

# MZUZU UNIVERSITY

## FACULTY OF EDUCATION

### DEPARTMENT OF MATHEMATICS

#### SYLLABUS

1. **Programme** : Bachelor of Science (Education)
2. **Subject** : Mathematics
3. **Course Title** : Real Analysis
4. **Course Code** : EMT 3503
5. **Level of Study** : Three
6. **Duration** : 14 Weeks
7. **Lecturer Hours per week** : Four
8. **Number of tutorials per week** : One
9. **Assessment** : Continuous 50%  
Examination 50%
10. **Aim(s) of the Course** : To develop students mathematical abilities in Real Analysis, to provide essential background knowledge for vast amount of more advanced mathematics, such as potential theory, measure theory, functional analysis, approximation theory and partial differential equations.
11. **Objectives of the Course** : By the end of this course students should be able to:
  1. define all terms and carry out operations of determining limits and continuity in metric spaces.
  2. Prove and apply convergence theorems of the Fourier series and sequences of functions.
  3. Prove differential and integration theorems of functions of a single real variable.
12. **Topics of Study:**
  - (i) Review of Set Theory

- (ii) Point Set topology: open sets, closed sets, continuity, connected sets, compact sets
- (iii) Metric Spaces: basic topology in metric spaces, limits and continuity in metric spaces
- (iv) Real numbers: as a completion of rationals, least upper bound, least upper bound,  $\liminf$  of real sequences.
- (v) Functions of real variables: sequence and series of functions, uniform convergence, Taylor series
- (vi) Integration theory: (Riemann or Lebesgue), Measure theory on real numbers.

**13. Prescribed Text:**

Royden, H.L., *Real Analysis*, Macmillan Company: New York, 1985

**14. Recommended Texts:**

1. Bryant, V., *Metric Spaces, Iteration and Applications*, CUP: Cambridge, 1985.
2. Russel, G.A., *Real Analysis, A First Course*, 2<sup>nd</sup> Edition, Addison Wesley, 2001

This Syllabus was presented to Senate on ..... and approved by Senate on.....

**CHAIRPERSON**