Tutorial Letter 101/3/2018

Microbial Ecology

MIB2602

Semesters 1 and 2

Department of Life and Consumer Sciences

IMPORTANT INFORMATION

This tutorial letter contains important information about your module.

BARCODE

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Dear Student

1 INTRODUCTION

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

The subject of Microbiology has several different parts. 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 Microbiology will become clear and understandable.

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

The staff of the Microbiology 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.

This is an online module, which means that you will find everything you need to complete the module on the module site on myUnisa. Check this site regularly for updates, posted announcements and additional resources uploaded throughout the semester. Rapid communications throughout the semester have been made possible through *my*Unisa. By using the *my*Unisa site, you can:

- submit assignments (**please note: it is advisable that you submit your assignment online as this will ensure that you receive rapid feedback and comments**),
- access your official study material,
- have access to the Unisa Library functions,
- "chat" to your lecturer or to fellow students and participate in online discussion forums, and
- obtain access to a variety of learning resources.

Please take some time to familiarise yourself with the site so that you get to know where the different tools and resources are. I will give you more information about this later in this learning unit.

Although I would like to encourage you study this module online, we also recognise that it might be impossible for some of you to get online at all, while some others of you might only be able to get online infrequently. For this reason, you can also use the print-based study pack that you will receive to study for this module.

Your study material for this module includes:

- Your prescribed textbook
- The learning units. You can access these by clicking on 'Learning units' in the menu on the module site. You will also receive the learning units as a printed document, study guide. This printed document will also be available on the web site, and you can access it by clicking on 'Official Study Material'.
- This tutorial letter, Tutorial Letter 101. You will receive this in print format, but you can also access it on the module site under 'Official Study Material'.

- Any other tutorial letters you may receive through the year

Details of your prescribed book are given in the 'Prescribed books' menu option that you can access on the left-hand side of this screen, and also in Tutorial Letter 101.

Please note that some of the printed 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 *my*Unisa under 'Official Study Material'.

2 PURPOSE AND OUTCOMES

2.1 Purpose

Qualifying students are able to know, understand and apply the principles and theory relating to interactions between microorganisms and their environment, be it terrestrial or aquatic.

2.2 Outcomes

After working through this module, you should be able to

- study interactions between microbes and their environment
- adopt a critical approach to contemporary topics in microbial ecology.
- describe various biogeochemical cycles.
- discuss microorganisms within a terrestrial (soil) environment
- discuss microbial adaptation and nutrition within an aquatic environment.

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

Willey, JM, Sherwood, LM & Woolverton, CJ. 2014. *Prescott's Microbiology*. 9th edition. New York: McGraw-Hill.
ISBN: 9789814581561

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
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
- 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.

The following is a recommended time schedule which can be used as a guideline for studying this module:

ACTIVITY	HOURS
Reading and re-reading Tutorial Letter 101 and Learning unit 0	3
Skimming learning units and textbook, forming a thorough general impression of the whole	5
First reading of learning units 1-8 and textbook (@ 2 hours per learning unit)	16
In-depth study of learning units 1-8 making mind maps and summaries, and doing learning activities (@ 8 hours per learning unit)	64
Completing two assignments (Note: Assignment 1 should typically take less time than assignment 2)	10
Examination revision	20
Writing the examination	2
Total	**120**

7 PRACTICAL WORK AND WORK-INTEGRATED LEARNING

There is no practical work for this module since this is a theoretical module.

8 ASSESSMENT

8.1 Assessment criteria

The assessment in this module has both formative and summative types of assessments.

8.2 Assessment plan

The assessment in this module consists of both formative assessment (learning activities and assignments) and summative assessment (the examination).

Within each of the learning units there are activities you should complete, including revision questions at the end of every unit. I encourage you to do these activities, as they will help you to achieve the learning outcomes and to prepare you for the examination.

There are three assignments which you should submit before the due dates. Assignment 01 contributes 20% towards the semester mark and Assignment 02 contributes 80%. Assignment 03 is not compulsory, but I would encourage you to do it, as it will enrich your learning process.

At the end of each semester you will write the examination. Assignments 01 and 02 combined contribute 30% towards the final mark, and the examination will contribute 70%.

