

Tutorial Letter 101/3/2016

Mechanics

PHY1505

Semesters 1 & 2

Department of Physics

IMPORTANT INFORMATION:

This tutorial letter contains important
information about your module.

BAR CODE

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1 INTRODUCTION AND WELCOME

The Department of Physics at Unisa is very pleased to welcome you to the module PHY1505 on Mechanics, which is offered as a semester module. Throughout the semester we will do our best to make you succeed in this module. From your side we expect you to start studying early in the semester and to complete all the module assignments thoroughly and on time. We hope you will find this module interesting and rewarding.

This tutorial letter contains important information about the scheme of work, resources and assignments for this module. We urge you to read it carefully and to keep it at hand when working through the study material, preparing the assignments, preparing for the examination and addressing questions to the module leader. Please read this tutorial letter, Tutorial Letter 101, in combination with Tutorial Letter 301 as it gives you an idea of generally important information about studying at a distance through the Department of Physics.

In this tutorial letter you will find the assignments and assessment criteria for this module as well as instructions on the preparation and submission of the assignments. This tutorial letter also provides information about the prescribed study material and other resources, and where to obtain them. Please study this information carefully and make sure that you obtain the prescribed study material as soon as possible. We also included certain general and administrative information about this module. Please study this section of the tutorial letter carefully. Also see the booklet entitled *My Studies @ Unisa*.

During the semester you may receive a number of tutorial letters either in print or online (through *myUnisa*). Tutorial letters are our main way of communicating with you about teaching, learning and assessment. Please read tutorial letters you receive immediately and carefully. **You must read all the tutorial letters** you receive during the semester **immediately and carefully**, as they always contain important and, sometimes, urgent information. If you have access to the Internet, you can view tutorial letters for the modules for which you are registered on the University's online campus, myUnisa, at <http://my.unisa.ac.za>

2 PURPOSE AND OUTCOMES OF THE MODULE

2.1 Purpose

The purpose of this module is to teach you the concepts, principles and laws of mechanics as well as problem-solving skills involving the application of concepts, principles and laws of mechanics. This module deals with the following concepts in mechanics:

- Concepts of motion
- Kinematics in One and Two dimensions
- Newton's Laws of Motion
- Conservation of Mechanical Energy and Momentum
- Newton's Law of Universal Gravitation
- Circular Motion and Rotation

- Oscillations
- Fluids and Elasticity

One of the primary goals of this module is to assist you to develop a conceptual understanding of these concepts.

2.2 Outcomes

After successful completion of this module you should be able to

- describe the motion of objects in terms of their position, velocity and acceleration using words, graphs and equations.
- state and explain Newton's three laws of motion and Newton's Law of Universal Gravitation.
- state and explain the principle of Conservation of Mechanical Energy and the principle of Conservation of Momentum.
- derive expressions for the moment of inertia of regular shaped objects of uniform mass density. (thin rod, circular disc, rectangular plate, cylinder, sphere)
- state and explain the Equation of Continuity and Bernoulli equation for incompressible fluids.
- integrate the concepts, principles and laws of mechanics (indicated above) to solve word problems in mechanics.

3 LECTURER AND CONTACT DETAILS

3.1 Lecturer

All queries that are about the content of this module should be directed to the module leader or the secretary of the Department of Physics. e-mail is the preferred form of communication to use. When you contact us please have your student number, module code and study material with you. When you e-mail or write to us, please indicate your student number and the appropriate module code.

You are always welcome to come and discuss your work with the module leader, but **please make an appointment before coming**. Please come to these appointments well prepared with specific questions that indicate your own efforts to have understood the basic concepts involved. You can contact the module leader at

Prof G. J. Rampho
Department of Physics
Private Bag X6
Florida 1710

e-mail : ramphjg@unisa.ac.za
Tel : 011 670 9076 (RSA)
: +27 11 670 9076 (International)

PLEASE NOTE: Letters to module leaders may not be enclosed with or inserted into assignments.

3.2 Department

Communication to the Department of Physics concerning matters that are of general administrative nature can be addressed to the secretary of the department.

