions and discussion/guest lectures are compulsory and may not be missed without excuse. In instances where a test or deadline is missed, a valid original doctor certificate is required within five working days after the test/deadline. In special circumstances (e.g. participation in provincial or national sporting events) a letter is required from the sporting body. In these instances, granting of permission to miss tests or deadlines is at the discretion of the course coordinator and is not automatic. If you are unable to make scheduled lectures, practicals or any of the deadlines you should contact Dr Victor Rambau in advance to make alternative arrangements.

Documentation must be handed in to Ms Shula Johnson and a sick test (oral) will normally be held one week (five working days) after the original test date. It is the student's responsibility to determine the time and place of this test. No time extensions will be allowed for handing in practical reports and reports handed in late will not be marked (or a marks penalty will be applied).

Afwesigheid (die misloop van 'n leergeleentheid)

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. Alle praktiese sessies en bespreking/gaslesings is verpligtend en mag nie sonder verskoning gemis word nie. In gevalle waar 'n toets of sperdatum gemis word, word 'n geldige oorspronklike doktersertifikaat binne vyf werksdae na die toets/ sperdatum vereis. In spesiale omstandighede (bv. deelname aan provinsiale of nasionale sportbyeenkomste) word 'n brief van die sportliggaam vereis. In hierdie gevalle is die toekenning van toestemming om toetse of sperdatums mis te loop na goeddunke van die kursuskoördineerder en is dit nie outomaties nie. Indien u nie geskeduleerde lesings, praktiese of enige van die sperdatums kan maak nie, moet u Dr Victor Rambau vooraf kontak om alternatiewe reëlings te tref.

Dokumentasie moet by me Shula Johnson ingehandig word. 'n Siekte toets ('n mondeling) sal normaalweg een week (vyf werksdae) na die oorspronklike toetsdatum gehou word. Dit is die student se verantwoordelikheid om die tyd en plek van hierdie toets te bepaal. Geen tyduitbreidings sal toegelaat word om praktiese verslae in te handig nie en verslae wat laat ingehandig word, sal nie gemerk word nie (of 'n punteboete sal toegepas word).

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: rvr2@sun.ac.za / shulaj@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: rvr2@sun.ac.za / shulaj@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 [Disiplinêre kode vir studente van die Universiteit Stellenbosch](#).

Plagiat 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.

Lecture programme:

Week	Lectures 38 lectures					Practicals	
	Monday 09:00 - 09:50	Wednesday 12:00 - 12:50	Thursday 08:00 - 08:50			FRIDAY 14:00 - 17:00	Practical/Seminar
24 -28 July	VR1 - Fish module intro	VR2- Fish Fish classification and evolution	VR3- Fish Fish - Buoyancy			28 July	Video Fish Body Plan (RV) Quiz
31 July – 4 August	VR4- Fish fish - sensory systems	VR5- Fish Fish - communication	VR6- Fish Fish - communication			4th August	Fish Head Plan (RV) Quiz
07-11 Aug	VR7 - Fish Fish - reproduction	VR- No lecture <i>9th National Womens Day</i>	VR 8- Fish Fish – Respiration			11 August	Seminar 1 Fish Ecology Dr Andriotti
14 -18Aug	VR9 - Fish migration	VR10- Fish diadromy	VR11- Fish Habitat adaptation			18 August	Video Mammal Form and Function Quizz(RV)
21-25 Aug	VR12- Mammals Early Synapsida	VR13- Mammals Emergence of Synapsida	VR14- Mammals Extant Mammals & Diversity			25 August	Mammal Cranial Body Plan Quiz(RV)
28 Aug- 1 September	VR15 Mammals Mammalian Diversity	VR16 Mammals Mammalian Diversity	VR17 Mammals Mammalian Diversity			1 September	Mammal Ecology Seminar Dr Richards
4th – 8th Sept	VR18 Mammals Mammalian specializations	VR 19 Mammals Mammalian specializations	VR20 Mammals Mammalian specializations			8 September	Mammal BodyPlan-Dentition (RV)
11-15 September	University Recess						
18 - 22Sept	VR-21 Mammals Primate Evolution- Latest Dev	VR-22 Mammals Primate Evolution- Latest Dev	VR-23 Mammals Primate Evolution- Latest Dev			22 September	Seminar Dr Flemming Seminar/ Dr Christoff Truter
25-29 Sept	AF - 1 'paleozoic landscape' <i>25 Sept is Public holiday. Fri follows Mon Roster</i>	AF-2 'paleozoic landscape'	AF-3 water to land transition'			29 September No Practical. Follow Monday Roster	29 September No Practical. Follow Monday Roster
2 -6 Oct	AF-4 'amphibian biology'	AF-5 'amphibian biology'	AF-6 'amniote origins and early reptiles'			6 October	Avian Body Plan (AF)
9-13 Oct	AF-7 'amniote origins and early reptiles'	AF-8 'amniote origins and early reptiles'	AF-9 'squamate reptiles'			13 October	Amphibian Body Plan (AF)
16-20 Oct	AF-10 'squamate reptiles'	AF-11 'squamate reptiles'	AF-12 'crocodiles and birds'			20 October	Amphibian body plan (AF)
23- 27 Oct	AF-13 'crocodiles and birds'	AF-14 'crocodiles and birds'	AF-15 'crocodiles and birds'			No Practical End of Term	No Practical End of Term

