

Tutorial Letter 101/3/2020

**Plant Biodiversity and Environmental
Botany**

BOT1502

Semesters 1 and 2

Department of Life and Consumer Sciences

This tutorial letter contains important information
about your module.

BARCODE

CONTENTS

	<i>Page</i>
1 INTRODUCTION TO THE MODULE	3
2 PURPOSE AND OUTCOMES	3
2.1 Purpose	4
2.2 Outcomes	4
3 LECTURER(S) AND CONTACT DETAILS.....	4
3.1 Lecturer(s)	4
3.2 Department.....	4
3.3 University.....	5
4 RESOURCES	5
4.1 Prescribed book(s).....	5
4.2 Recommended book(s).....	6
4.3 Electronic reserves (e-reserves)	6
4.4 Library services and resources	6
5 STUDENT SUPPORT SERVICES.....	6
6 STUDY PLAN.....	7
7 PRACTICAL WORK.....	7
8 ASSESSMENT	9
8.1 Assessment criteria.....	9
8.2 Assessment plan	9
8.3 Assignment numbers	10
8.3.1 General assignment numbers	10
8.3.2 Unique assignment numbers	10
8.4 Assignment due dates	10
8.5 Submission of assignments	11
8.6 The assignments	11
8.7 Other assessment methods	11
8.8 The examination	11
9 FREQUENTLY ASKED QUESTIONS	11
10 SOURCES CONSULTED	12
11 IN CLOSING.....	12
12 ADDENDUM.....	12

Dear Student

As part of this tutorial letter, we wish to inform you that Unisa has implemented a transformation charter based on five pillars and eight dimensions. In response to this charter, we have also placed curriculum transformation high on the agenda. For your information, curriculum transformation includes the following pillars: student-centred scholarship, the pedagogical renewal of teaching and assessment practices, the scholarship of teaching and learning, and the infusion of African epistemologies and philosophies. These pillars and their principles will be integrated at both the programme and module levels, as a phased-in approach. You will notice the implementation thereof in your modules, and we encourage you to fully embrace these changes during your studies at Unisa.

1 INTRODUCTION TO THE MODULE

Dear Student

Welcome to the Department of Life Sciences and in particular to the BOT1502 module. We hope you will find this academic year stimulating and satisfying.

The subject of Botany consists of several sections and at first you may find the course difficult, but I want to assure you that, as you make progress in your studies, all the aspects of Botany will become clear and understandable.

Your study of this module will be satisfying if you are DEVOTED and pay REGULAR attention to your study.

The staff of the Botany Section of the Department of Life Sciences (Botany) would like to assist you and we encourage you to contact us early if you experience any problems with this module.

The information supplied for the module will include tutorial matter such as the following

Tutorial Letter 101

Study Guide

Some of this tutorial matter may not be available when you register. Tutorial matter that is not available when you register will be mailed to you as soon as possible, but is also available on myUnisa.

You are reminded about the importance of myUnisa and regular use of the internet. You must be registered on myUnisa to be able to submit assignments, to have access to the library functions, to download study material, 'chat' to your lecturers or fellow students and participate in online discussion forums and gain access to all kinds of learning resources.

2 PURPOSE AND OUTCOMES

2.1 Purpose

The purpose of this module is to introduce you to botany and its development as a life science. The guide will help you to achieve insight into the building blocks of botany and the links of these blocks. It must be understood that module BOT1502 is only a part of the Botany course. The whole part is divided into different modules, from module BOT1501 to module BOT3704. All aspects of Botany are covered in various modules.

