

# Tutorial Letter 101/3/2018

**Basic Biology**

**BLG1501**

**Semesters 1 and 2**

**Department of Life and Consumer Sciences**

**IMPORTANT INFORMATION**

This tutorial letter contains important information  
about your module.

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# CONTENTS

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

Dear Student

## 1 INTRODUCTION

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

The subject of Biology 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 Biology 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 Biology Section of the Department of Life and Consumer Sciences 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 biology and its development as a life science. This guide will provide you with insight into the building blocks of biology and the links of these blocks. The role of cells in living organisms will be explored as well as the interrelatedness of biology and the various biological building blocks that are involved. This module is not a stand-alone – it forms an integral part of life science fields of study and, more specifically, undergraduate natural science (life sciences streams).

### 2.2 Outcomes

After working through this module, you should be able to

- contextualise the physical and chemical characteristics of life
- demonstrate your knowledge regarding plant and animal composition

- deal in a knowledgeable way with the molecular basis of inheritance
- explain processes such as protein synthesis and respiration
- use your knowledge of ecology to interpret and understand the biosphere
- discuss/explain the biodiversity and complexity of creation and the methods for the sustainment thereof and
- operate ethically sound in all forms of communication

### 3 LECTURER(S) AND CONTACT DETAILS

#### 3.1 Lecturer(s)

Dr Monde A Nyila Pr.Sci.Nat. (Microbiological Science)  
 Email address: nyilama@unisa.ac.za  
 Telephone number: +2711 471 2294

#### 3.2 Department

Department of Life and Consumer Sciences  
 Science 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 books

Campbell, NA., Urry, LS, Cain, ML, Wasserman, SA, Minorsky, PV & Jackson, RB. & Reece, JB, 2017. *Biology*. 11th edition. New York: Pearson Education  
 ISBN-10: 1-292-17043-3; ISBN13:978-1-292-17043-5

#### 4.2 Recommended books

None

#### 4.3 Electronic reserves (e-reserves)

None

#### 4.4 Library services and resources information

For brief information, go to [www.unisa.ac.za/brochures/studies](http://www.unisa.ac.za/brochures/studies)

For detailed information, go to the Unisa website at <http://www.unisa.ac.za/> and click on **Library**.

For research support and services of personal librarians, go to

<http://www.unisa.ac.za/Default.asp?Cmd=ViewContent&ContentID=7102>.

The Library has compiled numerous library guides:

- finding recommended reading in the print collection and e-reserves – <http://libguides.unisa.ac.za/request/undergrad>
- requesting material – <http://libguides.unisa.ac.za/request/request>
- postgraduate information services – <http://libguides.unisa.ac.za/request/postgrad>
- finding , obtaining and using library resources and tools to assist in doing research – [http://libguides.unisa.ac.za/Research\\_Skills](http://libguides.unisa.ac.za/Research_Skills)
- how to contact the library/finding us on social media/frequently asked questions – <http://libguides.unisa.ac.za/ask>

## 5 STUDENT SUPPORT SERVICES

Important information appears in your brochure *my Studies @ Unisa*.

## 6 STUDY PLAN

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

### Study table, with dates

#### Module: BLG1501

#### 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 to study with	Week	Date	
<b>1: INTRODUCTION: THEMES IN THE STUDY OF LIFE</b>	<b>Week 1</b>		<b>1</b>	29 January – 4 February 2018  9- 15 July 2018	
	1	Themes connect the concepts of biology			
	2	Evolution accounts for the unity and diversity of life			
	3	Scientists use two main forms of inquiry in their study of nature			
	<b>2: THE CHEMICAL CONTENT OF LIFE</b>	4			Matter, elements and compounds
		5			Atoms
	6	Chemical bonds			
<b>3: WATER AND THE FITNESS OF THE ENVIRONMENT</b>	<b>Week 2</b>		<b>2</b>	5–11 February 16- 22 July	
	1	The polarity of water molecules			
	2	Properties of water			
		Acidic and basic conditions of living organisms			
<b>4: CARBON AND THE MOLECULAR</b>	3	Organic chemistry			
	4	Carbon atoms			

