

BDE264 Diversity of Plant Form and Function

Short description of the module

Plants occupy the most diverse habitats on earth. A wide range of morphological and physiological adaptations are required to conquer these habitats. The diversity of plant form and function will be explored as interlinked themes to understand how plants grow, respond to natural cycles, capture resources and survive in adverse conditions. The theory and practicals will explore each theme in a complementary way that will include formal lectures, group discussions, laboratory and field experiments.

BDE264 Diversiteit van Plantvorm en - Funksie

Kort beskrywing van die module

Plante beset die mees uiteenlopende habitatte op aarde. 'n Wye reeks morfologiese en fisiologiese aanpassings word vereis om onder sulke omstandighede te oorleef. Die diversiteit van vorm en funksie word as verwante temas ondersoek ten einde te verstaan hoe plante groei, op siklusse in die natuur reageer, hulpbronne bekom en onder ongunstige toestande oorleef. Teorie en praktika vul mekaar aan deur formele lesings, groepbesprekings en laboratorium- en veldeksperimente.

Module summary

Name	BDE 264 Biodiversity of Plant Form and Function
Duration	2 nd Semester
Academic commitment*	16 credits = 160 notional hours
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 prerequisites**	Biology 144 or 154 and a final mark of at least 40% in the other Biology module A sub-minimum of 35% in both the test and the assignment is required

**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 264 Biodiversiteit van Plantvorm en - Funksie
Duur	2 ^{de} Semester
Akademiese verbintenis*	16 krediete = 160 veronderstelde ure
Geskeduleerde leergeleenthede	3 lesings per week 1 prakties per week
Assesseringsopsie	Opsie 5
Taalopsie	Opsie 3
Modus van aanbieding	In persoon
Newevereistes / Voorvereistes / Slaagvoorvereistes**	Biologie 144 of 154 met 'n finale punt van minstens 40% in die ander Biologie-module 'n Subminimum van 35% in beide die toets en die werkopdrag word vereis

**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

The aims of this module are to explore the diversity of plant form and function to understand how plants grow, respond to natural cycles, capture resources and survive in adverse conditions.

After completion of this course you should:

- master the integration of morphological and physiological evolution across the embryophytes
- relate the diversity of plant form to functionality
- interpret the structure of plants at the anatomical and morphological levels (organelles, cells, tissues, organs)
- integrate the structural understanding with the physiological (hormonal) processes at all of these levels
- understand how plants utilise and exploit the biotic and abiotic environments via structural and physiological adaptations
- think and communicate laterally and critically about plant form and function

Uitkomst

Die doel van die module is om die diversiteit van plant vorm en funksie te ondersoek om te verstaan hoe plante groei, reageer op natuurlike siklusse, hulpbronne vasvang en onder ongunstige toestande oorleef.

Na voltooiing van hierdie kursus behoort u:

- die integrasie van morfologiese en fisiologiese evolusie oor die embriofiete te bemeester
- die verskeidenheid plantvorme in verband te bring met funksionaliteit
- die struktuur van plante op anatomiese en morfologiese vlak (organelle, selle, weefsels, organe) te interpreteer
- die strukturele begrip te integreer met die fisiologiese prosesse op al hierdie vlakke
- te verstaan hoe plante die biotiese en abiotiese omgewings benut en benut deur strukturele en fisiologiese aanpassings
- lateraal en krities oor plantvorm en –funksie te dink en te kommunikeer

Scheduled learning opportunities

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

Lectures

The course comprises 38 lectures and 11 practicals. Lecture times are Tuesdays (9h10-10h00), Wednesdays (11h10 – 12h00) and Fridays (12h10-13h00) in the Natural Science Building (Broom Lecture theatre, room 2020).

Practicals

The course includes 11 practical sessions, and the completion of all of these practicals is COMPULSORY. Official practical sessions are on Monday afternoons (14h00-17h00).

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 en 11 praktika. Lesingtye is Dinsdae (9h10-10h00), Woensdae (11h10 – 12h00) en Vrydae (12h10-13h00) in die Natuurwetenskappe gebou (Broom lesingsaal, kamer 2020).

Praktika

Die kursus bestaan uit 11 praktika sessies, en die voltooiing van al hierdie praktika is VERPLIGTEND. Amptelike praktiese sessies is Maandag middag (14h00-17h00).

