ROWAN UNIVERSITY
Department of Mathematics

Syllabus

Math 01.331 - Introduction to Real Analysis II

COURSE DESCRIPTION:

Math 01.331 Introduction to Real Analysis II, 3 s.h.
Prerequisite: Math 01.330 (Introduction to Real Analysis I) with a grade of C- or better

This course is a continuation of Introduction to Real Analysis I. The purpose is to extend the student's understanding of basic analysis and the calculus. Topics included are: the mean-value theorem, existence of the Riemann integral, Riemann-Stieltjes integration, infinite series, convergence tests and Fourier series.

OBJECTIVE:

Students will demonstrate the ability to use rigorous mathematical thought processes in the following areas: sets, functions, sequences and series, limits, continuity, derivatives, integrals and Fourier series.

CONTENTS:

1.0 Mean Value Theorems

- 1.1 Local Maxima and Minima
- 1.2 Mean Value Theorem
- 1.3 Taylor's Theorem

2.0 Riemann Integral

- 2.1 Basic definition
- 2.2 Proof of the existence of the integral
- 2.3 Fundamental theorem of calculus
- 2.4 Properties of the integral
- 2.5 Improper integrals

3.0 Riemann-Stieltjes Integrals

- 3.1 Bounded version
- 3.2 Basic Theorems

4.0 Infinite Series

4.1 Definitions
4.2 Tests for convergence
4.3 Taylor Series

5.0 Sequences and Series of Functions

5.1 Definitions
5.2 Pointwise and uniform convergence
5.3 Uniform convergence of power series

6.0 Fourier Series

6.1 Convergence problems
6.2 Summability of Fourier series
6.3 Convergence of Fourier series
6.4 Orthogonal expansions

TEXT:

Generally, the same text is used in Introduction to Real Analysis II as was used in Introduction to Real Analysis I.

Edited: 04/2021