<b>DIVERSITY OF LIFE</b>	5	Functional groups		
		<b>Week 3</b>	<b>3</b>	12– 18 February 23- 29 July
<b>5: THE STRUCTURE AND FUNCTION OF LARGE BIOLOGICAL MOLECULES</b>	1	Macromolecules		
	2	Carbohydrates		
	3	Lipids		
	4	Proteins		
	5	Chemistry of life		
<b>6: A TOUR OF THE CELL</b>				
	6	The study of cells: the use of microscopes		
	7	Eukaryotic cells		
	8	Cell organelles		
	9	The endomembrane system		
		<b>Week 4</b>	<b>4</b>	19– 25 February 30 July – 5 August
<b>7: MEMBRANE STRUCTURE AND FUNCTION</b>	1	Cellular membranes and fluid mosaics of lipids and proteins		
	2	Selective permeability		
	3	Passive transport and active transport		
	4	Exocytosis and endocytosis		
		<b>Week 5</b>	<b>5</b>	26 Feb – 4 March 6 -12 August
<b>8: AN INTRODUCTION TO METABOLISM</b>	1	Laws of thermodynamics		
	2	ATP and cellular work		
	3	Enzymes		
	4	Regulation of enzymes		
		<b>Week 6</b>	<b>6</b>	5-11 March 13 – 19 August
<b>9: CELLULAR RESPIRATION: HARVESTING CHEMICAL ENERGY</b>	1	Glycolysis		
	2	The citric acid cycle		
	3	Oxidative phosphorylation and chemiosmosis		
	4	Fermentation		
		<b>Week 7</b>	<b>7</b>	12 – 18 March 20– 6 August
<b>10: THE CELL CYCLE</b>				
<b>11: MEIOSIS AND SEXUAL LIFE CYCLES</b>	1	Cell division		
	2	Phases of mitosis		
		The cell cycle		

<b>12: MENDEL AND THE GENE IDEA</b>	3	Fertilisation and meiosis		
<b>13: FROM GENE TO PROTEIN</b>		<b>Week 8</b>	<b>8</b>	19 – 25 March 27 August – 2 Sept
	1	Mendel's Laws		
	2	Human traits and Mendelian patterns of inheritance		
	3	Transcription and translation		
	4	Role of RNA		
	5	Gene expression in prokaryotes and eukaryotes		
	6	Point mutations		
<b>14: COMMUNITY ECOLOGY</b>		<b>Week 9</b>	<b>9</b>	26 March – 1 April 3 – 9 September
	1	Community's interactions, competition, predation, herbivory, symbiosis and disease		
	2	Disturbances and influences		
	3	Biogeography factors affect community biodiversity		
<b>15: ECOSYSTEMS</b>	4	Community ecology	<b>10</b>	2–8 April 10 – 18 September
		<b>Week 10</b>		
	1	Energy flow and chemical cycling		
	2	Physical and chemical factors		
	3	Energy transfer between trophic levels		
	4	Biological and geochemical processes		
	5	The human population and the disruption of the chemical cycles throughout the biosphere		
<b>16: CONSERVATION</b>		<b>Week 11</b>	<b>11</b>	9- 15 April 17– 23 September
	1	Human activities threaten the earth's biodiversity		
	2	Population conservation		

<b>BIOLOGY AND RESTORATION</b>	3	Landscape and regional conservation		
	4	Restoration ecology		
		<b>Week 12</b>	<b>12</b>	16– 22 April 24-30 Sept
	1	Sustainable development		
	2	Case study		

## 7 PRACTICAL WORK AND WORK-INTEGRATED LEARNING

Module BLG1501 is a theoretical module. NO practical session is included. All the practical work based on the theory of this module is included in module BLG1603. It is therefore recommended that you also register for practical module BLG1603 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.

### 8.2 Assessment plan

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%.

### 8.3 General assignment numbers

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

#### 8.3.1 Unique assignment numbers

##### Semester 1

Assignment 01: **791707**

Assignment 02: **856875**

##### Semester 2

Assignment 01: **708762**

Assignment 02: **692944**



### 8.3.2 Due dates for assignments

#### SEMESTER 01:

Assignment 01: Due date: 09 March 2018

Assignment 02: Due date: 6 April 2018

#### SEMESTER 02:

Assignment 01: Due date: 24 August 2018

Assignment 02: Due date: 14 September 2018

### 8.4 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.

### 8.5 The assignments

See page 11.

### 8.6 Other assessment methods

None

### 8.7 The examination

Use your brochure *my Studies @ Unisa* 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 (BLG1501). 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%.

#### Examination period

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 2018 and the supplementary examination will be written in

October/November 2018. If you are registered for the second semester, you will write the examination in October/November 2018 and the supplementary examination will be written in May/June 2019

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

## **10 SOURCES CONSULTED**

These sources are provided in Tutorial letter 101 guidelines.

