Biodiversity & Ecology (BDE) 311:
Climate and Global Change Challenges
53953-311, Year 2025

Short description of the module

The study of global change with a biological perspective brings together historical and current evidence for such change and summarises its main drivers. Topics include global climate change, anthropogenic drivers such as pollution, invasion biology, land use and ecosystem change. Data at different spatial and temporal scales and at different levels of biological organisation are covered (from species to communities and ecosystems, and from micro to macroscales), highlighting the technologies and numerical techniques used to study these processes. Examples will have a strong African focus, including case studies from the Western Cape Province from both faunal and floral perspectives. There is a strong emphasis on appropriate communication surrounding all the above topics both among scientists, and between scientists and other stakeholders, including the general public.

Biodiversiteit & Ekologie (BDE) 311:
Uitdagings vir Klimaats-en Globale Verandering
53953-311, Jaar 2025

Kort beskrywing van die module

Die studie van globale verandering met 'n biologiese perspektief bring historiese en huidige bewyse vir sulke verandering bymekaar en som die hoofdrywers daarvan op. Onderwerpe sluit in globale klimaatsverandering, antropogeniese drywers soos besoedeling, indringingsbiologie, grondgebruik en ekosisteemverandering. Data op verskillende ruimtelike en tydelike skale en op verskillende vlakke van biologiese organisasie word gedek (van spesies tot gemeenskappe en ekosisteme, en van mikro- tot makroskale), wat die tegnologieë en numeriese tegnieke beklemtoon wat gebruik word om hierdie prosesse te bestudeer. Voorbeelde sal 'n sterk Afrika-fokus hê, insluitend gevallestudies uit die Wes-Kaap Provinsie vanuit beide fauna- en blomperspektiewe. Daar is 'n sterk klem op toepaslike kommunikasie rondom al die bogenoemde onderwerpe, beide onder wetenskaplikes, en tussen wetenskaplikes en ander belanghebbendes, insluitend die algemene publiek.

Module summary

Name	BDE 311: Climate and Global Change Challenges
Duration	1st semester
Type	Compulsory in all BSc programmes
Academic commitment*	16 credits 4.5 hours per week
Scheduled learning opportunities	3 lectures per week 1 practical per week
Assessment option	Option: 5
Language option	Option 3
Mode of offering	Face-2-Face
Corequisites/ Prerequisites/Pass prerequisit	None

**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 311: Uitdagings vir Klimaats-en Globale Verandering
Duur	1st semester
Tipe	Verpligtend in alle BSc-programme
Akademiese verbintenis*	16 krediete 4.5 ure per week
Geskeduleerde leergeleenthede	3 lesings per week 1 tutoriaal per week
Assesseringsopsie	Opsie : 5
Taalopsie	Opsie 3
Modus van aanbieding	In persoon
Newevereistes / Voorvereistes / Slaagvoorvereistes**	Geen

**Veronderstelde leerure is die tyd wat die gemiddelde leerder aan die module sal moet spandeer om aan die uitkomste 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

- assess historical and current evidence for various kinds of global change;
- critically assess the main drivers of global change;
- apply methods and tools to study global change using various technologies and numerical techniques, including models that project future climate change scenarios;
- construct models and collate data to conduct large-scale analyses with data collected at different spatial scales and at different levels of biological and spatial scales;
- outline what is meant by 'confidence level' within the context of predictions around global change;
- evaluate the distinction between climate change and other anthropogenic processes causing biodiversity loss, such as land utilisation, pollution, and the spread of invasive species and the cumulative impact of anthropogenic impacts on biological systems;
- examine and explain the implications of climatic and anthropogenic stressors within an African context and identify South African examples;
- examine the implications of global change for socio-ecological systems;
- integrate knowledge from other modules in the BDE curriculum with new knowledge on the topics, and begin to communicate their views on these topics to fellow students and scientists, and to the public, based on scientific evidence.