2.2 Outcomes

Learning outcomes for BOT1502

After working through this module, you should be able to:

- Discuss the classification, morphology, reproduction and biological importance of the cyanobacteria
- Summarise the evolution of the earliest eukaryotes, as well as the classification, morphology, reproduction and biological importance of algae
- Reflect on the environmental challenges of life on land and the adaptations that selected bryophytes (mosses) (three major groups) had to make to overcome these challenges
- Explain the possible evolutionary origin of species, morphology and reproduction of the major groups of seedless vascular plants
- Distinguish between the morphology and reproduction of the major groups of gymnosperms and flowering plants
- Describe the composition of and interaction in terrestrial and aquatic ecosystems
- Critically discuss the impact that humans have on ecosystems and which cause local and global environmental problems
- Draw scientifically acceptable diagrams to illustrate macro- and micro-structures and life cycles

3 LECTURER(S) AND CONTACT DETAILS

3.1 Lecturer(s)

Primary Lecturer: *Ms PK Tlakula*

Email address: tlakupk@unisa.ac.za

Telephone number: +2711 471 2127

Second Examiner: *Ms LT Mankga*

Email address: mankglt@unisa.ac.za

Telephone number: +2711 471 3604

3.2 Department

Department of Life and Consumer Sciences

Florida Campus

Private Bag X6, Florida, 1710

Fax number: +27 11 471 2796

3.3 University

You will find general Unisa contact details in the brochure entitled my Studies @ Unisa; always use your student number when contacting the University.

4 RESOURCES

4.1 Prescribed book(s)

Graham, L.E., Graham, J.M., Wilcox, L.W., 2014. Plant Biology: New International Edition, 2nd Edition. Pearson. ISBN 978-1-292-04249-7.

Prescribed books can be obtained from the University's official booksellers. If you have difficulty in locating your book(s) at these booksellers, please contact the Prescribed Book Section at Tel: 012 429-4152 or e-mail vospresc@unisa.ac.za

4.2 Recommended book(s)

Recommended books can be requested online, via the Library catalogue.

Moore, R, Clark, WD & Vodopich, DS. 1998. Botany. 2nd edition. New York: Brown Publications.

Van der Schijff, HP. 1985. Algemene plantkunde. 5de uitgawe. Pretoria: Van Schaik.

Lee, RE. 1999. Phycology. 3rd edition. Cambridge: Cambridge University Press. Uno, G, Storey, R & Moore, R. 2001. Principles of botany. Boston: McGraw-Hill,.

[Please enter authors and book titles only. No book numbers please, as this system is no longer used by the library.]

Recommended books can be requested online, via the library catalogue. [Please enter authors and book titles only. No book numbers please, as this system is no longer used by the library.]

Recommended books can be requested online, via the library catalogue.

4.3 Electronic reserves (e-reserves)

None.

E-reserves can be downloaded from the library catalogue. More information is available at:

<http://libguides.unisa.ac.za/request/request>

4.4 Library services and resources information

The Unisa Library offers a range of information services and resources:

- for brief information go to: <https://www.unisa.ac.za/library/libatglance>
- for more detailed Library information, go to:
<http://www.unisa.ac.za/sites/corporate/default/Library>
- for research support and services (e.g. Personal Librarians and literature search services), go to <http://www.unisa.ac.za/sites/corporate/default/Library/Library-services/Research-support>

The Library has created numerous Library guides: <http://libguides.unisa.ac.za>

Recommended guides:

- request and find library material/download recommended material:
<http://libguides.unisa.ac.za/request/request>
- postgraduate information services: <http://libguides.unisa.ac.za/request/postgrad>
- [finding and using library resources and tools:](http://libguides.unisa.ac.za/Research_skills)
http://libguides.unisa.ac.za/Research_skills
- Frequently asked questions about the Library: <http://libguides.unisa.ac.za/ask>
- Services to students living with disabilities:
<http://libguides.unisa.ac.za/disability>

Important contact information:

- <https://libguides.unisa.ac.za/ask> - Ask a Librarian
- Lib-help@unisa.ac.za - technical problems accessing library online services
- Library-enquiries@unisa.ac.za - general library related queries
- Library-fines@unisa.ac.za - for queries related to library fines and payments

5 STUDENT SUPPORT SERVICES

The *Study@Unisa* brochure is available on myUnisa: www.unisa.ac.za/brochures/studies

This brochure has all the tips and information you need to succeed at distance learning and, specifically, at Unisa.

6 STUDY PLAN

Use your brochure my Studies @ Unisa for general time management and planning skills.

