Tutorial letter 101/0/2025

Discrete Mathematics: Combinatorics

MAT3707

Year module

Department of Mathematical Sciences

IMPORTANT INFORMATION

Please register on myUnisa, activate your myLife e-mail account and make sure that you have regular access to the myUnisa module website, MAT3707-2025-Y.

BARCODE

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1 INTRODUCTION

Dear Students

Unisa is a Comprehensive Open Distance e-Learning (CODeL) higher education institution. The comprehensiveness of our curricula encapsulates a range of offerings, from strictly vocational to strictly academic certificates, diplomas and degrees. Unisa's "openness" and its distance eLearning character result in many students registering at Unisa who may not have had an opportunity to enrol in higher education. Our CODeL character implies that our programmes are carefully planned and structured to ensure success for students ranging from the under-prepared but with potential to the sufficiently prepared.

Teaching and learning in a CODeL context involves multiple modes of delivery ranging from blended learning to fully online. As a default position, all post graduate programmes are offered fully online with no printed study materials, while undergraduate programmes are offered in a blended mode of delivery where printed study materials are augmented with online teaching and learning via the learner management system - `myUnisa`. In some instances, undergraduate programmes are offered fully online as well.

Furthermore, our programmes are aligned with the vision, mission and values of the University. Unisa's commitment to serve humanity and shape futures combined with a clear appreciation of our location on the African continent, Unisa's graduates have distinctive graduate qualities which include

- independent, resilient, responsible and caring citizens who are able to fulfil and serve in multiple roles in their immediate and future local, national and global communities
- having a critical understanding of their location on the African continent with its histories, challenges and potential in relation to globally diverse contexts
- the ability to critically analyse and evaluate the credibility and usefulness of information and data from multiple sources in a globalised world with its ever-increasing information and data flows and competing worldviews
- how to apply their discipline-specific knowledges competently, ethically and creatively to solve real-life problems
- an awareness of their own learning and developmental needs and future potential

The module MAT3707 is offered online, meaning that all information is available via the internet, we use `myUnisa` platform as our virtual campus. This is an online system that is used to administer, document and deliver educational material to you and support engagement with you. Look out for information from your lecturer as well as other Unisa platforms to determine how to access the virtual `myUnisa` module site. Information on the tools that will be available to engage with the lecturer and

fellow students to support your learning will also be communicated via various platforms.

You are encouraged to log into the module site (MAT3707-25-Y) on regularly (that is, at least twice per week).

Welcome to the MAT3707 module. We trust that you will find it both interesting and rewarding.

This tutorial letter contains important information about the scheme of work and resources for this module as well as exam admission.

We urge you to read it carefully before working through the study material, preparing the assignment(s), preparing for the examination and addressing questions to your lecturers.

In this tutorial letter, you might find the instructions on the preparation and submission of the assignments.
This tutorial letter also provides all the information you need with regard to the prescribed study material and other resources.
Please study this information carefully and make sure that you obtain the prescribed material as soon as possible.

You will access all files online, a number of tutorial letters for example, solutions to assignments (feedback to assignments can also be discussed on MS Teams/MAT3707), during the year. These tutorial letters will be uploaded on myUnisa, under Offical Study materials or Additional Resources on course website. A tutorial letter is our way of communicating with you about teaching, learning and assessment.

Right from the start we would like to point out that you must read all the tutorial letters you access from the module site immediately and carefully, as they always contain important and, sometimes urgent information.

Because this is a fully online module, you will need to use myUnisa to study and complete the learning activities for this course. Please visit the website for MAT3707 on myUnisa frequently. The website for your module is MAT3707-25-Y.

We wish you every success with your studies!

2 MODULE OVERVIEW

2.1 Purpose

The purpose of this module is to enable students to master the fundamental concepts of graph theory and combinatorics. In graph theory topics such as isomorphic graphs, planar graphs, Euler cycles, Hamilton circuits, graph colouring, trees, the travelling salesperson problem and minimal spanning trees are discussed. In combinatorics, we look at basic counting principles, generating functions, recurrence relations and inclusion exclusion principle.

