MATH 1.5: CALCULUS II

I. Course description:

1. **Credit points**: 3 ECTS

2. **Time commitment:**

Items	Lecture	Tutorial	Practical	**Total**
No. of hours	16	16	0	**32**

3. **Prerequisites**: Calculus I.

4. **Recommended background knowledge**: N/A.

5. **Subject description:**

This course is the continuation of **Calculus I** and focuses on multivariable calculus, vector calculus and ordinary differential equations.

6. **Objectives & Outcome:**

7. **Assessment/ Evaluation**

Component	Attendance	Exercises	Assignments	Reports	Midterm	Final
Percentage %	Qualifying requirement (More than 70 %)	05	0	0	30	70

8. **Prescribed Textbook(s):**

[1] James Stewart, CALCULUS, Early Transcendentals, 7th Edition, Thomson Books/Cole, 2012.
[2]. James C. Robinson, An introduction to Ordinary Differential Equations, Cambridge Univ. Press, 2004.
[3] Giáo trình Toán cao cấp I, II, III, Nguyễn Đình Trí, NXB Giáo dục 2005.

II. Course content & schedule:

1. Vectors
- Vectors in general
- The dot product
- The cross product
2. Functions of several variables
- Graphs and surfaces
- Limits and continuity
- Partial derivatives and the differential
- Gradient and directional derivatives
- The chain rule

- Second-order partial derivative

3. Optimization

- Critical points : local extrema
- Optimization
- Lagrange multiplier

4. Integrating functions of several variables

- The definite integral of a function of two variables
- Iterated integrals, Fubini's theorem
- Triple integrals
- Double integrals in polar coordinates
- Integrals in cylindrical, spherical coordinates

5. Line and surface integrals. Stoke and Green theorems

- Line integrals
- Flux integrals and divergence
- Curl and Stoke's theorem

6. First-order ordinary differential equation

- Euler's method
- Separation of variables
- Applications and modeling

7. Second-order ordinary differential equations (constant coefficients)

- General theory : existence and uniqueness, linearity
- The Wronskian
- Homogeneous and inhomogeneous second-order linear equations.