The Secretary
Department of Physics
Private Bag X6
Florida 1710

e-mail : physics@unisa.ac.za
Tel : 011 670 9066 (RSA)
: +27 11 670 9066 (International)

3.3 University (contact details)

If you need to contact the University about matters not related to the content of this module, please consult the brochure *My Studies @ Unisa* that you received with your study material. This brochure contains information on how to contact the University (e.g. to whom you can write for different queries, important telephone and fax numbers, addresses and details of the times certain facilities are open). **Always have your student number at hand when you contact the University.**

4 MODULE RELATED RESOURCES

4.1 Prescribed book

The prescribed study material for this module is :

- **Prescribed Textbook :**

Physics for Scientists and Engineers: A Strategic Approach with Modern Physics,
3rd Edition (Pearson New International Edition), (Pearson, 2014) by Randall D. Knight
ISBN 13: 978-1-292-02078-5

- **Prescribed Chapters :**

Chapter 1 to Chapter 15: The content of the module is derived from the first 15 chapters of the prescribed textbook. All sections of each chapter should be studied.

Please refer to the list of official booksellers and their addresses in the *My Studies @ Unisa* brochure. 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 Department at Tel: 012 429 4152 or e-mail vospresc@unisa.ac.za.

4.2 Recommended books

There are no recommended books for this module.

4.3 e-Reserves

There are no e-Reserves for this module.

5 STUDENT SUPPORT SERVICES FOR THE MODULE

For information on the various student support systems and services available at Unisa (e.g. student counseling, tutorial classes, language support), please consult the publication *My Studies @ Unisa* that you received with your study material.

5.1 Study groups

It is advisable to have contact with fellow students. One way to do this is to form study groups. The addresses of students in your area may be obtained from the following department:

Directorate: Student Administration and Registration
PO Box 392
UNISA 0003

5.2 myUnisa

If you have access to a computer that is linked to the Internet, you can quickly access resources and information at the University. The *myUnisa* learning management system is Unisa's online campus that will help you to communicate with your lecturers, with other students and with the administrative departments of Unisa all through the computer and the Internet.

To go to the *myUnisa* website, start at the main Unisa website, www.unisa.ac.za, and then click on the "*myUnisa*" link below the orange tab labeled "Current students". This should take you to the *myUnisa* website. You can also go there directly by typing my.unisa.ac.za in the address bar of your browser. Please consult the publication *My Studies @ Unisa* which you received with your study material for more information on *myUnisa*.

5.3 Group Discussions

There are no group discussions for this module.

5.4 Tutorial Classes

There are no tutorial classes for this module.

6 MODULE SPECIFIC STUDY PLAN

Pace	Concepts
week 1 to week 3	- Concepts of motion - Kinematics in One and Two dimensions
week 4 to week 6	- Newton's laws of motion - Circular motion and Rotation
week 8 to week 10	- Mechanical energy and momentum - Newton's law of Universal Gravitation
week 12 to week 14	- Oscillations - Fluids and Elasticity

7 MODULE PRACTICAL WORK AND WORK INTEGRATED LEARNING

There are no practicals for this module.

8 ASSESSMENT

8.1 Assessment plan

There are two written assignments and a written examination for this module. Please make sure that you **solve only the problems for the semester for which you are registered**. When marking the assignments, constructive comments will be made on your work, which will then be returned to you. The assignments and the comments on these assignments constitute an important part of your learning and should help you to be better prepared for the next assignment and the examination. Please do not wait until you receive Assignment 01 back before you start working on Assignment 02.

Both assignment 01 and assignment 02 count equally towards your semester mark for this module. Your semester mark for this module counts 20% and your examination mark 80% of your final mark for the module.

8.2 General assignment numbers

The assignments are numbered as 01 and 02 for each semester.

8.2.1 Unique assignment numbers

Please note that each assignment has a unique assignment number which has to be written on the cover of your assignment.

8.2.2 Due dates of assignments

The due dates for the submission of the assignments in 2016 are

Assignment number	Semester 1	Semester 2
01	25 February	27 July
02	30 March	01 September

8.3 Submission of assignments

You may submit written assignments either by post or electronically via *myUnisa* in **PDF format**. Assignments may **NOT** be submitted by fax or e-mail. For detailed information on assignments, please refer to the *My Studies @ Unisa* brochure, which you received with your study package. Assignments should be sent to

The Registrar
P.O. Box 392
UNISA 0003

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.