Study material

Prescribed textbook: Plant Physiology and Development. 2017. Taiz et al..

Complimentary textbook: Anatomy of flowering plants. 2007. Rudall

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

Voorgeskrewe handboek: Plant Physiology and Development. 2017. Taiz et al.

Aanvullende handboek: Anatomy of flowering plants. 2007. Rudall

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 NP Makunga (NPM)

makunga@sun.ac.za

Lecturers:

Prof LL Dreyer (LLD)

ld@sun.ac.za

Dr. Itumeleng Moroenyane (IM)

imoroenyane@sun.ac.za

Course assistant:

Mrs Janette Hutton / Mrs. Megan Mathese

Janette@sun.ac.za / megank@sun.ac.za

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

Dosente

Kursus koördineerder: Prof NP Makunga (NPM)

makunga@sun.ac.za

Lektore:

Prof. LL Dreyer (LLD)

ld@sun.ac.za

Dr. Itumeleng Moroenyane (IM)

imoroenyane@sun.ac.za

Kursus assistent:

Mrs Janette Hutton / Mrs. Megan Mathese

Janette@sun.ac.za / megank@sun.ac.za

Besonderhede rakende eweknie-fasiliteerders sal op SUNLearn aangekondig word.

Assessment

This module follows assessment option 5. Please see the [Faculty of Science's assessment guidelines](#) for more details.

Method of assessment	Description	#	Allocated marks	Criteria	Dates
Assignment	Assignment	1	25%		27 Sep
A1 assessment	Scheduled invigilated evening assessment, on campus, closed-book.	1	25%		01 Oct
A2 assessment	Scheduled invigilated assessment, on campus, closed-book.	1	50%		01 Nov @ 14:00pm

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

Calculation of final marks

Test 1 (Based only on Prof. Dreyer's lectures).....25%
 Test 2 (Based on Prof. Makunga and Dr. Moroenyane's lectures).....50%
 Practical Assignment (IM).....25%

Final Mark.....100%

In order to pass the module, you need to **complete all the assessments** and achieve a *Final Mark* of at least 50%.

Assesserings

Hierdie module volg assesseringsopsie 5. Raadpleeg die [Fakulteit Natuurwetenskappe se assesseringsriglyne](#) vir meer besonderhede.

Metode van assessering	Beskrywing	#	Punte toegeken	Kriteria	Datums
Taak	Taak	1	25%		27 Sep
A1 assessering	Geskeduleerde assessering wat in die aand onder toesig op kampus plaasvind, toeboek.	1	25%		01 Okt
A2 assessering	Geskeduleerde assessering wat onder toesig op kampus plaasvind, toeboek.	1	50%		01 Nov @ 14:00 nm

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

Berekening van finale punte

Toets 1 (Gebaseer slegs op Prof. Dreyer se lesings)..... 25%
 Toets 2 (Gebaseer op Prof. Makunga en Dr. Moroenyane se lesings).....50%

Praktiese Assessering (IM).....25%

Finale Punt.....100%

Om hierdie module te slaag, **moet jy al die assesserings voltooi** en 'n Finale punt van ten minste 50% verwerf.

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. 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.

When you miss a test or deadline, you must hand in a valid original medical certificate to Megan Mathese (megank@sun.ac.za)

within one week of the test or hand-in date. 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 co-ordinator, and is not automatic.** It is your own responsibility to make sure that you know the time and place of each test and exam.

Reports handed in late will have marks deducted at a rate of 5% per day. Reports handed in a week or more after the deadline will not be marked. If a practical is missed for medical reasons, the student needs to complete the practical on his/her own time and valid original medical certificate presented within 2 days from absence.

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.

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.

Wanneer jy 'n toets of sperdatum mis, moet jy 'n oorspronklike geldige mediese sertifikaat aan Megan Mathese (megank@sun.ac.za) oorhandig **binne een week van die toets of inhandigingsdatum.** Onder spesiale omstandighede (bv. deelname aan provinsiale of nasionale sportbyeenkomste) word 'n brief verlang van die sportbeheerliggaam. **In hierdie gevalle is die toestaan van vergunning om 'n toets of sperdatum te mis mag word, onderhewig aan die goeddenke van die kursuskooördineerder, en gebeur dit nie outomaties nie.** Dit is jou verantwoordelikheid om seker te maak dat jy weet waar en wanneer elke toets en eksamen geskryf word.

