MATHEMATICS II MAJOR 2024

School of Mathematics

University of the Witwatersrand

COURSE COORDINATOR

Dr. R. Kwashira

Semester I

TOPIC	LECTURER	OFFICE	EMAIL
MATH2001A	Dr. R. Maartens	MSB 341	Ronnie.Maartens@wits.ac.za
	Prof. S. Mukwembi	MSB 308	Simon.Mukwembi@wits.ac.za
MATH2007A	Prof. Y. Hardy	MSB 340	Yorick.Hardy@wits.ac.za
	Prof. Y. Zelenyuk	MSB 316	Yuliya.Zelenyuk@wits.ac.za
MATH2019A	Dr. R. Kwashira	MSB 337	Rugare.Kwashira@wits.ac.za
	Prof. B. Watson	MSB 345	Bruce.Watson@wits.ac.za

Contents

Mathematics II - Useful Information

MATH II Major consists of 6 modules, giving a total of 48 points. The prerequisite for this course is a pass in MATH I Major, that is, MATH1034A and MATH1036A, or equivalent modules.

All relevant material and information on the MATH II topics will be posted on Canvas - Ulwazi. Students should check their course suites and student email regularly for details of assessments, content to be examined, marks, solutions of assessments, etc.

1 MATH II Course Outcomes

1.1 Learning Outcomes

- Understand axioms, definitions and theorems.
- Find examples and counter examples to illustrate concepts.
- Express reasoning clearly in the form of mathematical proofs.
- Solve theoretical and applied problems.
- Apply theory to spatial and physical problems and perform computations.

1.2 Assessment Criteria

- Definitions, theorems and axioms must be accurately presented.
- Examples must be appropriate.
- Proofs must be logical and notional consistent.
- Correct application of concepts to problems.

- Use routine procedures (algorithms) and appropriate mathematical techniques to solve problems.

1.3 Assessment Methods

Students will be assessed through Tutorial Tests, Midterm Tests and Final Exams for each module as described in Section 3.

Axioms, definitions, theorems, examples, counterexamples and application of concepts will be assessed. Most questions will be similar to those seen in lectures, tutorials and study guides, but some will be unseen.

2 Lectures and Tutorials

Note that a class register will be taken at random during lectures and tutorials. It is the responsibility of the student to make sure their attendance is recorded during the class or immediately after the class by speaking to your lecturer or tutor.

Any subject or content related queries should be send to your lecturer via email or the correct tools on Ulwazi as informed by your lecturer. Only general administrative queries are sent to the Course Coordinator, Dr. R. Kwashira.

2.1 Lectures

- There are 6 lectures per week, all given on the E slot of the Timetable. Students must attend all lectures of all the topics they are registered for in 2024.

- In the First Semester the modules given will be:
  - MATH2001A, Basic Analysis - BA (8 points).
  - MATH2007A, Multivariable Calculus - MC (8 points).
  - MATH2019A, Linear Algebra - LA (8 points).
- In the Second Semester the modules given will be:
  - MATH2016A, Advanced Analysis - AA (8 points).
  - MATH2015A, Abstract Mathematics - AM (8 points).
  - MATH2003A, Differential Equations - DE (8 points) OR Statistics (8 points).

2.2 Tutorials

- You will be writing Tutorial Tests during the tutorial sessions.
- The dates for the Tutorial Tests will be announced and published on your course suite on Ulwazi.
- The tutorial venues will be announced on your course suite on Ulwazi as well.
- Absence from a Tutorial Test should be reported to the Course Coordinator, Dr. R. Kwashira, with supporting documents as explained in Section 4.1.

3 Tests and Exams

- Midterm Test, Tutorial Tests and Final Exams will be written in each of the modules.
- Information, such as the dates, venues, times, etc. on the assessments will be uploaded on the Course Suites on Ulwazi.

- To obtain a pass in a module you require a minimum final mark of 50%.
- **Students who miss the Midterm Test with a valid reason and supporting documents (sick note, death certificate, affidavit, etc.) will have to write a comprehensive test that covers the content. More details on this assessment will be announced on Ulwazi.**
- A year mark will always include the Midterm test (either a zero, or mark that has been obtained from the Midterm Test, or the comprehensive Midterm Test). The comprehensive Midterm Test will be written together with those who do not have a year mark. No student will be allowed to write the Final Examination without a mark for the Midterm test.
- Students who have missed both the tutorial tests and the midterm test should write an email to the Course Coordinator, Dr. R. Kwashira, at least 2 weeks before the last lecture of that module. It remains the responsibility of the student to inform the Course Coordinator in this regard and failing to do so could lead to a failure of the module.

3.1 PMIN Rules

- A PMIN means that you have passed the module with minimum requirements, that is, you will be given credit for that module.
- Students who did 6 MATH II modules, and satisfy the conditions of PMIN as given in the next bullet, will receive a PMIN.

