MANGALORE UNIVERSITY

DEPARTMENT OF MATHEMATICS

MSC MATHEMATICS

MTH 453	Real Analysis - II	4 Credits (48 hours)

Course Outcome: Students will have the knowledge and skills to demonstrate a competence in formulating, analysing and solving problems in several core areas of higher level Real Analysis, Develop skills to work with Riemann Integrals, sequences and series of functions and their convergence, approximation theory like Weierstrass Theorem, differentiation of several variable functions.

Course Specific Outcome: At the end of the course Students will have the knowledge and skills to **e**xplain Demonstrate accurate and efficient use of the following advanced topics in various situations -

- The Riemann-Stieltjes, Integral, Rectifiable curves, Improper Integrals.
- Sequences and Series of Functions, Uniform convergence and continuity.
- Integration, differentiation, Equicontinuous families of functions.
- The Stone-Weierstrass theorem.
- Functions of several variables: Differentiation, The contraction principle, The inverse function theorem, The implicit function theorem.

Unit I

The Riemann-Stieltjes Integral:

Definition and existence of integrals, Properties of integral, Integration and differentiation, Integration of vector-valued functions, Rectifiable curves.

Improper Integrals: Definition, Criteria for convergence, Interchanging derivatives and integrals.

(20 Hours)

Unit II - Sequences and Series of Functions:

Discussion of main problem, Uniform convergence, uniform convergence and continuity, Uniform convergence and integration, Uniform convergence and differentiation, Equicontinuous families of functions, The Stone-Weierstrass theorem.

Unit III - Functions of Several Variables:

Differentiation, The contraction principle, the inverse function theorem, The implicit function theorem.

(12 Hours)

References

[1] Walter Rudin, *Principles of Mathematical Analysis*, 3rd Ed., McGraw Hill, 1976.

[2] Robert. G. Bartle, *The Elements of Real Analysis*, 2nd Ed., Wiley International Ed., New York, 1976.

[3] Serge Lang, *Analysis* I, Addison Wesley Publishing Company, 1968.

[4] T. M. Apostol, *Mathematical Analysis*, 2nd Ed., Narosa Publishers, 1985.

[5] Ajith Kumar and S. Kumaresan, *A Basic Course in Real Analysis*, CRC Press, 2014.

[6] R. R. Goldberg ,*Methods of Real Analysis*, 2nd Ed., Oxford & I. B. H. Publishing Co., New Delhi, 1970.

[7] N. L. Carothers, *Real Analysis*, Cambridge University Press, 2000.

[8] Russel A. Gordon, *Real Analysis - A First Course*, 2nd Ed., Pearson, 2011.