Update: 26 April 2022

Honours BDE Course 2022

(Biodiversity and Ecology 778)
Botany and Zoology Department
Stellenbosch University
(53953-778)

Dear Students, welcome to the BDE Honours course! We hope that 2022 will be an enjoyable and enriching experience for all of you.

This document contains all the information you will need about the Honours course. If there are any **queries** about the course they should be directed to the

Honours Co-ordinator: Dr **Victor Rambau**,
Rm 4004, rvr2@sun.ac.za, Tel: 021 808 3586 / 084 298 8139 **OR**

Honours Administrator: Ms **Fawzia Gordon**,
Rm 3056, fg1@sun.ac.za, Tel 021 808 2402 / 083 611 0644.

The Honours course runs over one year and through a combination of independent research, skills development and theoretical training, aims to develop an enhanced understanding of scientific theory and practice. Students should emerge with a broad theoretical grasp of diverse topics in ecology and evolution and the skills and ability to design and conduct rigorous scientific research. Successful completion of the Honours course will allow students the opportunity to study further for an academic degree (MSc and PhD).

The Honours course is divided into several theory modules, generic skills and a research project. Most of the lectures / contact sessions will be presented in Room 1010. The research project component forms 50% of the final course mark and is thus of primary importance. Students should decide on research topics early and allocate about half (or more) of their time throughout the course to the research component. It is essential that students manage their time accordingly. Alongside the research, students will attend a number of courses designed to provide some of the basic skills of a scientist (e.g. writing, analysis, communication) as well as a series of theoretical modules where students will explore the primary literature with the guidance of the relevant experts in the department. There are also opportunities for outreach, which all students are expected to attend.

In addition to these core requirements students are all expected to demonstrate on an undergraduate course during the second semester. Students will be paid to do this and should consult Mari Sauerman about possibilities. It is also important to consult with your project supervisors about this. EVERY honours student must attend ALL departmental seminars (usually Wednesday at 1pm, although on occasions this may differ; you will be informed via the departmental email list).

SUMMARY OF IMPORTANT DATES

(update 30 March 2022)