Study table, with dates

Module: BOT1502

Study table, with dates

Activity

To successfully prepare for and submit your assignments you have to work according to a time table. Use the following table or draw up your own table to schedule your studies for this subject. This table starts after close of registration; if you register early, adjust the dates.

STUDY UNIT	SECTION	CONTENT	WEEK	DATE
1 <i>Prokaryotes</i>	1	Introduction	1	9–14 February
	2	The classification of prokaryotic organisms		
	3	The characteristics of cyanobacteria		
	4	Reproduction of cyanobacteria		
		Week 2	2	15–21 February
	1	The biological importance of cyanobacteria		
	2	The biological importance of cyanobacteria		
	3	Representative cyanobacterium genera		
		Week 3		
2 <i>Algae</i>	1	The evolution of algae	3	22–28 February
	2	The structure of flagella in eukaryotic cells		
	3	Phylum Euglenophyta (euglenoids)	4	1-7 March
	4	Phylum Dinophyta (dinoflagellates)		
		Week 4		

	1	Phylum Bacillariophyta (diatoms)	5	8–14 March
	2	Phylum Chlorophyta (green algae)		
		Week 5		
	3	Other phyla of algae		
	4	The biological importance of algae		
		Week 6		
	1	An overview of bryophytes		
3 <i>Bryophytes</i>	2	The classification of bryophytes	6	15–21 March
	3	The classification of bryophytes		
4 <i>Seedless vascular plants</i>	1	Week 7		
	1	The evolution of seedless vascular plants		
	2	Type of living seedless vascular plants	7	22–28 March
	3	Type of living seedless vascular plants		
Week 8				
5 <i>Gymnosperms</i>	1	An overview of Gymnosperms	8	29 March–4 April
	2	Types of living Gymnosperms		
Week 9				
6 <i>Angiosperms</i>	1	Sexual reproduction in flowering plants	9	5–11 April
	2	The evolution of flowers and fruits		
	3	A sampling of Angiosperm diversity		

	3	A sampling of Angiosperm diversity		
Week 10				
Ecology and the biosphere	1	Abiotic factors	10	12–18 April
	2	Ecosystems		
	3	Populations		
Week 11				
7 Ecosystems dynamics	1	Interactions between organisms in ecosystems	11	19–25 April
	2	Communities and ecosystems		
		Week 12		
	1	Human population growth		
8 Conservation biology	2	Human impacts on ecosystems	12	26 April–1 May
	3	The future		

7 PRACTICAL WORK

Module BOT1502 is a theoretical module. NO practical session is included. All the practical work based on the theory of this module is included in the BOT1603 (Old code BOT1343) module. It is therefore recommended that you also register for the practical module BOT1603 as some of the work which may not be fully understood in the theory, will become clear during the practical sessions.

8 ASSESSMENT

8.1 Assessment criteria

The assessment in this module has both formative and summative types of assessments. At the end of each of the study units there are self-evaluation questions. There are two assignments which you should submit before the due dates. Assignment 01 contributes 20% towards the semester mark and Assignment 02 contributes 80%. At the end of each semester you will write

the examination. Both Assignments 01 and 02 combined contribute 30% towards the final mark and the examination will contribute 70%.

8.2 Assessment plan

There are two assignments for both semesters, namely Assignment 01 and Assignment 02. If you are registered for semester 1 you should only submit assignments for that semester only. You are not allowed to submit the assignments for the semester which you are not registered

8.3 Assignment numbers

8.3.1 General assignment numbers

Assignment No.1

Assignment No.2

8.3.2 Unique assignment numbers

Semester 1

Assignment No1: **654006**

Assignment No.2: **785406**

Semester 2

Assignment No1: **623781**

Assignment No.2: **679813**

8.4 Assignment due dates

Semester 1

Assignment No.1: **13 March 2020**

Assignment No.2: **17 April 2020**

Semester 2

Assignment No.1: **08 August 2020**

Assignment No.2: **09 October 2020**

8.5 Submission of assignments

You may submit written assignments and assignments done on mark-reading sheets either by post or electronically via myUnisa. Assignments may not be submitted by fax or email.