2.2 Outcomes

To understand, compute and apply the following graph theoretic and combinatorial concepts:

2.2.1 First set

Apply certain concepts of graph theory: in particular, to determine isomorphism between graphs, as well as to determine whether a graph is connected, bipartite and planar.

- Model a problem in graph-theoretic terms.
- Show that two given graphs are isomorphic (by demonstrating an isomorphism).
- Show that two graphs are not isomorphic (by indicating a property that the one graph possesses and the other graph lacks).
- Determine if a given graph is bipartite or not.
- Determine whether a graph is connected or not.
- Determine whether a graph is planar or not by using the circle-chord method. Find a $K_{3,3}$ or K_5 configuration in a non-planar graph.
- Apply Euler's theorem.
- Apply the corollaries to Euler's theorem (including extensions in the Study Guide) to show that a graph is non-planar.

2.2.2 Second set

Apply the concepts of Euler cycles, Hamilton circuits and graph colouring.

- Determine if a given graph has an Euler cycle/Euler trail.

- Find an Euler cycle/Euler trail in a given graph.
- Determine whether a given graph has a Hamilton circuit by using the Rules, or Dirac's theorem or Grinberg's theorem.
- Find a lower bound and an upper bound for the chromatic number of a graph.
- Find the chromatic number of a graph by finding equal upper and lower bounds.

2.2.3 Third set

Apply the concepts of trees and minimal spanning trees.

- Model certain problems in terms of trees.
- Calculate the number of leaves, vertices or internal leaves in an m-ary tree when one of the these values is given.
- Bound the number of leaves of an m-ary tree in terms of m and the height of the tree.
- Bound the height of an m-ary tree in terms of its number of leaves.
- Calculate the number of different undirected trees on n labels.
- Construct depth-first or breath-first spanning trees.
- Find the shortest paths from a given vertex using breath-first spanning trees.
- Find a minimal spanning tree.

2.2.4 Fourth set

Apply basic counting principles and binomial identities to solve a variety of counting problems.

- Solve simple counting problems using the multiplication and addition principles.
- Determine the number of r-permutations and r-combinations of a set of n distinct objects.
- Solve counting problems involving permutation and combinations.
- Determine the number of arrangements of n objects (with repetition), where r_i is of type i $(i = 1, 2, \ldots, m)$, $n = r_1 + r_2 + \cdots + r_m$.
- Determine the number of selections with repetition of r objects chosen from n types of objects.
- Solve counting problems involving arrangements and selection with repetition.
- Solve counting problems involving distribution of r distinct/identical objects in n distinct/identical containers.

2.2.5 Fifth set

Apply the concepts of generating functions, recurrence relations and inclusion-exclusion formula.

- Construct (ordinary) generating problems for problems related to:
    1. The number of integer solutions of an equation;
    2. Selection with repetition;
    3. The distribution of identical objects in distinct containers;
    4. The distribution of identical object in identical containers.
- Calculate the coefficients of generating functions in order to solve the original combinatorial problem for which the generating function has been constructed.
- Construct exponential generating functions for problems related to:
    1. Arrangements with repetition;
    2. The distribution of different objects in different containers.
- Use power series of the exponential function to calculate the coefficients of exponential generating functions in order to solve the original combinatorial problem for which the exponential generating function has been constructed.
- Model certain combinatorial problems in terms of recurrence relations.
- Solve linear recurrence relations.
- Solve inhomogeneous recurrence relations.
- Solve recurrence relations using generating functions.
- Explain how the inclusion-exclusion formula is derived for two or three sets.
- Use the inclusion-exclusion principle to solve certain counting problems.

