

## **COURSE SYLLABUS FORM**

**American University of Beirut  
Faculty of Arts and Sciences  
Department of Mathematics**

**Course Number and Title: Math 223; Advanced Calculus**

1. **Course Learning Outcomes:** Basic knowledge of the following topics:

- Metric spaces.
- Normed vector spaces.
- Derivatives of functions of several variables.
- Chain rule for functions of several variables.
- Mean-value theorems for functions of several variables.
- Taylor's theorem for functions of several variables.
- Implicit and Inverse function theorems.
- Differential forms.
- Stoke's theorem.
- Notions from Differential Geometry.

2. **Resources Available to Students:** Textbook: Principles of Mathematical Analysis; W. Rudin; 3<sup>rd</sup> Edition; McGraw-Hill.

3. **Grading Criteria:** Two quizzes each allocated 20 points, a final examination allocated 40 points, and weekly homework assignments allocated 20 points.

4. **Schedule:**

- One Week: Metric spaces.
- One week: Normed vector spaces.
- One Week: Derivatives of functions of several variables.
- One Week: Chain rule for functions of several variables.
- One Week: Mean-value theorems for functions of several variables.
- One Week: Taylor's theorem for functions of several variables.
- Two Weeks: Implicit and Inverse function theorems.
- Three Weeks: Differential forms.
- Two Weeks: Divergence and Stoke's theorem.
- Two weeks: Notions from Differential Geometry

5. **Course Policy (if any):** Two quizzes, a final examination, and weekly homework assignment.