For detailed information on assignments, please refer to the my Studies @ Unisa brochure, which you received with your study package.

To submit an assignment via myUnisa:

- Go to myUnisa.
- Log in with your student number and password.
- Select the module.
- Click on assignments in the menu on the left-hand side of the screen.
- Click on the assignment number you wish to submit.
- Follow the instructions.

8.6 The assignments

See page 13.

8.7 Other assessment methods

None

8.8 The examination

Use your my Studies @ Unisa brochure for general examination guidelines and examination preparation guidelines.

For examination admission it is compulsory for you to hand in the first assignment for this course(BOT1502). It is also to your own advantage to do the assignments in order to test your understanding of the subject, and to establish how well prepared you are for the examination. You need to obtain a minimum of 40% in your examination to pass. If you failed to do that and want admission to a supplementary examination, the total of your examination mark and year mark needs to be over 40%.

This module is offered in a semester period of 15 weeks (12 weeks of study and three weeks of examination period). This means that if you are registered for the first semester, you will write the examination in May/June and the supplementary examination will be written in October/November. If you are registered for the second semester, you will write the examination in October/November and the supplementary examination will be written in May/June.

During the semester, the Examination Section will provide you with information regarding the examination in general and examination venues, dates and times.

To help you in your preparation for the examination, you will receive a tutorial letter that will explain the format of the examination paper, give you examples of questions that you may expect and set out clearly what material you have to study for examination purposes.

Calculating your final mark:

Year mark (marks for your assignments) = **30%**

Examination = **70%**

Total = **100%**

9 FREQUENTLY ASKED QUESTIONS

The brochure my Studies @ Unisa contains an A-Z guide of the most relevant study information.

Q: How do I know where to write examinations?

A: After you have registered you will be contacted by the examination department about the venues (examination centres) where you will sit for your exams.

Q: Where do I get additional information about the modules I have registered for?

A: For each module you have registered for there is additional information on myUnisa.

Q: How do I submit my assignment via myUnisa?

A: For detailed information on and requirements as far as assignments are concerned, see the brochure my Studies @ Unisa that you received with your study material.

10 SOURCES CONSULTED

These sources are provided in Tutorial letter 101 guidelines.

11 IN CLOSING

I hope and trust that you will enjoy the course. Please do not hesitate to contact us if you experience problems.

Wishing you all the best with your studies

Pearl Tlakula

12 ADDENDUM

Assignments

SEMESTER 1

Assignment 01

Unique assignment No: **654006**

DUE DATE: 13 March 2020

MULTIPLE CHOICE QUESTIONS

INSTRUCTIONS

Fill in your name and student number on the mark reading sheet. Choose the best answer for each of the following questions. Indicate the correct answer clearly by shading in the appropriate number on the mark reading card. If more than one number is shaded in, in any answer, NO marks will be awarded for the question.

Use the unique mark-reading sheet number:

- 1 Which of the following statements is FALSE?
 1. Seeds include a source of nourishment of the developing embryo.
 2. A selective disadvantage of seeds is that the seed coat is highly vulnerable to invasion by fungi and bacteria.
 3. Most plants that produce seeds also produce nonflagellated sperm.
 4. Many seeds can remain dormant during long periods of drought or low temperatures.
 5. In seed plants, fertilization can occur without the presence of water.

- 2 **The world's tallest plants are members of which group?**
 1. Ginkophyta
 2. Gnetophyta
 3. Cycadophyta
 4. Coniferophyta
 5. Ginkophyta and Gnetophyta

3 Seed plants LACK which of the following structures?

1. ovules surrounded by integuments
2. microspores and megaspores
3. vascular tissues
4. a large, nutritionally independent sporophyte
5. a large, nutritionally independent gametophyte

4 In the life cycle of a pine tree_____.

- 1 germinating seeds develop into sporophytes
- 2 microspores are produced by mitosis within a microsporangium
- 3 each megaspore gives rise to a pollen grain
- 4 pollen cones, unlike ovulate cones, tend to become woody as they mature
- 5 all of the above