3 CURRICULUM TRANSFORMATION

Unisa has implemented a transformation charter, in terms of which the university has placed curriculum transformation high on the teaching and learning agenda. Curriculum transformation includes 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. All of these will be phased in at both programme and module levels, and as a result of this you will notice a marked change in the teaching and learning strategy implemented by Unisa, together with the way in which the content is conceptualised in your modules. We encourage you to embrace these changes during your studies at Unisa in a responsive way within the framework of transformation

4 Lecturer(s) and contact details

4.1 Lecturer(s)

The primary lecturer for this module is:

Dr. Partha Pratim Ghosh	
Department	Mathematical Sciences
Email	ghoshpp@unisa.ac.za

A notice will be posted on `myUnisa` if there are any changes and/or an additional lecturer is appointed to this module.

Please do not hesitate to consult your lecturer whenever you experience difficulties with your studies. You may contact your lecturer by email or by visiting him in his office. **Please arrange an appointment in advance (by e-mail) to ensure that your lecturer will be available when you arrive.** Please come to these appointments well prepared with specific questions that indicate your own efforts to have understood the basic concepts involved. If these difficulties concern exercises which you are unable to solve, you must send us your attempts so that we can see where you are going wrong.

If you should experience any problems with the exercises in the study guide or prescribed book, your lecturer will gladly help you with them, provided that you send in your bonafide attempts. **When sending in any queries or problems, please do so separately from your assignments and address them directly to your lecturer.**

Whenever you contact a lecturer via e-mail, please include your student number in the subject line to enable the lecturer to help you more effectively.

4.2 Department

You can contact the Department of Mathematical Sciences as follows:

`Departmental Secretary`	
Telephone number	+27 11 670 9171 RSA
	+27 11 670 9147 International
E-mail	mathsciences@unisa.ac.za
	swanemm@unisa.ac.za

4.3 University

To contact the University, follow the instructions on the `Contact us` page on the `Unisa website`.

If you need to contact the university about matters not related to the content of this module, contact addresses of the various administrative departments appear on the Unisa website:

http://www.unisa.ac.za/sites/corporate/default/Contact-us/Student-enquiries.

Please include your student number in all correspondence. You must use myLife e-mail to send enquiries to all UNISA departments.

5 Resources

5.1 Prescribed book

Prescribed books can be obtained from the university's official booksellers. If you have difficulty locating your prescribed book, please contact the Prescribed Books Section at (012) 429 4152 or email vospresc@unisa.ac.za.

Your prescribed textbook for this module is:

Title	Applied Combinatorics
Author	Alan Tucker
Publisher	John Wiley & Sons, New York 2012
Edition	Sixth Edition
	ISBN 978-0-470-45838-9

Please buy the textbook as soon as possible since you have to study from it directly. You cannot do this module without the prescribed textbook.

Please refer to the list of official booksellers and their addresses in the *Study @ 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 Section at Tel: 012 429-4152 or e-mail `vospresc@unisa.ac.za`.

5.2 Recommended book(s)

There are no recommended books for this module.

5.3 Electronic reserves (e-reserves)

E-reserves can be downloaded from the Library catalog. More information is available at: `http://oasis.unisa.ac.za/search/r`

5.4 Library services and resources

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 Library glance at http://www.unisa.ac.za/sites/corporate/default/Library
- For research support and services (e.g. the services offered by personal librarians and the request a literature search service offered by the information search librarians), go to http://www.unisa.ac.za/sites/corporate/default/Library/Library-services/Research-support
- For library training for undergraduate students, go to https://www.unisa.ac.za/sites/corporate/default/Library/Library-services/Training

The library has created numerous library guides, available at 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
- Frequently asked questions about the library: http://libguides.unisa.ac.za/ask
- Services to students living with disabilities: http://libguides.unisa.ac.za/disability
- A–Z of library databases: https://libguides.unisa.ac.za/az.php

Important contact information:

- Ask a librarian:
  https://libguides.unisa.ac.za/ask
- Technical problems encountered in accessing library online services:
  Lib-help@unisa.ac.za
- General library-related queries:
  Library-enquiries@unisa.ac.za
- Queries related to library fines and payments:
  Library-fines@unisa.ac.za
- Social media channels: Facebook: UnisaLibrary and Twitter:
  https://twitter.com/unisalibrary

6 Student support services

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

This brochure contains important information and guidelines for successful studies through Unisa.