Uitkomste

Aan die einde van hierdie kursus moet studente

- historiese en huidige bewyse vir verskeie soorte globale verandering assesseer;
- die hoofdryfvere van globale verandering krities assesseer;
- metodes en instrumente toepas om globale verandering te bestudeer deur verskeie tegnologieë en numeriese tegnieke te gebruik, insluitend modelle wat toekomstige klimaatveranderingscenario's projekteer;
- modelle konstrueer en data versamel om grootskaalse ontledings uit te voer met data wat op verskillende ruimtelike skale en op verskillende vlakke van biologiese en ruimtelike skale ingesamel is;
- uiteensit wat met 'vertrouensvlak' bedoel word binne die konteks van voorspellings rondom globale verandering;
- die onderskeid tussen klimaatsverandering en ander antropogeniese prosesse wat biodiversiteitsverlies veroorsaak, soos grondbenutting, besoedeling, en die verspreiding van indringerspesies en die kumulatiewe impak van antropogeniese impakte op biologiese sisteme evalueer;
- die implikasies van klimaats- en antropogeniese stressors binne 'n Afrika-konteks ondersoek en verduidelik en Suid-Afrikaanse voorbeelde identifiseer;
- die implikasies van globale verandering vir sosio-ekologiese sisteme ondersoek;
- kennis van ander modules in die BDE-kurrikulum integreer met nuwe kennis oor die onderwerpe, en begin om hul sienings oor hierdie onderwerpe aan medestudente en wetenskaplikes, en aan die publiek te kommunikeer, gebaseer op wetenskaplike bewyse.

Scheduled learning opportunities

The official timetable indicating all scheduled learning opportunities and their allocated venues can be accessed via My.SUN.

Lectures

This course consists of 38 lectures, presented face to face, unless indicated otherwise. All lectures will be held in the **Annex, room 1030, Natural Sceinces** building on Mondays (10:10–11:00), Tuesday (08:10-09:00) and Fridays, (11:10-12:00)..

Practicals

This course consists of 11 compulsory, face to face practicals. Official practicals are on **Wednesday (14:00-17:00) in room 2025 or NARGA B** (Rm 2087, Admin A).
Attendance of all practicals is compulsory.

Geskeduleerde leergeleenthede

Die amptelike rooster wat al die geskeduleerde leergeleenthede en die toegewysde venues aandui, is beskikbaar by My.SUN.

Lesings

Die kursus bestaan uit 38 lesings in persoon aangebied sal word, tensy anders aangedui. Al die lesings word aangebied in die **Anneks, kamer 1030** (Natuurwetenskappe -gebou op Maandae (10:10–11:00), Dinsdae (08:10-09:00,) en Vrydae (11:10-12:00).

Praktika

Die kursus bestaan uit 11 verpligtende praktika (in persoon aangebied). Amptelike praktika is op **Woensdae (14: 00-17: 00) in kamer 2025 of NARGA B** (Rm 2087, Admin A).
Alle praktika is verpligtend

Study material

This module does not make use of a set textbook, as the field of global change pushes forward rapidly and thus cannot be summarised in one book. We make extensive use of reports of the Intergovernmental Panel on Climate Change (IPCC, 2007 and onwards, available online at www.ipcc.ch) and selected journal articles; students will be advised on these, and all articles are made available on the SunLearn platform (http://learn.sun.ac.za). It is expected that students will use the resources provided to them

Studiemateriaal

Hierdie module maak nie gebruik van ´n voorgeskrewe handboek nie, aangesien die veld van globale veranderinge vinnig vorder en dus nie in een boek opgesom kan word nie. Ons maak baie gebruik van verslae van die Inter-regeringspaneel oor Klimaatsverandering (IPCC, 2007 en 2015, aanlyn beskikbaar by www.ipcc.ch) en geselekteerde joernaal artikels; studente sal ingelig word oor hierdie artikels, en alle artikels sal op die SunLearn (http://learn.sun.ac.za) platform beskikbaar gestel word. Daar word van studente verwag om die bronne wat aan hulle beskikbaar gestel word te gebruik

Lecturers

Course coordinator:
Dr Nasreen Peer (NP), rm 2048 Natural Science .Building, npeer@sun.ac.za

Lecturers:
Dr Nasreen Peer (NP), rm 2048 NatSci building, npeer@sun.ac.za
Prof. Susana Clusella-Trullas (SCT), rm 3071 Nat. Sci. Building, sct333@sun.ac.za

Prof. Guy Midgley (GM), rm 2039E Nat. Sci. Building, gfmidgley@sun.ac.za

Prof. Dave Richardson (DR), rm 3037 Nat. Sci. Building, rich@sun.ac.za

Prof. Tammy Robinson-Smythe (TRS), rm 3039 Nat. Sci. Building, trobins@sun.ac.za

Course Assistant:
Ms Fawzia Gordon (FG), rm 3056 Nat. Sci.Building, fg1@sun.ac.za

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

Dosente

Kursuskoördineerder:
Dr Nasreen Peer (NP), kamer 2048 Natuurwetenskappe-gebou, npeer@sun.ac.za

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Kursusassistent:
Me Fawzia Gordon (FG), rm 3056 NatWet-gebou, fg1@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.