5 Adaptations of many conifers to cold, dry conditions include_____.

- 1 needle-like leaves
- 2 absence of vessel elements
- 3 recessed stomata
- 4 a hypodermis
- 5 all of the above

6 In populations of organisms with a Type I survivorship curve, the death rate_____.

- 1 increases markedly in old age
- 2 is the same for all age groups
- 3 is the highest for young individuals
- 4 shows no particular pattern over different age groups
- 5 is always low at all ages

7 Which of the following characteristics does NOT apply to angiosperms?

- 1 dominant sporophyte.
- 2 gametophytes that are smaller than those of gymnosperms.
- 3 lack of vessel elements.
- 4 the capacity for self-pollination in most species.
- 5 production of fruits from mature ovaries.

8 In angiosperms, the microgametophyte corresponds to the _____.

- 1 pollen grain
- 2 nucellus
- 3 stamen
- 4 ovule
- 5 carpel

9 Dioecious plants produce_____.

- 1 carpellate and staminate flowers on separate plants
- 2 carpellate and staminate flowers on the same plant
- 3 bisexual flowers
- 4 both bisexual and unisexual flowers on the same plant
- 5 no flowers

10 Exponential growth of a population is possible under what sort of conditions?

- 1 when competition for resources is intense.
- 2 when the death rate exceeds the birth rate.
- 3 when the death rate is equal to the birth rate.
- 4 when resources are unlimited.
- 5 when population size exceeds the carrying capacity.

Total: **20 Marks**

SEMESTER 1

ASSIGNMENT 02

Unique assignment No: **785406**

DUE DATE: 17 April 2020

- It is advisable to keep a copy of your answers.
- Number the questions in the same way as on the assignment.
- Answer ALL the questions.

QUESTION 1

- 1.1 Draw a fully-labelled diagram showing the process of conjugation in Spirogyra. (10)
- 1.2 List FOUR advantages and FOUR disadvantages of algae. (8)
- 1.3 Name the different terrestrial biomes of the world and give one diagnostic characteristic of each biome. (12)

[30]

QUESTION 2

- 2.1 By means of a labelled diagram, describe the life cycle of an angiosperm. Use blocks of information to explain each stage. (15)
- 2.2 What are the advantages and disadvantages of genetically modified plants? (10)
- 2.3 Briefly explain why ozone is an important atmospheric gas and what the effects of ozone depletion would be on plants. (5)
- 2.4 Discuss what is meant by the “drivers of environmental change” and give one example. Also discuss what plans the National Government of South Africa has in place to combat negative impacts on the environment. (10)

[40]

QUESTION 3

- 3.1 Explain the “biological magnification” (5)
- 3.2 Identify and explain the role of dominant and keystone species in a community. (10)
- 3.3 Describe the carbon cycle in a typical terrestrial ecosystem. (15)

[30]

Total: **100 Marks**

END OF ASSIGNMENT 02 (SEMESTER 01)

SEMESTER 2

ASSIGNMENT 01

Unique assignment No: **623781**

DUE DATE: 08 August 2020

MULTIPLE CHOICE QUESTIONS

INSTRUCTIONS

Fill in your name and student number on the mark reading sheet. Choose the best answer for each of the following questions. Indicate the correct answer clearly by shading in the appropriate number on the mark reading card. If more than one number is shaded in, in any answer, NO marks will be awarded for the question.

Use the unique mark-reading sheet number:

1 Which of the following statements is FALSE?

1. Seeds include a source of nourishment of the developing embryo.
2. A selective disadvantage of seeds is that the seed coat is highly vulnerable to invasion by fungi and bacteria.
3. Most plants that produce seeds also produce nonflagellated sperm.
4. Many seeds can remain dormant during long periods of drought or low temperatures.
5. In seed plants, fertilization can occur without the presence of water.