PLEASE NOTE: Although students may work together when preparing assignments, each student must write and submit his or her own individual assignment. In other words, you must submit your own calculations in your own words. It is **NOT** acceptable for students to submit identical assignments on the basis that they worked together. That is copying (a form of plagiarism) and none of these assignments will be marked. Furthermore, you may be penalized or subjected to disciplinary proceedings by the University.

8.4 Assignments

There are two compulsory assignments for this module.

If you are registered for **Semester 1** your assignments are given in **Addendum B**.

If you are registered for **Semester 2** your assignments are given in **Addendum C**.

9 OTHER ASSESSMENT METHODS

There are no other assessment methods for this module.

10 EXAMINATION

10.1 Examination admission

To be admitted to the examination you must submit your two assignments

10.2 Examination period

If you are registered for the first semester, and you qualify, you will write the examination in May/June 2016 and the supplementary examination will be written in October/November 2016. If you are registered for the second semester, and you qualify, you will write the examination in October/November 2016 and the supplementary examination will be written in May/June 2017.

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

10.3 Examination paper

The examination will be a single two-hour written paper. One part of the examination will require you to define or explain concepts, laws and principles of mechanics, while the other part will require you to solve problems in mechanics. **NO formula sheet will be provided in the examination.** Refer to the *My Studies @ Unisa* brochure for general examination guidelines.

11 FREQUENTLY ASKED QUESTIONS

You are encouraged to frequently check the Discussion Forum on the module website on *myUnisa*. For any other study information see the brochure *My Studies @ Unisa*.

12 CONCLUSION

I hope that you will enjoy this module and wish you success.

ADDENDUM A: SOLUTION RUBRIC

Solutions to problems in the assignments and examination will be marked following the rubric below. Examples will be given during the semester to show how the rubric is applied.

Criterion	5	4	3	2	1	0
PROBLEM DESCRIPTION	useful and complete	useful with minor omissions/errors	parts not useful, missing or contain errors	most not useful, missing or contain errors	all not useful or contain errors	no description provided
PHYSICS APPROACH	appropriate and complete	appropriate with minor omissions /errors	parts not appropriate, missing or contain errors	most not appropriate, missing or contain errors	all not appropriate	no approach provided
MATHEMATICS PROCEDURES	appropriate and complete	appropriate with minor omissions /errors	parts not appropriate, missing or contain errors	most not appropriate, missing or contain errors	all not appropriate	no approach provided
LOGICAL PROGRESSION	clear, focused and consistent	clear and focused with minor omissions /errors	parts not clear, not focused or not consistent	most not clear, not focused or not consistent	all not clear, not focused or not consistent	no evidence of logical progression

Criteria that are not applicable to the problem or not necessary to help obtain the solution will not be used in evaluating the solution.

ADDENDUM B: SEMESTER 1 STUDENTS ONLY

All the problems are taken from the prescribed textbook. Solve the problems indicated and submit the solutions for evaluation on or before the due date indicated.

You are advised to work through the relevant chapters in the prescribed textbook thoroughly before attempting to solve assignment problems. It is essential to submit assignments on or before the due date.

ASSIGNMENT 01 DUE DATE: 25 FEBRUARY 2016 Unique Number : 880808

Chapter	1	2	3	4	4	5	6	6	7	8
Problem	56	69	22	42	70	32	28	55	38	51

TOTAL : 100

ASSIGNMENT 02 DUE DATE: 30 MARCH 2016 Unique Number : 795439
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Chapter	9	9	10	11	11	12	13	14	15	15
Problem	46	58	44	44	62	58	32	56	26	62

TOTAL : 100

ADDENDUM C: SEMESTER 2 STUDENTS ONLY

All the problems are taken from the prescribed textbook. Solve the problems indicated and submit the solutions for evaluation on or before the due date indicated.

You are advised to work through the relevant chapters in the prescribed textbook thoroughly before attempting to solve assignment problems. It is essential to submit assignments on or before the due date.

ASSIGNMENT 01
DUE DATE: 27 July 2016
Unique Number : 779616

Chapter	1	2	3	4	4	5	6	6	7	8
Problem	57	68	20	41	68	30	32	54	36	50

TOTAL : 100

ASSIGNMENT 02
DUE DATE: 01 September 2016
Unique Number : 866091

Chapter	9	9	10	11	11	12	13	14	15	15
Problem	48	60	34	42	66	57	34	54	28	60

TOTAL : 100