In this module you will submit FOUR practical reports, and you might receive spot tests (or peer assessments) throughout the duration of the semester.

There will be two tests as follows:

- SEMESTER TEST (A1):
  *26 March 2025, Wednesday @ 14h00
  This will cover all lecture and practical content up to this date

- FINAL TEST (A2):
  9 June 2025, Monday @ 14h00
  This will cover the remainder of the lecture and practical content

A SECOND OPPORTUNITY/SICK TEST (A3) will take place as follows:
26 June 2025, Wednesday @ 14h00
This is an oral exam, it will cover the entire module and will be taken by all students who missed the A1 or A2 tests and students who received between 40-50% as a final mark.

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

In hierdie module sal jy VIER praktiese verslae indien, en jy sal dalk deur die loop van die semester koltoetse (of portuurassesserings) ontvang.

Daar sal twee toetse soos volg wees:

- SEMESTERTOETS (A1):
  *26 Maart 2025, Woensdag @ 14h00
  Dit sal alle lesing en praktiese inhoud tot op hierdie datum dek

- FINALE TOETS (A2):
  9 Junie 2025, Maandag @ 14h00
  Dit sal die res van die lesing en praktiese inhoud dek

'n TWEEDE GELEENTHEID/SIEKE TOETS (A3) sal soos volg plaasvind:
26 Junie 2025, Woensdag @ 14h00
Hierdie is 'n mondelinge eksamen, dit sal die hele module dek en sal geneem word deur alle studente wat die A1- of A2-toetse misgeloop het en studente wat tussen 40-50% as 'n finale punt ontvang het.

Sien asseblief die assesserings- en bevorderingshoofstuk in die US Jaarboek Deel 1 (Algemeen) vir institusionele reëls rakende assesserings.

Calculation of final marks

The final mark is the sum of your practical assessments (10% each giving you a total of 40%), your A1 test mark (30%) and your A2 test mark (30%) all adding up to 100%. To pass the module you must obtain a final mark of 50%.

Berekening van finale punte

Die finale punt is die som van jou praktiese assesserings (10% elk gee jou 'n totaal van 40%), jou A1-toetspunt (30%) en jou A2-toetspunt (30%) wat saam optel tot 100%. Om die module te slaag moet jy 'n finale punt van 50% behaal.

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 Nasreen Peer in advance to make alternative arrangements.
Documentation must be handed in to Ms Fawzia Gordon 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 Nasreen Peer vooraf kontak om alternatiewe reëlings te tref.
Dokumentasie moet by me Fawzia Gordon 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: npeer@sun.ac.za and fg1@sun.ac.za

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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: npeer@sun.ac.za en fg1@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 klasverteenwoordiger 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.

The SU Policy on Plagiarism defines plagiarism as: "The use of the ideas or material of others [including AI generative tools, such as ChatGPT or Bing] without [appropriate] acknowledgement, or the re-use of one's own previously evaluated or published material without acknowledgement (self-plagiarism)." Such acknowledgement would include referencing the source of previously expressed ideas or published materials, or acknowledging the contribution of e.g. the AI tool, as stipulated for a specific assessment or assignment.

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.

Die US Plagiaatbeleid definiëer plagiaat as: ": Die gebruik van ander se idees of materiaal [insluitend KI generatiewe instrumente, soos ChatGPT of Bing] sonder [toepaslike] erkenning, of die hergebruik van 'n persoon se eie voorheen geëvalueerde werk of gepubliseerde materiaal sonder erkenning (selfplagiaat)." Sodanige erkenning sal insluit die verwysing na die bron van voorheen uitgedrukte idees of gepubliseerde materiaal, of die erkenning van die bydrae van bv. die KI-instrument, soos gestipuleer vir 'n spesifieke assessering of opdrag.

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 must be requested within the first month of the semester.

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 goeddunke van individuele dosente toegestaan word.