			BDE HONOURS 2022		
			TIMETABLE SUMMARY		
			Update: 2022-03-30		
	Updatd changes				
	2022				Lectures 10wk, exam 1wk
	Month & Date	**Day**	**Lecture / Event**	**Time**	**Venue**
	Feb 07	**Mon**	**Welcome , Course outline & Dept Intro**	10H00 - 11h30	Room 2020, NatSci Bldg
	Feb 07	Mon	Project Presentations from Supervisors	11h30 -13h00	Room 2020, NatSci Bldg
	Feb 07- Feb 11	Mon-Fri	Meeting Supervisors	On your own time	
	Feb 14- Mar 14	**Mons & Weds**	**Biostatistics Course** **Prof Tammy Robinson-Smythe**	09h00 -13h00	NARGA B, Rm 2087 Admin A
	Feb 16	Wed	Library Orientation (Marie Theron)	14h00 -15h00	E-Learn , BIB
	Feb 17, 24 & Mar 3	**Thurs'**	**Philosophy of Science (1-3) @ 10h00 -13h00** **Dr Jurie van den Heever**	10h00 -13h00	Room 1025, NatSciBldg
	Feb 15	Tues	Ethical Approval & Permits (Victor Rambau)	10h00-11h00	Room 2025, NatSciBldg
	Feb 15	Tues	Ethical Approval & Permits (Winston Beukes)	11h00-12h00	Room 2025, NatSciBldg
	Feb 18	Fri	Time Management workshop (Mathilda Van der Vyver)	10h00 - 1300	Room 2025, NatSciBldg
	Feb 23	Wed	Communictaion in Science 1: Scientific writing (Savel Daniels)	14h00 -15h00	Room 2025, NatSciBldg
	Mar 04	Fri	Careers in Conservation & Ecology (Ernst Baard)	10h00-11h00	Room 3004, NatSci Bldg
	Mar 09	Wed	Communication in Science 2: Popular science writing (Dane McDonald)	14h00 - 16h00	Room 2025, NatSciBldg
	Mar 14	**Mon**	**Biostats EXAM: 09h00 -13h00**	09H00 -13h00	NARGA B
	Mar 10, 17	Thurs	Paleontology of the Karoo lecture (1-2) (Jurie van den Heever)	10H00 -13h00	Room 1025, NatSciBldg
	Mar 20	Sun	**Project Proposal Hand -in (DRAFT to Supervisor)**		
	Mar 21 - 26	**Mon-Sat**	**Karoo Field Trip (Jurie van den Heever)**	07h00 (Mon)	
	Mar 26 - Apr 03		*University Holidays 1*		
	Mar 26 - Apr 04		*School Holidays 1*		
	Apr 04-08	Mon -Fri	Graduation 2nd: Science Wed 6 Apr @ 09:00		
	Apr 03	**Sun**	**Project Proposal Hand -in (FINAL to Fawzia)**	07h00	
	Apr 03- Apr 08	**Sun-Mon**	**Evol Ecol Fieldtrip (Bruce Anderson)**	10h00	
	Apr 12 - June 28	**Tues'**	**Module 1: Biodiversity & Systematics Lectures**	10h00 -13h00	Room 1010, NatSciBldg
	Apr 13	Wed	Communication in Science 3: Social media (Nox Makunga)	10h00- 12h00	Room 2025, NatSciBldg
	Apr 13	**Wed**	**Internal markers return marked proposals to Fawzia**		
	Apr 14 - Jul 01	**Fri**	**Module 2: Evolutionary Ecology Lectures**	10h00 -13h00	Room 1025, NatSciBldg
	Apr 15 - Apr 18	*Fri- Mon*	*Easter holiday*		
	Apr 20	**Wed**	**Project Proposal Presentations @ 13h00 -16h00**	13h00 - 16h00	Teams/ Venue
	Apr 21	**Thur**	**Project Proposal Presentations @ 13h00 -16h00**	13h00 - 16h00	Teams/ Venue
			The week of the presentations, no lectures		
			Note: 27 Apr (Wed) & 2 May (Mon) Public holiday		
	May 18	**Wed**	Book Review # 1: (Victor Rambau)	09h00-11h00	
	June 25 - Jul 17		*University Holidays 2*		
	June 25 - Jul 18		*School Holidays 2*		
	June 28	Tues	**EXAM: Biodiversity & Systematics**		
	July 01	Fri	**EXAM: Evolutionary Ecology**		
	Jul 02 - 11		***Honours Mid Year Recess:***		
	Jul 12 - Sep 27	Tues'	**Module 3: Plant Animal Environment**	10h00 -13h00	
	Jul 15 - Sep 30	Fri's	**Module 4: Global change**	10h00 -13h00	
	Sep 03 - Sep 11		*US holidays 3*		
	Oct 01 - Oct 10		*School Holidays 3*		
	Sep 27	Tues	**EXAM: Plants Animals Extreme Environm**		
	Sep 30	Fri	**EXAM: Global Change Biology**		
	Oct 04	Tues	Book Review # 2: (Mike Cherry)		
	Oct 11	Tues	Oral Exam		
	Oct 13	Thurs	General Written Exam		
	Nov 02	**Wed**	**Project Final Article Hand In to Fawzia**		
	Nov 10	Thurs	Internal markers return marked final article to Fawzia		
	Nov 17	**Thurs**	**ARM: Honours Presentations**		
	Nov 18	**Fri**	ARM continues		
	Nov 22	**Tues**	**Honours Marks to be loaded on system**		
	Dec 05 - 09	Mon-Fri	Graduation (Science ??)		