- If you
  - Have an overall weighted average of all 6 MATH II modules of 50% or more, **AND**
  - Passed 4 (or 5) out of the 6 MATH II modules, **AND**
  - Have a mark between 35% and 49% for the 2 (or 1) MATH II modules not passed,

  THEN you will be given a PMIN for those 2 (or 1) MATH II modules.
- If any one or more of these requirements are not met, then you will not receive a PMIN.
- If you passed (have credits for) some of the MATH II modules in previous years, then these marks will be used in the determination of whether you meet the requirements of a PMIN.
- If you passed 4 of the MATH II modules and failed the remaining 2 MATH II modules, then either both the failing 2 modules receive a PMIN (meeting the requirements above), or both is failed. You cannot PMIN one module and fail the other.
- If your set degree only requires that you enrol for 3 of the MATH II modules, then the requirements for PMIN is as follows:
  - Have an overall weighted average of all 3 MATH II modules of 50% or more, **AND**
  - Passed 2 out of the 3 MATH II modules, **AND**
  - Have a mark between 35% and 49% for the MATH II module not passed.
- PMIN is done automatically, meaning you do not have to apply for it, at the end of the year.

3.2 Composition of Final Marks

The assessments and contribution of each assessment to the final mark for each of the 6 MATH II modules are as follows:

- Tutorial Test 1 = 10%,
- Tutorial Test 2 = 10%,
- Midterm Test = 40%,
- Final Exam = 40%.

This will give you a final mark out of 100 whereby a pass for that module is at least 50%.

3.3 Timetable for Midterm Tests

All Midterm Tests (but not Exams) will take place as indicated in the schedule below.

TOPICS	**TEST DATE**
MC	10 April 2024
BA	17 April 2024
LA	24 April 2024
AM	11 September 2024
AA	18 September 2024
DE	25 September 2024

The venues, times and scope for the tests will be announced on Ulwazi.

4 Due Performance (DP) Requirements

In order to qualify to write an Examination, students must meet the following requirements, known as the DP Requirements:

- An attendance of lecturers and tutorial classes of at least 50%. As mentioned in Section 2, a register is taken at random in lectures and tutorial classes, and your attendance will be calculated based on these registers only.
- A year mark which includes the Midterm Test (either a zero, or mark that has been obtained from the Midterm Test, or the comprehensive Midterm Test).

Students may appeal the decision on the DP Requirements by contacting the Course Coordinator, Dr. R. Kwashira.

In order to pass a module, a student must write the Final Examination.

4.1 Missed Tests

- In the event of being absent from a Tutorial Test or Midterm Test for any one of the MATH II modules, the reason must be explained in writing (email) with the relevant documentation attached as proof within 3 days of the test missed to the Course Coordinator, Dr. R. Kwashira. Documentation may include doctor certificates, death certificates, and affidavits.
- Note that it is the student's responsibility to register their absence from a Tutorial Test or Midterm Test, and failing to do so within the 3 days after the test missed, will result in a zero for that test.

Note that you are given 3 days from the day of the assessment to submit your documents.

4.2 Missed Exam

In the event of being absent from an Exam, students must apply to the Science Faculty directly for the Deferred Examination, attaching the relevant documents as required. Note that it is the student's responsibility to register their absence from an Examination.

PLEASE FOLLOW THE CORRECT PROCEDURE!!!
DO NOT SEND AN ABSENCE NOTIFICATION TO THE COURSE COORDINATOR OR YOUR LECTURER FOR A MISSED EXAM.

5 Differential Equations versus Statistics

- If you have passed First Year Statistics, or are currently enrolled for First Year Statistics with the School of Statistics and Actuarial Science, then you MAY NOT do the Statistics module offered here and you MUST do Differential Equations.
- If you are planning to major in Computer Science and have not done any Statistics modules previously, you MUST do the Statistics module.
- Students doing Physics are recommended to do the Differential Equations module.
- Students doing CAM are recommended to do the Statistics module if they have not done any Statistics previously.
- Students wanting to eventually do Mathematics of Finance are recommended to do the Statistics module if they have not previously done any Statistics modules.
- You should **not** take both Differential Equations and Statistics.

6 Syllabuses and Reference Textbooks

All necessary information for the course for ALL topics will be posted on Ulwazi. A list of reference textbooks together with the syllabus for each topic will be also be provided on Ulwazi.

7 Mathematics Beyond Second Year and Mathematical Maturity

To be admitted to MATH III Major you will be required to pass all 6 MATH II modules with either an outright PASS or PMIN.

Emphasis is put on BA and AM as these topics are an introduction to the type of thinking that is required in most modern Mathematics. This may require an adjustment of your mathematical mind set. Namely, an understanding that mathematical arguments must proceed by strict logical arguments from a set of well defined assumptions (axioms). The grasp of the axiomatic idea is a demonstration of mathematical maturity. Because these modules require a change in approach, you will need to keep up with the material and tutorial problems FROM THE OUTSET. These are not modules which you will be able to pass simply by making an effort shortly before the Exams.

8 Timetable

A detailed Timetable with venues for each Lecture Group will be announced and posted on Ulwazi in each of your Course Suites.

	8:00 - 8:45	9:00 - 9:45	10:15 - 11:00	11:15 - 12:00	12:30 - 13:15	13:15 - 14:15	14:15 - 15:00	15:15 - 16:00	16:15 - 17:00
MON			MC	LA		L			
TUE					BA	U			
WED						N	BA	TUT	TUT
THU						C			
FRI	MC	LA				H			