If you need assistance with regard to the myModules system, you are welcome to use the following contact details:

- Toll-free landline: 0800 00 1870 (Select option 07 for myModules)
- E-mail: `mymodules22@unisa.ac.za` or `myUnisaHelp@unisa.ac.za`

You can access and view short videos on topics such as how to view your calendar, how to access module content, how to view announcements for modules, how to submit assessment and how to participate in forum activities via the following link:

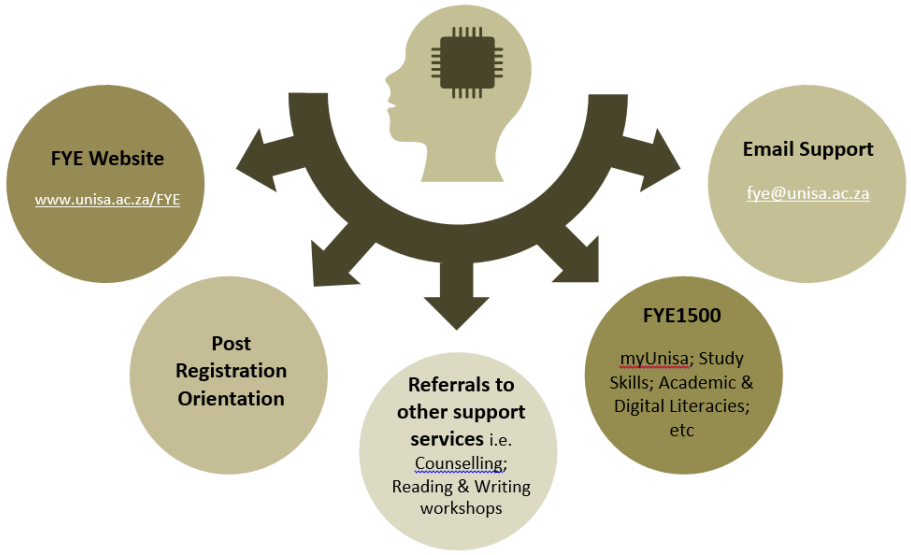
`https://dtls-qa.unisa.ac.za/course/view.php?id=32130`

Registered Unisa students get a free myLife e-mail account. Important information, notices and updates are sent exclusively to this account. Please note that it can take up to 24 hours for your account to be activated after you have claimed it. Please do this immediately after registering at Unisa, by following this link: `myLifeHelp@unisa.ac.za`

Your myLife account is the **only** e-mail account recognised by Unisa for official correspondence with the university, and will remain the official primary e-mail address on record at Unisa. You remain responsible for the management of this e-mail account.

6.1 First year experience

Many students find the transition from school education to tertiary education stressful. This is also true in the case of students enrolling at Unisa for the first time. Unisa is a dedicated open distance and e-learning institution, and it is very different from face-to-face/contact institutions. It is a mega university, and all our programmes are offered through either blended learning or fully online learning. It is for this reason that we thought it necessary to offer first-time students additional/extended support to help them seamlessly navigate the Unisa teaching and learning journey with little difficulty and few barriers. We therefore offer a specialised student support programme to students enrolling at Unisa for the first time - this is Unisa's First-Year Experience (FYE) Programme, designed to provide you with prompt and helpful information about services that the institution offers and how you can access information. The following FYE services are currently offered:



To ensure that you do not miss out on important academic and support communication from the SRU, please check your myLife inbox regularly.