Verslae wat laat ingehandig word, sal onderhewig wees aan aftrekking van punte teen 5% per dag. Verslae wat 'n week of meer na die sperdatum ingehandig word sal nie gemerk word nie. Indien 'n prakties vir mediese redes gemis word, word daar van die student verwag om die prakties in sy/haar eie tyd te voltooi en 'n geldige, oorspronklike mediese sertifikaat moet binne 2 dae na die afwesigheid ingehandig 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: Prof. Makunga (makunga@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: Prof. Makunga (makunga@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 klasverteenvoordiger 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.

Repeaters

Students repeating this module, may contact Prof. Makunga to apply for exemption of the practical.

Akademiese Wangedrag

Akademiese wangedrag sluit plagiaat samespanning, bedrog en versinsel in, soos bepaal in die [Dissiplinêre kode vir studente van die Universiteit Stellenbosch](#). Die [SU Beleid oor Plagiat](#) definieer plagiaat as: "Die gebruik van die idees of material van anders (insluitende KI generatiewe gereedskap, soos ChatGPT of Bing) sonder [toepaslike] erkenning, of die hergebruik van 'n mens se eie voorheen geëvalueerde of gepubliseerde materiaal sonder erkenning (selfplagiat)." 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.

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 plagiat](#). Minder ernstige gevalle word deur die modulekoördineerder en betrokke departement hanteer soos uiteengesit in die fakulteitsprosedures.

Herhalers

Studente wat hierdie module herhaal, mag Prof. Makunga kontak en aansoek doen vir vrystelling van die prakties.

Lecture schedule

Prof. LL Dreyer					
Day	Week 1 (22/07 – 26/07)	Week 2 (29/07 – 02/08)	Week 3 (05/08 – 09/08)	Week 4 (12/08 – 16/08)	
Tuesday	Plant anatomy - introduction	Dermal tissue	Ground tissue	Vascular tissue	
Wednesday	Plant meristems	Dermal tissue	Ground tissue	Vascular tissue	
Friday	Plant meristems	Dermal tissue	Public Holiday (Friday timetable on Monday 05/08), Ground tissue	Vascular tissue	
Prof. NP Makunga					
Day	Week 5 (19/08 – 23/08)	Week 6 (26/08 – 30/08)	Week 7 (02/09 – 06/09)	Week 8 (16/09 – 20/09)	
Tuesday	Introduction to plant growth and development	Plant growth and development: Cytokinins	Plant growth and development: Ethylene	Plant growth and development: Phytochrome	
Wednesday	Plant growth and development: Auxins	Plant growth and development: Gibberellins	Plant growth and development: Ethylene	Plant growth and development: specialized metabolism	
Friday	Plant growth and development: Auxins	Plant growth and development: Gibberellins and abscisic acid	Plant growth and development: Phytochrome	Plant growth and development: specialized metabolism	
Dr. Moroenyane					
Day	Week 9 (23/09 – 27/09)	Week 10 (30/09 – 04/10)	Week 11 (07/10 – 11/10)	Week 12 (14/10 – 18/10)	Week 13 (21/10 – 25/10)
Tuesday	Public Holiday (No lecture)	Biotic interactions: harmful interactions	Biotic interactions: Plant defenses against pathogens	Abiotic stress: acclimation and adaptation	Abiotic Stress: Mechanism that protect plants
Wednesday	Introduction to Biotic interactions	Biotic interactions: Inducible defense response (Herbivory)	Biotic interactions: Plant defense against other organism	Abiotic stress: signaling pathways	Abiotic Stress: Mechanism that protect plants
Friday	Biotic interactions: beneficial interactions	Biotic interactions: Plant defenses against pathogens	Introduction to Abiotic stress	Abiotic stress: signalling pathways	Discussion on plant tolerance to abiotic and biotic stress