Lesingsprogram:

Week	Lectures 38 lectures					Praktiess	
	Maandag 09:00 - 09:50	Woensdag 12:00 - 12:50	Donderdag 08:00 - 08:50			FRIDAY 14:00 - 17:00	Praktiess / Seminaar
24 -28 Julie	VR1 - Vis Module -inleiding	VR2- Vis Visklassifikasie en evolusie	VR3- Vis Visdryfvermoë			28 Julie	Vis liggaamsplan (RV) Quiz
31 Julie – 4 August	VR4- Vis Vis - sensoriese sisteme	VR5- Vis Vis - kommunikasie	VR6- Vis Vis - kommunikasie			4th Augustus	Vis Kop (RV) Quiz
07-11 Aug	VR7 - Vis Vis - voortplanting	VR- Geen Lesing 9th Nasienal Vrouemens Dag	VR 8- Vis Vis - asemhaling			11 Augustus	Seminaar 1 Vis Ekologie Dr Andriotti
14 -18Aug	VR9 - Vis Vis - migrasie	VR10- Vis Vis - diadromie	VR11- Vis Vis - habitataanpassing			18 August	Video Soogdier Vorm en Funksie Quizz(RV)
21-25 Aug	VR12- Soogdiere Vroeë Synapsida	VR13- Soogdiere Die opkoms van Synapsida	VR14- Soogdiere Bestaande soogdiere en diversiteit			25 August	Soogdier-liggaamsplan KranialQuiz(RV)
28 Aug- 1 September	VR15 Soogdiere Soogdierverskeidenheid	VR16 Soogdiere Soogdierverskeidenheid	VR17 Soogdiere Soogdierverskeidenheid			1 September	Soogdier Ekologie Seminaar Dr Richards
4th – 8th Sept	VR18 Soogdiere Soogdiere se spesialisasies	VR 19 Soogdiere Soogdiere se spesialisasies	VR20 Soogdiere Soogdiere se spesialisasies			4 September	Soogdier-liggaamsplan Na-Kranial (RV)
11-15 September	University Recess						
18 - 22Sept	VR-21 Soogdiere Primaat-evolusie - Laat Dev	VR-22 Soogdiere Primaat-evolusie - Laat Dev	VR-23 Soogdiere Primaat-evolusie - Laat Dev			22 September	Seminaar Dr Christoff Truter
25-29 Sept	AF - 1 paleozoïese landskap 25 Sept is Publiek Vakansie. Fri volg Maandag Roster	AF-2 paleozoïese landskap	AF-3 'oorgang van water na land			29 September Geen Prakties Volg Maandag Roster	29 September Geen Prakties Volg Maandag Roster
2 -6 Okt	AF-4 Amfibia	AF-5 Amfibia	AF-6 oorsprong van amniote			6 Oktober	Avian Body Plan (AF)
9-13 Okt	AF-7 oorsprong van vroeë reptiele	AF-8 oorsprong van vroeë reptiele	AF-9 Squamata reptiele			13 Oktober	Amphibian Body Plan (AF)
16-20 Okt	AF-10 Squamata reptiele	AF-11 Squamata reptiele	AF-12 Krokodille en Voëls			20 Oktober	Amphibian body plan (AF)
23- 27 Okt	AF-13 Krokodille en Voëls	AF-14 Krokodille en Voëls	AF-15 Krokodille en Voëls			Geen Prakties Einde van Term	Geen Prakties Einde van Term