6.2 Using Recognition of Prior Learning (RPL) to apply for module credit within a qualification

Now that you are a registered student, you are advised to familiarise yourself with the learning outcomes of the module or modules you have chosen. If you have been exposed to those learning outcomes for three years or more - either through work experience or other involvement - you can apply to be exempted from completing assignments and writing examinations. As part of your application for this exemption, you will be required to compile a portfolio of evidence substantiating how your experience is equivalent to the learning outcomes. The diagram below shows the steps involved in obtaining recognition of prior learning (RPL) for module credit. For more information on the process, RPL fees, and the contact details of your college RPL coordinator, visit the Unisa website: www.unisa.ac.za/rpl

7 Study plan

Your study plan of the module is outlined below. Please refer to the general management and planning skills guidelines in the *Studies @ Unisa* Brochure for further details.

The study plan below shows the content to be covered during specific periods of the year in terms of the broad concepts or topics, the study guide units and the prescribed book chapters. Your studies will be largely guided by the tutorial discussions and learning activities, and the assignments, which are all based on the same study plan. You should therefore participate as much as possible in the tutorial discussions and complete assignments and the learning or self-assessment activities linked to each topic in order to do well in the assignments, and for you to be well prepared for the final examination.

NB Note that Assignment 1 is the compulsory assignment and it might include other part of the units in the prescribed book or the study guide, please don't be surprised to see questions from different units.

Month	Activities
January - February	Read the `Tutorial Letter 101` (this letter)
February - May	Complete the material on *Graph Theory*, i.e., the outcomes 2.2.1 - 2.2.3
Submit Assignment 1 by end of May 2025	
June-July	Complete the material on *Combinatorics*, i.e., the outcome 2.2.4 - 2.2.5
Submit Assignment 2 by end of July 2025	
August - September	Revise the full syllabus and get ready for the Assignment 3, which is akin to the main examination. You should consider this as a preparation for the main examination
Submit Assignment 3 by end of September 2025	
October - December	Prepare for examination Get to know your shortcomings and repair them

8 How to study online

8.1 What does it mean to study online?

- All your study material and learning activities for online modules are designed to be delivered online on *myUnisa*.
- **All your assignments must be submitted online**. This means that you will do all your activities and submit all your assignments on *myUnisa*.
- All communication between you and the University happens online. Lecturers will communicate with you via e-mail and SMS, and use the **Announcements** and **Additional Resources Forums** to keep you up date with developments in the module.

It is very important that you log in to myUnisa regularly. We recommend that you log in at least once a week to do the following:

- **Check for new announcements on the module site**. You can also set your myLife e-mail account so that you receive the announcement e-mails on your cellphone.
- **Read the notices on the myUnisa landing page**.

9 Assessments

9.1 Assessment criteria

There are three assignments for this module, numbered 01, 02 and 03 and one examination.

Examination admission.

Please note that lecturers are not responsible for examination admission, and ALL enquiries about examination admission should be directed by e-mail to `exams@unisa.ac.za`.

You will be admitted to the examination if and only if at least one assignment reaches the Assignment Section before the due date
and also obtain a minimum of 40% in the assignments combined

Note that your marks for the assignments contribute 20% to your final mark (the remaining 80% is contributed by the final examinations).

9.2 Assessment plan

- To complete this module, you will be required to submit 3 assessments.
- All information about when and where to submit your assessments will be made available to you via the `MAT3707-25-Y` site for this module.
- Due dates for assessments, as well as the actual assessments are available on the `MAT3707-25-Y` site for this module.
- To gain admission to the examination, you will be required to submit at least one assignment.
- To gain admission to the examination, you also need to obtain a year mark average of 40% for the assignments.
- The assignment weighting for the module is 20 %.
- You will receive examination information via the myModules sites. Please watch out for announcements on how examinations for the modules for which you are registered will be conducted.

- The examination will count 80% towards the final module mark.