Lesingskedsule

Prof. LL Dreyer					
Dag	Week 1 (22/07 – 26/07)	Week 2 (29/07 – 02/08)	Week 3 (05/08 – 09/08)	Week 4 (12/08 – 16/08)	
Dinsdag	Plant anatomie - inleiding	Dermale weefsel	Grond weefsel	Vaatweefsel	
Woensdag	Plant meristeme	Dermale weefsel	Grond weefsel	Vaatweefsel	
Vrydag	Plant meristeme	Dermale weefsel	Publieke Vakansiedag (Vrydag rooster op Maandag 05/08), Grond weefsel	Vaatweefsel	
Prof. NP Makunga					
Dag	Week 5 (19/08 – 23/08)	Week 6 (26/08 – 30/08)	Week 7 (02/09 – 06/09)	Week 8 (16/09 – 20/09)	
Dinsdag	Inleiding tot plantgroeï en -ontwikkeling	Plantgroeï en ontwikkeling: Sitokiniene	Plantgroeï en ontwikkeling: Etileen	Plantgroeï en ontwikkeling: Fitochroom	
Woensdag	Plantgroeï en ontwikkeling: Ouksiene	Plantgroeï en ontwikkeling: Gibberelliene	Plantgroeï en ontwikkeling: Etileen	Plantgroeï en ontwikkeling: Gespesialiseerde metabolisme	
Vrydag	Plantgroeï en ontwikkeling: Ouksiene	Plantgroeï en ontwikkeling: Gibberelliene en absiensuur	Plantgroeï en ontwikkeling: Fitochroom	Plantgroeï en ontwikkeling: Gespesialiseerde metabolisme	
Dr. Moroenyane					
Dag	Week 9 (23/09 – 27/09)	Week 10 (30/09 – 04/10)	Week 11 (07/10 – 11/10)	Week 12 (14/10 – 18/10)	Week 13 (21/10 – 25/10)
Dinsdag	Publieke Vakansiedag (Geen lesing)	Biotiese interaksies: skadelike interaksies	Biotiese interaksies: Plant verdediging teen patogene	Abiotiese stres: akklimatisering en aanpassing	Abiotiese stres: Meganisme wat plante beskerm
Woensdag	Inleiding tot Biotiese interaksies	Biotiese interaksies: Induseerbare verdedigingsreaksie (Herbivoor)	Biotiese interaksies: Plant verdediging teen ander organisme	Abiotiese stres: seinpaaie	Abiotiese stres: Meganisme wat plante beskerm
Vrydag	Biotiese interaksies: voordelige interaksies	Biotiese interaksies: Plant verdediging teen patogene	Inleiding tot Abiotiese stres	Abiotiese stres: seinpaaie	Bespreking oor plantverdraagsaamheid vir abiotiese en biotiese stres

Practical programme

Date	Week	Lecturer	Theme
22 Jul	1		Introduction to BDE264 Assignment due on 27 September 2024
29 Jul	2	LLD	Stems
5 Aug	3	LLD	No practical, Friday timetable
12 Aug	4	LLD	Roots
19 Aug	5	LLD	Leaves
26 Aug	6	NPM	Growth and development: Seed germination
02 Sep	7	NPM	Growth and development: Floral longevity
09 Sep		Recess	No Practical
16 Sep	8	NPM	Field trip
23 Sep	9	NPM	Growth and development: Data collection and Phytochemical extraction
30 Sep	10	IPM	Introduction to plant stress physiology: AMF colonisation and staining (Biotic Interactions)
07 Oct	11	IPM	Biotic interactions: Rhizosphere diversity and carbon use
14 Oct	12	IPM	Abiotic Stress: Measuring plant physiological response to heat/drought stress
21 Oct	13	IPM	Poster presentation

Praktiese program

Datum	Week	Lektor	Tema
22 Jul	1		Geen prakties
29 Jul	2	LLD	Stingels
5 Aug	3	LLD	Vrydag rooster, geen prakties
12 Aug	4	LLD	Wortels
19 Aug	5	LLD	Blare
26 Aug	6	NPM	Groei en ontwikkeling: saadontkieming
02 Sep	7	NPM	Groei en ontwikkeling: blom-langlewendheid
09 Sep		Vakansie	Geen prakties
16 Sep	8	NPM	Uitstappie
23 Sep	9	NPM	Groei en ontwikkeling: fitochemiese ekstraksie
30 Sep	10	IPM	Inleiding tot plantstresfisiologie en praktiese oorsig: AMF kolonisasie en kleuring (Biotiese interaksies)
07 Oct	11	IPM	Biotiese interaksies: Risosfeerdiversiteit en koolstofgebruik
14 Oct	12	IPM	Abiotiese stres: Meting van plantfisiologiese reaksie op hitte/droogte stres
21 Oct	13	IPM	Plakkaart voorlegging