RESEARCH PROJECT (55867-717) 60 credits

Students are required to each conduct an independent research project. Many research topics are available in the department, but students are also encouraged to develop their own research questions. Early on in the course students should speak to the relevant academics in order to decide on a research topic. The research project accounts for 50 % of the total course mark and as such is the most critical part of the Honours year. Although the final written project report (written as a scientific paper) forms the bulk of the mark, students are also required to submit a written project proposal (maximum 20 double spaced pages), present their proposed research verbally to the department and present their results at the department research meeting at the end of the academic year.
See link for research project opportunities:
http://www.sun.ac.za/english/faculty/science/botany-zoology/research

GENERIC SCIENTIFIC SKILLS (66184-715) 24 credits

STATISTICS: Experimental design and data analysis are arguably the most important skills required by any scientist and thus this forms the bulk of the generic module requirements for the Honours course. An intensive introductory statistics course will run for the first 4 weeks (two four hour sessions on Mondays & Wednesdays) of term presented by Prof Tammy Robinson-Smythe (TR).
{An exam is associated with this component of the generic module}

ETHICS & PERMITS: (RVR
General lecture will be presented by Dr Victor Rambau.

COMMUNICATION IN SCIENCE : During the course of the Honours year students will be required to read many scientific papers and to distinguish good from weak ones. Students will receive a library tour and guidance on effective reading, searching and evaluating literature. Students will also receive training in scientific writing and presentation skills.

PHILOSOPHY: Students will receive four lectures and a series of discussion sessions around a selected philosophy of science book presented by Dr Jurie van den Heever (JvdH).
{1 assignment}

BOOKS: Two books will be assigned which students will be required to read during the course of the year. There will be a group discussion session around each of the books. Questions on all books will be asked in the general written exam}

FIELDTRIP: All students are required to attend a six day fieldtrip running from 21 to 26 March 2022 under the supervision of Dr Jurie van der Heever (JvdH). This will take students through diverse Cape landscapes in search of fossils and all array of extant biota.
{1 popular science article on some aspect of the fieldtrip}

DEMI TRAINING: Will be given before the start of the 2nd semester first year practicals

EXAMINATION

The generic skills modules will be assessed as follows:

1. Statistics exam - students will be required to complete a hands-on exam on the statistics material covered during the course.
2. Popular scientific article – students will be required to write a popular scientific article (such as published in Veld and Flora) based on something they encounter during the Karoo fieldtrip which catches their interest. These are not just trip reports, but will also require some additional literature research by the students.
3. Philosophy assignment. Will be announced by Dr Jurie van den Heever
4. General written exam – this will comprise essay questions designed to test students' general understanding of broad currently relevant aspects of biology. It will draw on experience gained during the generic modules, the choice modules and student's continued reading of the newspapers and tabloid scientific literature. In addition students will be required to answer an essay question on one (or more) of the allocated set books.
5. General oral exam – students will be required to answer questions posed by a panel of three or four academics. These questions will probe students' general understanding and ability to build logical arguments about broad topics in biology. The oral exam will also provide students with experience of an interview situation, something that they're likely to encounter during their future careers.

OTHER:

CONFERENCE ATTENDANCE**:**

Students may attend a conference of their choice on their own costs or supervisor's costs.

Fynbos Forum: 5 – 9 September, Club Mykonos, Langebaan.

THEORETICAL TOPICS IN BIODIVERSITY SCIENCES (12249-796) 36 credits

Members of the academic staff present focused, integrated, interactive modules in their fields of expertise designed to provide in-depth exposure to theory and/or relevant techniques in the Biodiversity Sciences. **Students choose 3 of the 4 broad subject areas listed below**. The range of material covered under each topic will provide students with the requisite breadth of exposure to key concepts in ecology and evolution.

Each module meets for a three- hour session once a week and students are expected to do all the requisite reading/assignments between each meeting. Each course should occupy 25% of your time, allowing you to work in parallel on your research projects. It is essential that students manage their time accordingly. In some instances (e.g. extended fieldtrips) it may be necessary to miss module contact sessions – if this is necessary it is essential that students clear this with their supervisor and the Honours co-ordinator timeously, so that alternative plans can be made.