## **11 CONCLUSION**

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

## 12 ADDENDUM

### Assignments

<b>SEMESTER 1</b>
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#### Assignment 01

**DUE DATE: 9 March 2018**

**Unique mark-reading sheet number: 791707**

#### **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. NO marks will be awarded for the question if more than one number is shaded in for any answer.

- 1.1 What is the basic unit of life?
  1. DNA
  2. cells
  3. organelles
  4. nuclei
  5. tissue
  
- 1.2 When a base is added to a buffered solution, the buffer will:
  1. donate OH<sup>-</sup> ions
  2. accept water molecules
  3. donate H<sup>+</sup> ions
  4. accept H<sup>+</sup> ions
  5. None of the above is correct
  
- 1.3 A pH of 7 indicates that
  1. the solution consists of pure water.
  2. the concentration of hydrogen ions equals that of hydroxide ions.
  3. there are no hydrogen ions in solution.
  4. there are no hydroxide ions in solution.
  5. 1 and 2 are correct.
  
- 1.4 Cellulose is an example of a
  1. polypeptide
  2. lipid
  3. polysaccharide
  4. fat
  5. nucleic acid

- 1.5 An atom is defined as the smallest
1. particle of a compound that can take part in chemical reaction.
  2. particle of an element that can take part in chemical reaction.
  3. 4 and 5 are correct.
  4. particle of a molecule that reacts with other molecules.
  5. particle of an isotope that can take part in a chemical reaction.
- 1.6 Chitin is an example of a
1. polypeptide
  2. polysaccharide
  3. fat
  4. nucleic acid
  5. glycerol
- 1.7 The electron configuration  $1s^22s^22p^6$  belongs to
1. carbon
  2. oxygen
  3. nitrogen
  4. neon
  5. magnesium
- 1.8 Ribosomes are responsible for
1. protein synthesis
  2. digestive compartments
  3. photosynthesis
  4. controlling the centre of the cell
  5. the removal of waste from the cell
- 1.9 The mass number refers to
1. the number of protons in an atom
  2. the combined number of protons and neutrons of an atom
  3. the number of electrons in an atom
  4. the combined number of protons and electrons of an atom
  5. the number of neutrons and electrons in an atom
- 1.10 Which statement best describes the isotonic solution?
1. It is a solution with a high solutes concentration and a low water concentration.
  2. It is a solution with a high water concentration and low solutes concentration.
  3. It is a solution with a balanced water and solutes concentration.
  4. It is a solution with a high water concentration and a low solutes concentration, hence producing constant movement of water.
  5. Both 1 and 2 are correct.

**Total: 20**

**END OF ASSIGNMENT 01 (SEMESTER 1)**

<b>SEMESTER 1</b>
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**ASSIGNMENT 02**  
**UNIQUE NO.: 856875**  
**(DUE DATE: 6 APRIL 2018)**

**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.

**QUESTIONS**

## STUDY UNIT 9

Answer question 9.10: Draw a diagram to describe the process of alcoholic fermentation. (10)

Answer question 9.11: Compare the fate of pyruvate in alcohol fermentation and lactic acid fermentation in tabular format. (10)

## STUDY UNIT 10

Answer question 10.4: Explain the difference between cytokinesis in plant and animal cells. (6)

## STUDY UNIT 11

Answer question 11.2: Distinguish between asexual and sexual reproduction (4)

Answer question 11.5: List the phases of meiosis I and meiosis II and describe the events characteristic of each phase. (20)

## STUDY UNIT 12

Answer question 12.6: In sesame plants, the one-pod condition (P) is dominant to the three-pod condition (p). Normal leaf (L) is dominant to wrinkled leaf (l). A homozygote in one-pod condition and normal leaves is crossed with a homozygote in three-pod condition and wrinkled leaves. Use a Punnett square to predict the phenotypic and genotypic ratios of the F<sub>2</sub> generation. (20)

## STUDY UNIT 13

Explain the general process of transcription, including the three major steps of initiation, elongation and termination. (10)

STUDY UNIT 14

Answer question 14.14: Distinguish between parasitism, mutualism and commensalism. (6)

STUDY UNIT 15

Answer question 15.1: Distinguish between autotrophs and heterotrophs. (4)

Answer question 15.10: How is the accumulation of chlorofluorocarbons responsible for depleting the atmospheric ozone?  
(10)

**TOTAL: 100 MARKS**

**END OF ASSIGNMENT 02 (SEMESTER 1)**

<b>SEMESTER 2</b>
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**Assignment 01****DUE DATE: 24 August 2018****Unique mark-reading sheet number:708762**

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. NO marks will be awarded for the question if more than one number is shaded in for any answer.