Please note that this module has a total of THREE assignments consisting of THREE written assignments (01-03).

The questions for the assignments are given online on the module site. For each assignment there is a **FIXED CLOSING DATE**; the date by which the assignment **must reach** the university (the student must submit the assignment online).

Solutions are **not** posted, neither a memorandum made available; reason: mathematics is not learnt by *reading* solutions/memorandum, it is to be *understood* by solving problems yourself. Hence, queries/doubts shall always be entertained via emails and they shall be reverted back with hints (note: no solution, you shall have to develop the hints to a complete solution) and if required further with face-to-face meetings.

Late assignments will not be marked and granted 0%, but queries/doubts on the assignment problems thereof shall be entertained.

Written assignment

Not all the questions in the written assignment will be marked and you will also not be informed beforehand which questions will be marked. The reason for this is that Mathematics is learnt by doing Mathematics, and it is therefore extremely important to do as many problems as possible.

Note that at least one assignment is the compulsory rule for admission to the examination and must reach (submit online) us by the due date.

The assignments have a combined 20% contribution towards the final mark.

The Written assignments can only be submitted online electronically through myUnisa.

The assessments together with the contributions of assignments to the year mark are as follows;

Assignment	Format	Weight (%)	Due date
01	Written	8	see myUnisa
02	Written	8	see myUnisa
03	Written	4	see myUnisa
Total		20	

*Because this is an online module, the assignments are not provided in this tutorial letter. Instead, the assignments are provided online as they become due. You will see and access them when you go online.

9.3 Assessment due dates

- There are no assignment **due dates** included in this tutorial letter.

- Assignment due dates will be made available to you on the myUnisa landing page for this module. We envisage that the due dates will be available to you upon registration.

- Please start working on your assessments as soon as you register for the module.

- Log on to the myUnisa site for this module to obtain more information on the due dates for the submission of the assessments.

9.4 Submission of assessments

- Unisa, as a comprehensive open distance e-learning institution (CODeL), is moving towards becoming an online institution. You will therefore see that all your study material, assessments and engagements with your lecturer and fellow students will take place online. We use *my*Unisaas our virtual campus.

- The *my*Unisavirtual campus will offer students access to the myModules site, where learning material will be available online and where assessments should be completed. This is an online system that is used to administer, document, and deliver educational material to students and support engagement between academics and students.

- The myUnisa platform can be accessed via https://my.unisa.ac.za. Click on the myModules 2025 button to access the online sites for the modules that you are registered for.

- The university undertakes to communicate clearly and as frequently as is necessary to ensure that you obtain the greatest benefit from the use of the myModules learning management system. Please access the announcements on your myModules site regularly, as this is where your lecturer will post important information to be shared with you.

- When you access your myModules site for the module/s you are registered for, you will see a welcome message posted by your lecturer. Below the welcome message you will see the assessment shells for the assessments that you need to complete. Some assessments may be multiple choice (Quiz), some tests, others written assessments, some forum discussions, and so on. All assessments must be completed on the assessment shells available on the respective module platforms.

- To complete quiz assessments, please log on to the module site where you need to complete the assessment. Click on the relevant assessment shell (Assessment 1, Assessment 2, etc.). There will be a date on which the assessment will open for you. When the assessment is open, access the quiz online and complete it within the time available to you. Quiz assessment questions are not included in the Tutorial Letter 101 and are only made available online. You must therefore access the quiz online and complete it online where the quiz has been created.

- It is not advisable to use a cell phone to complete the quiz. Please use a desktop computer, tablet or laptop when completing the quiz. Students who use a cell phone find it difficult to navigate the **Online Assessment** tool on the small screen and often struggle to navigate between questions and successfully complete the quizzes. In addition, cell phones are more vulnerable to dropped internet connections than other devices. **If at all possible, please do not use a cell phone for this assessment type**.