8.3 General assignment numbers

There are three assignments for both semesters, namely Assignment 01, Assignment 02 and Assignment 03. Assignment 03 is not compulsory and will not be marked.

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 for which you are not registered.

8.3.1 Unique assignment numbers

Semester 1
Assignment 01: **719274**
Assignment 02: **849002**
Assignment 03: **700805**

Semester 2
Assignment 01: **705664**
Assignment 02: **881692**
Assignment 03: **820332**

8.3.2 Due dates for assignments

SEMESTER 01:
Assignment 01: Due date: 9 March 2018
Assignment 02: Due date: 6 April 2018
Assignment 03: Due date: 20 April 2018

SEMESTER 02:
Assignment 01: Due date: 24 August 2018
Assignment 02: Due date: 14 September 2018
Assignment 03 :Due date : 21 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 *my*Unisa. Assignments may **not** be submitted by fax or email.

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

To submit an assignment via *my*Unisa:
- Go to *my*Unisa.
- 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 9.

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 (MIB2602). 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

SEMESTER 1

ASSIGNMENT 01
Unique assignment no: 719274

DUE DATE: 9 March 2018

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. Which of the following is NOT directly involved in microbial ecology?
   1. communities.
   2. urbanisation.
   3. populations.
   4. ecosystems. (2)

2. Which of the following is NOT involved in biogeochemical cycling?
   1. Nutrients
   2. Transversion
   3. Reduction
   4. Immobilisation (2)

3. All of the following are involved in the environments of microorganisms **except** ...
   1. biofilms.
   2. loops.
   3. mats.
   4. bases. (2)

4. All of the following are associated with microbial interactions **except** _____.
   1. rumen
   2. mutualism
   3. commensalism
   4. conidium (2)

5. Which of the following are NOT associated with aquatic environments?
   1. Dissolved oxygen
   2. Outer membrane
   3. Redfield ratio
   4. Primary producers (2)

6. An extremely heat- and chemical-resistant, dormant, thick-walled spore that develops within bacteria is known as a(n)…
   1. mycelium.
   2. flagellum.
   3. viroid.
   4. endospore. (2)

7. All of the following are associated with microbial soil ecology **except** ____.
   1. organic matter.
   2. carbon to nitrogen ratio.
   3. humus.
   4. marine snow. (2)

8. The formation of a cyst (dormant, low metabolic activity) is called ____.
   1. syngamy
   2. excystment
   3. conjugation
   4. encystment (2)

9. In the Winogradsky column the bottom part consists of ____..
   1. O_2 dominated mud
   2. Rust- coloured zone
   3. Anoxic H_2S dominated zone
   4. Red zone. (2)

10. The flow of energy and matter in living organisms through a producer-consumer sequence is known as ___.
   1. the ecosystem
   2. the food chain
   3. commensalism
   4. the food web (2)

TOTAL MARKS [20]

END OF ASSIGNMENT 01 (SEMESTER 1)

SEMESTER 1

ASSIGNMENT 02
DUE DATE: 06 April 2018
Unique number: 849002
INSTRUCTIONS

1.Type your assignment on a computer. You may print on ordinary white paper and not necessarily the Unisa typing paper provided. Please use 1,5 spacing and Arial or a similar font of 11 or 12 pitch. Leave a line open between questions. We will not mark a typed assignment that does not comply with these requirements. If you could not type your assignment, use a black or blue pen and please write neatly.
2) Use the assignment cover and envelope provided. When stapling your answers inside the cover, staple only in the top left-hand corner.
3) Your student number is the number just below your address. This number must be filled in on the assignment cover and must also be quoted in all correspondence with the university.
4) Answer all questions as briefly and clearly as possible.
5) Formulate the answers in your own words.
6) Number your answers correctly.

Question 1

Describe the following terms: (5 x 5 =25)

1.1 Geosmin.

1.2 Benthos.

1.3 Micro environment.

1.4 Eutrophic

1.5 Extreme environments.

[25]

Question 2

Regarding microbial ecology, explain the following:

2.1 Terrestrial environments

2.2 Biogeochemical cycles

2.3 Winogradsky columns

2.4 Ecology

(4 x 5 = 20)
[20]

Question 3

Write explanatory notes on acid mine drainage with particular reference to soil, water ecology and extreme microorganisms. [**30]**

Question 4

Briefly discuss biofilms, microbial mats and microbial loops.