2025 BDE 311: Lecture Calendar

LECTURES: Room 1030 (The Annex), Natural Science Building

WEEK	No.	TIME	TOPIC	Lecturer
10-14 Feb	1	Mon (10:10–11:00)	Introduction to course - what is global change	SCT
	2	Tue (08:10-09:00)	Multidimensionality of climate change	SCT
	3	Fri (11:10-12:00)	Multidimensionality of climate change	SCT
17-21 Feb	4	Mon (10:10–11:00)	Extreme climate events	SCT
	5	Tue (08:10-09:00)	Extreme climate events	SCT
	6	Fri (11:10-12:00)	Environment at the scale of the organism	SCT
24–28 Mar	7	Mon (10:10–11:00)	Environment at the scale of the organism	SCT
	8	Tue (08:10-09:00)	Biophysical models	SCT
	9	Fri (11:10-12:00)	Biophysical models	SCT
3–7 Mar	10	Mon (10:10–11:00)	Biophysical models	SCT
	11	Tue (08:10-09:00)	Biophysical models	SCT
	12	Fri (11:10-12:00)	Welcome to the Anthropocene	GM
10-14 Mar	13	Mon (10:10–11:00)	Assessing the evidence base	GM
	14	Tue (08:10-09:00)	Climate models – can we trust them?	GM
	15	Fri (11:10-12:00)	The drivers of global change	GM
17-21 Mar	16	Mon (10:10–11:00)	Loss of biodiversity - why it matters	GM
	17	Tue (08:10-09:00)	Species and ecosystem level responses	GM
		Fri , 21	**No class_** Public Holiday	GM
24-28 Mar	18	Mon (10:10–11:00)	Species and ecosystem level responses	GM
	19	Tue (08:10-09:00)	Ocean acidification	TRS
	20	Fri (11:10 – 12:00)	Sea level rise	TRS
RECESS				
7-11 Apr	21	Mon (10:10–11:00)	Global Change – A broad definition	NP
	22	Tue (08:10-09:00)	Global Change in terrestrial environments	NP
	23	Fri (11:10-12:00)	Global Change in marine environments	NP
14-18 Apr	24	Mon (10:10–11:00)	Species range shifts	NP
	25	Tue (08:10-09:00)	The challenges of studying global change	NP
	26	**Thurs, 17** (11:10-12:00)	**Following Friday roster** -Functional traits	NP

		Fri, 18	**No class**_Good Friday	NP
21-25 Apr		Mon , 21	**No Class**_ Easter Monday -	NP
	27	Tue (08:10-09:00) ()	Global change impacts on humans	NP
	28	Fri (11:10-12:00)	Communicating global change	NP
28 Apr–2 May		Mon	**No class**_Public Holiday -	NP
	29	**Tue 29**, (10:10-11:00)	**Following Monday roster** - The importance of people	NP
	30	Fri (11:10-12:00)	Class debate	NP
5-9 May	31	Mon (10:10–11:00)	Invasion Science – A brief biography	DR
	32	Tue (08:10-09:00)	Invasion Science - Pathways	DR
	33	Fri (11:10-12:00)	Invasion Science - Spread	DR
12-16 May	34	Mon (10:10–11:00)	Invasion Science - Impact	DR
	35	Tue (08:10-09:00)	The IPBES Invasive Species Assessment	DR
	36	Fri (11:10-12:00)	Conflicts of interest in invasive species management	DR

2025 BIOLOGY 311: Practical Calendar

Wednesdays, 14h00 -17h00: NARGA B: Room 2087, Admin A building OR Lab 2025, Natural Science building

DATE	NO.	TOPIC	LECTURER	Venue
12-Feb	1	Choosing a study organism: from simple to complex life cycles	SCT	Lab 2025
19-Feb	2	Field prac (weather and microclimate data collection)	SCT	J Marais park
26-Feb	3	Modelling activity restriction of your study organism	SCT	Lab 2025
5-Mar	4	How to beat climate change	GM	NARGA B
12-Mar	5	Tutorial to support hand-in work	GM	NARGA B
19-Mar	6	Tutorial to support hand-in work	GM	NARGA B
26-Mar	7	A1 Assessment (to consent)	SCT+GM	TBA
RECESS				
9-Apr	8	Species Distribution Modelling	NP	NARGA B
16-Apr	9	Debate – multiple perspectives around an issue	NP	Lab 2025
23-Apr	10	The Community Voice Method – screening/discussion	NP	Lab 2025
7-May	11	Visit to the Botanical Gardens	DR	Bot Gardens
14-May	12	Visit to the Eerste Rivier	DR	Field