- For written assessments, please note the due date by which the assessment must be submitted. Ensure that you follow the guidelines given by your lecturer to complete the assessment. Click on the submission button on the relevant assessment shell on myModules. You will then be able to upload your written assessment on the myModules site of the modules that you are registered for. Before you finalise the upload, double check that you have selected the correct file for upload. Remember, no marks can be allocated for incorrectly submitted assessments.

You only submit your assignments electronically via *myUnisa*. Assignments can **not** be submitted by fax or e–mail nor by post as such will not be considered for marking.

For written assignments: Submit your answers in numerical order and make sure that every answer is numbered clearly. Write **clearly** in black ink.

9.4.1 Types of assignments and descriptions

All assignments are defined as either optional, mandatory, compulsory, or elective.

- **Elective assignments**

  - If not submitted, the student gets no mark for this item.
  - The best of the required submissions will count.

- **Mandatory assignments**
  - If not submitted, the student gets no mark for this item.
- **Compulsory assignments**
  - If not submitted, the result on the student's academic record will be *absent*.
- **Optional assignments**
  - You are encouraged as a student to do optional assignment so that it may benefit your learning.

I. Elective assignments

a. the student is given a choice of which assignments within an identified group to submit, only the best result(s), the number of which is specified in advance, will contribute towards the year mark.

b. elective assignments must also be grouped into an elective group.

c. for the student to select which assignment to submit, the elective assignments must be grouped together. For such an elective group, relevant information must be provided to the student, such as how many of the assignments must be submitted and how many of the assignment marks should be combined into the year mark.

d. The selection criteria define how marks received for assignments in an elective group are to be combined into the year mark. Three different criteria may be used for calculating the year mark:
   - The best mark should be used, or
   - If the student submits fewer than the required number of assignments per group or no assignment in a group, a mark of 0% will be used.
   - 0% is awarded to all non-submitted or unmarked assessments. A best mark is then calculated from all items.

II. Mandatory assignments

a. contribute to the year mark.

b. If a student fails to submit a mandatory assignment, no mark is awarded and the year mark is calculated accordingly. The student will therefore forfeit the marks attached to this assignment when the final mark for the module is calculated.

III. Compulsory Assessment

a. when not submitted, the student will fail a Continuous Assessment module but will be shown as absent from the examination in the case of other modules.

IV. Optional assignments - You are encouraged as a student to do optional assignment so that it may benefit your learning.

9.5 The assessments

As indicated in section 9.2, you need to complete three assessments for this module. The assignments for this module are Assignments 01, 02 and 03:

	Outcomes
Assignment 01	2.2.1 - 2.2.3
Assignment 02	2.2.4 - 2.2.5
Assignment 03	Revision, based on the whole syllabus, and akin to the main examination

There are no assignments included in this tutorial letter. Assignments will be uploaded on the my-Modules site for MAT3707.

Make sure you submit the correct assignment.

9.6 Other assessment methods

There are no other assessment methods for this module.

9.7 The examination

Examination information and details on the format of the examination will be made available to you online via the myUnisa site. Look out for information that will be shared with you by your lecturer and e-tutors (where relevant) and for communication from the university.

If you are registered for this module in 2025 then you will write the examination in **October/November** 2025.

Please note:

- The exam is a two hour examination.
- The use of a pocket calculator is not permitted during examination. You are **NOT** allowed to use a calculator during the exam.

The examination questions will be similar to the questions asked in the study guide and in the assignments.

9.7.1 Invigilation/proctoring

Since 2020 Unisa conducts all its assessments online. Given stringent requirements from professional bodies and increased solicitations of Unisa's students by third parties to unlawfully assist them with the completion of assignments and examinations, the University is obliged to assure its assessment integrity through the utilisation of various proctoring tools: Turnitin, Moodle Proctoring, the Invigilator App and **Intelligent Remote Invigilation System (IRIS)**. These tools will authenticate the student's identity and flag suspicious behaviour to assure credibility of students' responses during assessments. The description below is for your benefit as you may encounter any or all of these in your registered modules:

Turnitin is a plagiarism software that facilitates checks for originality in students' submissions against internal and external sources. Turnitin assists in identifying academic fraud and ghost writing. Students are expected to submit **typed** responses for utilisation of the Turnitin software.