2 The world's tallest plants are members of which group?

1. Ginkophyta
2. Gnetophyta
3. Cycadophyta
4. Coniferophyta
5. Ginkophyta and Gnetophyta

3 Seed plants LACK which of the following structures?

1. ovules surrounded by integuments
2. microspores and megaspores
3. vascular tissues
4. a large, nutritionally independent sporophyte
5. a large, nutritionally independent gametophyte

4 In the life cycle of a pine tree_____.

- 1 germinating seeds develop into sporophytes
- 2 microspores are produced by mitosis within a microsporangium
- 3 each megaspore gives rise to a pollen grain
- 4 pollen cones, unlike ovulate cones, tend to become woody as they mature
- 5 all of the above

5 Adaptations of many conifers to cold, dry conditions include_____.

- 1 needle-like leaves
- 2 absence of vessel elements
- 3 recessed stomata
- 4 a hypodermis
- 5 all of the above

6 In populations of organisms with a Type I survivorship curve, the death rate_____.

- 1 increases markedly in old age
- 2 is the same for all age groups
- 3 is the highest for young individuals
- 4 shows no particular pattern over different age groups
- 5 is always low at all ages

7 Which of the following characteristics does NOT apply to angiosperms?

- 1 dominant sporophyte.
- 2 gametophytes that are smaller than those of gymnosperms.
- 3 lack of vessel elements.
- 4 the capacity for self-pollination in most species.
- 5 production of fruits from mature ovaries.

8 In angiosperms, the microgametophyte corresponds to the ____.

- 1 pollen grain
- 2 nucellus
- 3 stamen
- 4 ovule
- 5 carpel

9 Dioecious plants produce_____.

- 1 carpellate and staminate flowers on separate plants
- 2 carpellate and staminate flowers on the same plant
- 3 bisexual flowers
- 4 both bisexual and unisexual flowers on the same plant
- 5 no flowers

10 Exponential growth of a population is possible under what sort of conditions?

- 1 when competition for resources is intense.
- 2 when the death rate exceeds the birth rate.
- 3 when the death rate is equal to the birth rate.
- 4 when resources are unlimited.
- 5 when population size exceeds the carrying capacity.

Total: 20 Marks

SEMESTER 2

ASSIGNMENT 02

Unique assignment no: **679813**

DUE DATE: 09 October 2020

INSTRUCTIONS

- It is advisable to keep a copy of your answers.
- Number the questions in the same way as on the assignment.
- Answer ALL the questions.

QUESTION 1

Briefly explain the difference between the following:

- | | |
|---|-------------|
| 1.1 Survivorship curves I and III | (4) |
| 1.2 Primary and secondary succession | (4) |
| 1.3 UNCCD and CBD Conventions | (4) |
| 1.4 r- and K- type of populations | (4) |
| 1.5 Density dependence and density independence | (4) |
| | [20] |

QUESTION 2

- | | |
|---|-------------|
| 2.1 Differentiate between indigenous, exotic and invader plants.
Give one example of each. | (10) |
| 2.2 Name the categories of weeds and invader plants as stipulated by the CARA I
egislation and briefly discuss what role this legislation plays in the conservation
and protection of the biodiversity in South Africa. | (10) |
| 2.3 By means of a labelled diagram, describe the life cycle of a pine. Use blocks
of information to explain each stage. | (20) |
| | [40] |

QUESTION 3

- 3.1 What are the advantages and disadvantages of genetically modified plants? (10)
- 3.2 Briefly explain why ozone is an important atmospheric gas and what the effects of ozone depletion would be on plants. (10)
- 3.3 Discuss what is meant by the “drivers of environmental change” and give one example. Also discuss what plans the National Government of South Africa has in place to combat negative impacts on the environment. (10)
- [30]**

QUESTION 4

Explain BRIEFLY (one word or two) how each of the following is accomplished:

- 4.1 Osmoregulation and excretion in the Dinophyta. (2)
- 4.2 Movement of diatoms. (1)
- 4.3 Re-establishment of cell size in the Bacillariophyta. (2)
- 4.4 Conjugation in Spirogyra. (2)
- 4.5 Feeding in heterotrophic Euglenophyta. (1)
- 4.6 Detection of light intensity in Euglena and Chlamydomonas. (2)
- [10]**

Total: **100 Marks**

END OF ASSIGNMENT 02 (SEMESTER 2)