[25]
TOTAL MARKS [100]

END OF ASSIGNMENT 02 (SEMESTER 1)

Assignment 03:

Unique number: 700805
Discussion Forum

Due date: 20 April 2018

Discussion Forum

Note: This assignment is not compulsory and will not be marked. I would however like to encourage you to undertake it, as it will contribute positively to your learning experience.

To complete assignment 3, you need to go to the 'Discussion' option in the module web site on *my*Unisa. Click on the forum 'Module-related discussions' and then on the Activity 4.2: Microbe-plant interactions'.Answer the question in this topic, and also respond to at least one other posting by another student.

SEMESTER 2

Assignment 01

DUE DATE: 24 August 2018

Unique mark-reading sheet number: 705664
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. What is NOT associated with nitrogen fixation?
   1. *Rhizobia*
   2. nodules
   3. *Agrobacterium*
   4. Bacteroid (2)

2. Which of the following is NOT involved in biogeochemical cycling?
   1. Nutrients
   2. Immobilisation
   3. Reduction
   4. Inversion (2)

3. All of the following are involved in the environments of microorganisms **except …**
   1. biofilms.
   2. bases.
   3. mats.
   4. loops. (2)

4. All of the following are examples of methods involved in microbial ecology **except**
   1. viable counts.
   2. turnover.
   3. fimbria.
   4. ribosomal RNA. (2)

5. Which of the following are NOT associated with aquatic environments?
   1. Dissolved oxygen
   2. Redfield ratio
   3. Outer membrane
   4. oligotrophism (2)

6. Which of the following is NOT associated with marine environments?
   1. Plasmolysis
   2. Estuaries
   3. Halotolerance
   4. Blooms (2)

7. All of the following are most closely associated with the photic zone **except** ...
   1. element cycling.
   2. virioplankton.
   3. estuaries.
   4. pelagic. (2)

8. All of the following are associated with microbial soil ecology **except** ...
   1. organic matter.
   2. carbon to nitrogen ratio.
   3. humus.
   4. marine snow. (2)

9. All of the following are associated with microbial interactions **except** ...
   1. rumen.
   2. mutualism.
   3. commensalism.
   4. asthma. (2)

10. Which of the following is NOT directly involved in microbial ecology?
   1. communities.
   2. populations.
   3. urbanisation.
   4. ecosystems (2)

TOTAL MARKS [20]

END OF ASSIGNMENT 01 (SEMESTER 2)

SEMESTER 2

Assignment 02

DUE DATE: 14 September 2018

Unique mark-reading sheet number: 881692

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

Describe the following terms: (5X8=40)

1.1 Extreme environments
1.2 Micro environment
1.3 Benthos
1.4 Eutrophic
1.5 Geosmin

[40]

Question 2

Write explanatory short notes on the following: (5X5=20)

2.1 Soil as a microbial environment (5)
2.2 Soil microorganisms linked to plant and human disease (5)
2.3 Positive and negative microbial interactions (5)
2.4 The rumen as an ecosystem (5)

[20]

Question 3

Explain in detail four different methods of microbial interactions. **[20]**

Question 4

Summarise the role of soil micro-organisms in the global circulation of nutrients. **[20]**

TOTAL MARKS [100]

END OF ASSIGNMENT 02 (SEMESTER 2)

Assignment 03
Unique number: 820332
Discussion Forum:
Due date: 21 September 2018

Discussion Forum
Note: This assignment is not compulsory and will not be marked. I would however like to encourage you to undertake it, as it will contribute positively to your learning experience.

To complete assignment 3, you need to go to the 'Discussion' option in the module web site on myUnisa. Click on the forum 'Module-related discussions' and then on the topic Activity 4.3: The subsurface biosphere'. Answer the question in this topic, and also respond to at least one other posting by another student.

END OF ASSIGNMENT 03 (SEMESTER 2)