- 1.1 A 9:3:3:1 phenotypic ratio is characteristic of the\_\_\_\_\_.
1. F<sub>1</sub> generation of a monohybrid cross
  2. F<sub>2</sub> generation of a monohybrid cross
  3. F<sub>1</sub> generation of a dihybrid cross
  4. F<sub>2</sub> generation of a dihybrid cross
  5. F<sub>3</sub> generation with dihybrid cross
- 1.2 A pH of 7 indicates that
1. the solution consists of pure water.
  2. the concentration of hydrogen ions equals that of hydroxide ions.
  3. there are no hydrogen ions in solution.
  4. there are no hydroxide ions in solution.
  5. 1 and 2 are correct.
- 1.3 The electron configuration  $1s^22s^22p^4$  belongs to \_\_\_\_\_.
1. carbon
  2. oxygen
  3. nitrogen
  4. neon
  5. magnesium
- 1.4 Cellulose is an example of a
1. polypeptide
  2. lipid
  3. polysaccharide
  4. fat
  5. nucleic acid

- 1.5 The atomic number refers to
1. the number of protons in an atom.
  2. the combined number of protons and neutrons of an atom.
  3. the number of electrons in an atom.
  4. the combined number of protons and electrons of an atom.
  5. the number of neutrons and electrons.
- 1.6 Which statement best describes the isotonic solution?
1. It is a solution with a high solutes concentration and a low water concentration.
  2. It is a solution with a high water concentration and low solutes concentration.
  3. It is a solution with a balanced water and solutes concentration.
  4. It is a solution with a high water concentration and a low solutes concentration, hence producing constant movement of water.
  5. Both 1 and 2 are correct.
- 1.7 Which statement best describes chemical work?
1. The beating of cilia, contraction of muscles.
  2. Movement of chromosomes during cellular reproduction.
  3. The pumping of substances across membranes against spontaneous movement.
  4. The pushing driving of endergonic reactions, such as the synthesis of polymers from monomers.
  5. The diffusion of substances across the selective permeable membrane.
- 1.8 Negatively charged ions are known as \_\_\_\_\_.
1. cations
  2. non-polar
  3. polar covalent
  4. anions
  5. All the above are correct.
- 1.9 The following term is not part of the group:
1. solute
  2. solvent
  3. evaporation
  4. solution
  5. 1 and 3
- 1.10 What is the basic unit of life?
1. DNA
  2. cells
  3. organelles
  4. nuclei
  5. tissues

**Total: 20**

**END OF ASSIGNMENT 01 (SEMESTER 2)**



**SEMESTER 2****Assignment 02****DUE DATE: 14 September 2018****Unique mark-reading sheet number: 692944****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.

**QUESTIONS****STUDY UNIT 9**

Answer question 9.1: What is the summary equation for cellular respiration? (6)

Answer question 9.6: Explain why ATP is required for the preparatory steps of glycolysis. (2)

Answer question 9.12: Compare in tabulated form the processes of fermentation and cellular respiration. (6)

**STUDY UNIT 10**

Answer question 10.3. Make labelled drawings to illustrate the different phases of mitosis in an animal cell with two chromosomes. (20)

**STUDY UNIT 11**

Answer question 11.6: Tabulate the key differences between mitosis and meiosis. (14)

**STUDY UNIT 12**

Answer question 12.5. A purple flower with an unknown genotype is crossed with a white flower. Determine the genotype of the purple flower if purple (P) is dominant and white (p) is recessive. (20)

**STUDY UNIT 13**

Answer question 13.10: Describe the structure and function of ribosomes. (10)

**STUDY UNIT 14**

Answer question 14.8: Define predation, herbivory and parasitism. (6)

**STUDY UNIT 15**

Answer question 15.8: Write short notes on the greenhouse effect. (6)

**STUDY UNIT 16**

Answer question 16.3: List the four major threats to biodiversity and give an example of four major threats to biodiversity and give an example of each. (10)

**TOTAL:100**

**END OF ASSIGNMENT 02 (SEMESTER 2)**