Each course will be evaluated by means of a written exam and an assignment(s). In addition, students will receive a mark for their participation in the contact sessions. Student must attain a subminimum of 45% for each choice module and 50 % overall average for the three modules. The module choices are listed below:

(1) Biodiversity and Systematics
Co-ordinator: Victor Rambau
Teachers: Victor Rambau, Sophie von der Heyden, Conrad Matthee & Leanne Dreyer,
Dates: 12 April – 28 June 2022
Lectures are on Tuesdays @ 10h00 – 13h00

The Biodiversity and Systematics module essentially covers four areas: chromosomal speciation (mammals), phylogenetics and phylogeography. The fourth aspect that is discussed is an overview (with case studies) of Cape floral diversity. The aim of the module is to provide the basis of the evolutionary processes that give rise to extant biodiversity which is estimated at approximately 8 million species. Some recent indications are that 86% terrestrial and 91% marine species have yet to be discovered and described. Modern species descriptions (documentation of biodiversity) take into account evolutionary history and in this module we focus on such a systematic approach. The content of this module partly builds on the foundations laid in the third year module, Evolutionary Principles and Processes. Although this module is presented by different lecturers, there is overlap in topics that are covered and therefore it is expected that some of the study material will reflect this.

(2) Evolutionary Ecology of Plants and Animals
Co-ordinator: Bruce Anderson
Teachers: Bruce Anderson, Theresa Wossler and Anton Pauw,
Dates: 08 April – 01 July 2022
Lectures are on Fridays @ 10h00 – 13h00

How do everyday events create the wonderful diversity of species, form and behaviour that we see around us today? Can we, through observing the lives of animals and plants around us, make sense of the long tails of sugarbirds, the scent of flowers, and the asexuality of the worker bee. The answers often come by studying natural selection acting on the trait of interest – this is how ecology translates into evolutionary change, or even speciation.

This year module will cover the following three areas: pollination networks – a geographic perspective (includes a fieldtrip) , study natural selection in the wild and the importance of honeybees as pollinators in natural habitats.
On the filedtrip students will see where one plant species varies in morphology across the different sites. Data will be collected on pollinators at the different sites and a geographically variable pollinator networks will be built.

(3) Plants and Animals in Extreme Environments
Co-ordinator: Alex Flemming
Teachers: Alex Flemming, Guy Midgley, Nox Makunga, Savel Daniels,
Dates: 12 July – 27 September 2022
Lectures on Tuesdays @ 10h00 – 13h00

Plant and animal adaptations to environmental extremes involve a suite of form and functional changes which range from anatomy, physiology, biochemical and genetic alterations. The plant portion of this module will cover stresses from the cell to organismal level and integrate this with the larger biome. These stresses include biotic and abiotic factors, to which the plant can respond in a variety of mechanisms. Terrestrial animals occurring in extreme environments exhibit various life history strategies, which are constrained by phylogeny, but many parallelisms are apparent. In this module, we will cover similar adaptations that evolved because of parallel environmental stresses in all of the vertebrate classes.

(4) Global Change Biology
Co-ordinator: Susana Clusella-Trullas
Teachers: Guy Midgley, Susana Clusella-Trullas, John Wilson
Dates: 15 July – 30 September 2022
Lectures on Fridays @ 10h00 – 13h00

The term "Global Change" has come to represent a multi-facetted set of pressures on the socio-ecological system that supports all human life. The interactions of these pressures with biodiversity, ecosystem services and the attendant impacts on people make for both a fascinating and highly applicable subject area for understanding future scenarios for ecosystems and human wellbeing, and how risks can be managed. This module will focus on a few key drivers of global change - mainly invasive aliens, climate change, and habitat transformation - and explore them in interactive ways which will include formal background lectures and class engagement in informal discussion, debate and mini-assignments that will assess global change risks in the context of the Greater Cape Floristic Region

COURSE MARK STRUCTURE

IMPORTANT MARKING RULES: Students need to attain 50% for each of the 3 components of the Honours course in order to graduate. In addition, **ALL** assignments must be handed in and students must take all exams. Failure to do so will result in an incomplete for the course. The general written exam, each choice module and the written project article all carry sub-minimums of 45%. Deadlines will be specified for hand-in of all the assignments. **Late hand-ins will incur penalties of 5% per day and will not be accepted after 7 days.** All the project proposals , final project written articles, popular articles and other assignments should all be handed in directly to Fawzia Gordon (Rm 3056) in an electronic form and in a hard copy.
The four written exams (general plus three choice modules), the project write-up and the project seminars will be externally examined.

