



MULTIMEDIA UNIVERSITY OF KENYA

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Leader in Innovative Technology

FACULTY OF SCIENCE & TECHNOLOGY DEPARTMENT OF MATHEMATICS COURSE OUTLINE

Code & Name	SMA 2301: Real Analysis I
Prerequisite	
Cohort	BSCT Y3S2, MAY-JULY 2021
Lecturer	Siro L. M. (Mr.)
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Purpose

To expose students to abstract ideas and rigorous methods in mathematical analysis and their applications to important practical problems.

Learning outcomes

At the end of the course students should be able to:

1. Define countable and uncountable sets
2. Identify open and closed subspaces of a metric space
3. Classify points of a subset as limit points, interior points
4. Define dense sets
5. Demonstrate an understanding of limits and how they are used
in sequences and series of real numbers
6. Describe compact metric spaces and compactness
7. Describe continuity and uniform continuity

Course Description

Countable and uncountable sets, point set topology in metric spaces, open and closed subspaces of a metric space, limit points of a subset, closure and interior of a subset, Dense sets, sequences and series, monotonic sequences, limit of supremum and limit of infimum, absolute convergence, root and integral tests, compact metric spaces and compactness, continuity and uniform continuity, Riemann integration

Delivery Methodology

Lectures, individual and group assignments and exercises.

Learning Resources

Handouts, journals, white boards, textbooks.

Teaching Schedule

Week	Course content	Remarks
1	<ul style="list-style-type: none"> Countable and uncountable sets 	

2	• point set topology in metric spaces	
3	• open and closed subspaces of a metric space	
4	• limit points of a subset	
5	• closure and interior of a subset	
6	• CAT 1	
7	• Dense sets	
8	• sequences and series, monotonic sequences, limit of supremum and limit of infimum	
9	• absolute convergence, root and integral tests	
10	• compact metric spaces and compactness	
11	• continuity and uniform continuity • Riemann integration	
12	CAT 2	
13	Revision	
14	EXAM	
15	EXAM	

Course Assessment

Continuous Assessment Tests	30%
End of Semester Examination	70%

Course Textbooks

1. Abbott, S. (2015). *Understanding Analysis* (2nd Ed). Springer-Verlag New York, <http://www.springer.com/la/book/9780387215068>
2. Belding, D.F. & Mitchell, K.J (2008). *Foundations of Analysis*. Dover Publications (0800759462964)
3. Fitzpatrick, P. and Royden, H. (2010): *Real Analysis* (4th Ed). Pearson Education Inc., ISBN 978-0-13-. 143747-0
4. Gaughan, E.D. (1987). *Introduction to Analysis* (3rd Ed). Brooks/Cole, ISBN 0534076033, 9780534076030.
5. White, A.J, *Real Analysis: an introduction*, Addison-Wesley, London, Great
6. Britain, 1968.

Reference Textbooks

1. Bartle, Robert G., and Sherbert, Donald R., *Introduction to Real Analysis*,
2. Third Edition, John Wiley Sons, New York, 2000.
3. Rudin, Walter, *Principles of Mathematical Analysis*, Third Edition, McGraw-Hill,
4. New York, 1976.
5. Royden, H.L, *Real Analysis*, Third Edition, Prentice-Hall, New Jersey, 1988.
6. Stoll, Manfred, *Introduction to Real Analysis*, Second Edition, Addison-Wesley, Boston, 2001.

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