The **Moodle Proctoring** tool is a facial recognition software that authenticates students' identity during their Quiz assessments. This tool requires access to a student's **mobile or laptop camera**. Students must ensure their camera is activated in their browser settings prior to their assessments.

The Invigilator "mobile application-based service does verification" of the identity of an assessment participant. The Invigilator Mobile Application detects student dishonesty-by-proxy and ensures that the assessment participant is the registered student. This invigilation tool requires students to download the app from their Play Store (Google, Huawei and Apple) on their mobile devices (camera enabled) prior to their assessment.

IRIS Invigilation software verifies the identity of a student during assessment and provides for both manual and automated facial verification. It has the ability to record and review a student's assessment session. It flags suspicious behaviour by the students for review by an academic administrator. IRIS software requires installation on students' laptop devices that are enabled with a webcam.

Students who are identified and flagged for suspicious dishonest behaviour arising from the invigilation and proctoring reports are referred to the disciplinary office for formal proceeding.

Please note:

Students must refer to their module assessment information on their myModule sites to determine which proctoring or invigilation tool will be utilised for their formative and summative assessments.

Note that Assignment 3 (Assignment 3) will utilise the Moodle Proctoring tool or the IRIS invigilation software in order for you to practice the use of protoring before the examination.

9.8 Supplementary

If you are registered for this module in 2025 then you will write the supplementary examination in **January/February** 2026.

During the course of the year, the Examination Section will provide you with information regarding the examination in general, examination websites, examination dates and examination times ant that including the supplementary examination.

10 ACADEMIC DISHONESTY

10.1 Plagiarism

Plagiarism is the act of taking the words, ideas and thoughts of others and presenting them as your own. It is a form of theft. Plagiarism includes the following forms of academic dishonesty:

- Copying and pasting from any source without acknowledging the source.
- Not including references or deliberately inserting incorrect bibliographic information.
- Paraphrasing without acknowledging the original source of the information.

10.2 Cheating

Cheating includes, but is not limited to, the following:

- Completing assessments on behalf of another student, copying the work of another student during an assessment, or allowing another student to copy your work.
- Using social media (e.g. WhatsApp, Telegram) or other platforms to disseminate assessment information.
- Submitting corrupt or irrelevant files, this forms part of examination guidelines
- Buying completed answers from so-called "tutors" or internet sites (contract cheating).

10.3 For more information about plagiarism, follow the link below:

https://www.unisa.ac.za/sites/myunisa/default/Study-@-Unisa/Student-values-and-rules

11 STUDENTS LIVING WITH DISABILITIES

The Advocacy and Resource Centre for Students with Disabilities (ARCSWiD) provides an opportunity for staff to interact with first-time and returning students with disabilities.

If you are a student with a disability and would like additional support or need additional time for assessments, you are invited to contact (name and e-mail address of the lecturer must be inserted) to discuss the assistance that you need.

12 FREQUENTLY ASKED QUESTIONS

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

13 SOURCES CONSULTED

The Study Guide and the prescribed textbook were consulted in preparing this tutorial letter.

14 IN CLOSING

Remember that there are no "short cuts" to studying and understanding mathematics. You need to be dedicated and work consistently. We hope that you will enjoy MAT3707 and we wish you all the best in your studies.

Do not hesitate to contact us by e-mail if you are experiencing problems with the content of this tutorial letter or with any academic aspect of the module.

We wish you a fascinating and satisfying journey through the learning material, and trust that you will complete the module successfully.

Enjoy the journey!

Dr Partha Pratim Ghosh – lecturer for MAT3707
Department of Mathematical Sciences