MODULE DESCRIPTION	**MARKS**
1. Generic Skills Module [66184-715, 24 credits] Module final mark /100; work out as a %)	**200**
1) Introductory to biostatistics (Exam +Tutorials)	60
3) Natural history field excursion report (popular article)	20
4) Philosophy assignment	20
6) General Oral exam (general knowledge)	40
7) General written exam (books + general knowledge)	60
2. Choice Modules (X3) [12249-796, 36 credits] Module final mark /100; work out as a %)	**300**
Choice 1 (final written exam + participation mark+ an assignment)	100
Choice 2 (final written exam + participation mark+ an assignment)	100
Choice 3 (final written exam + participation mark+ an assignment)	100
3. Research Component [55867-717, 60 credits] Module final mark /100; work out as a %)	**500**
Written project proposal	50
Project proposal seminar	50
Written project	300
Project seminar	100
TOTAL : BDE honours degree [53953-778, 120 credits] (Module final mark /100; work out as a %)	**1000**

LECTURERS: Contact details

LECTURERS CONTACT DETAILS: 2019-04-17

Initial	Surname	Name	Title	Email	Tel No	*Office No*
BA	**Anderson**	Bruce	Prof	banderso.bruce@gmail.com bca@sun.ac.za	3586	*2006*
MIC	**Cherry**	Mike	Prof	mic@sun.ac.za	3233	*2037*
SCT	**Clusella -Trullas**	Sussana	Prof	sct333@sun.ac.za	3974	*3071*
SRD	**Daniels**	Savel	Prof	srd@sun.ac.za	3230	*4006*
LD	**Dreyer**	Leanne	Prof	ld@sun.ac.za	3070	*1095*
AE	**Ellis**	Allan	Prof	agellis@sun.ac.za	3158	*1092*
AF	**Flemming**	Alex	Dr	aff@sun.ac.za	3057	*1040*
SK	**Kumschick**	Sabrina	Dr	sabrinakumschick@sun.ac.za	3396	*3025*
NM	**Makunga**	Nox	Prof	makunga@sun.ac.za	3061	*1087*
CAM	**Matthee**	Conrad	Prof	cam@sun.ac.za	3957	*4007*
JM	**Measey**	John	Prof	jmeasy@sun.ac.za	2385	*2039D*
GM	**Midgley**	Guy	Prof	gfmidgley@sun.ac.za	3223	*1027*
AP	**Pauw**	Anton	Prof	apauw@sun.ac.za	3314	*2009*
NP	**Peer**	Nasreen	Dr	npeer@sun.ac.za	2048	*2086*
VR	**Rambau**	Victor	Dr	rvr2@sun.ac.za	2862	*4004*
DR	**Richardson**	Dave	Prof	rich@sun.ac.za	3711	*2039D*
TR	**Robinson-Smyth**	Tammy	Prof	trobins@sun.ac.za	3747	*2054*
ZS	**Shaik**	Zaynab	Miss	zshaik@sun.ac.za	3956	*2030*
CS	**Simon**	Carol	Prof	csimon@sun.ac.za	3068	*2044*
MT	**Theron**	Marie	Ms	theronm@sun.ac.za	4430	*Library*
JvH	**Van den Heever**	Jurie	Dr	jurivdh@gmail.com	082 406 8405	
SvdH	**Von der Heyden**	Sophie	Prof	svdh@sun.ac.za	9321	*3043*
JW	**Wilson**	John	Prof	jrwilson@sun.ac.za	3408	*2036*
TW	**Wossler**	Theresa	Prof	wossler@sun.ac.za	3160	*2031*
	ADMIN					
FG	**Gordon**	Fawzia	Ms	Fg1@sun.ac.za	2402	*3056*
SJ	**Jacobs**	Saudah	Ms	saudah@sun.ac.za	3236	*2033*
JB	**Basson**	Janine	Ms	JI2@sun.ac.za	2596	*2032*
MS	**Sauerman**	Mari	Ms	mpdb@sun.ac.za	3224	*2030*