

**COURSE SYLLABUS**  
**FOR FULL-TIME UNDERGRADUATE PROGRAMS**  
*(Issued under Decision No.1380/QĐ-ĐHKTQĐ on 15/8/2016 by the University President)*

**1. COURSE NAME:      Calculus 2**

Code:      TOCB 1103

Number of Credits: 03

**2. DEPARTMENT IN CHARGE OF INSTRUCTION**

**Department of fundamental mathematics**

**Office:** 4<sup>th</sup> floor, Building 7, National Economics University, 207 Giai Phong road,  
Hanoi, Vietnam

**Office Hours:** 8am-5pm, from Monday to Friday

**Office Telephone:** 084 4 36283007, ext: 5944 or 5798

**3. PRE-REQUISITE:** Calculus 1 (TOCB1102)

**4. COURSE DESCRIPTION**

The module includes basic knowledge about differential equations, difference equations, series and multiple integrals. This is advanced and necessary calculus and useful mathematical tool for students to approach, analyze and study dynamic economic models by mathematical methods.

**5. LEARNING OUTCOMES**

On successful completion of this course students will be able to:

- \* To gain confidence with mathematics
- \* To develop analytical skills
- \* To develop organizational skills
- \* To develop both independent learning and group work skills
- \* To develop verbal and non-verbal communication skills
- \* To successfully use mathematics in economics and business applications

## 6. COURSE OBJECTIVES

Course Content:

- \* Differential equations: Concept, First order differential equations, Linear Second-Order differential equations.
- \* Difference equations
- \* Series of numbers
- \* Functional Series
- \* Exponential Series
- \* Multiple integrals

## 7. COURSE CONTENT AND LECTURE PLAN

### TENTATIVE SCHEDULE

<i>No</i>	<i>Contents</i>	<i>Total hours</i>	<i>In details</i>	
			<i>Theory</i>	<i>Practice, Discussion, Exams</i>
1	Chapter 1. Differential Equations	12	8	4
2	Chapter 2. Difference Equations	9	6	3
3	Chapter 3. Series	12	8	4
4	Chapter 4. Multiple Integrals	12	8	4
	<b>Total</b>	<b>45</b>	<b>30</b>	<b>15</b>

### Weeks 1-4: CHAPTER 1. DIFFERENTIAL EQUATIONS

*Chapter 1 provides an overview of differential equations and how to solve some first and second order ordinary differential equations.*

- 1.1 The basic concepts of differential equations
- 1.2 Methods solve some first order ordinary differential equations
- 1.3 The linear, second-order differential equations

**References of Chapter 1: Chapter 11 [1], Chapter 5 [2], Chapters 21, 22, 23 [4]**

**Weeks 5-7:                    CHAPTER 2. DIFFERENCE EQUATIONS**

*Chapter 2 provides an overview of the difference equations and solutions to some first and second order ordination difference equations.*

2.1 The basics of difference equations

2.2 First order difference equations

2.3 Linear second order difference equations

**References of Chapter 2: Chapter 12 [1], Chapter 5 [2], Chapters 18, 19, 20 [4]**

**Weeks 8-11:                    CHAPTER 3. SERIES**

*Chapter 3 provides general knowledge and the basics of series, including series of numbers, series of functions, exponential series, and trigonometric series.*

3.1 A rough outline of series of numbers

3.2 Positive number series

3.3 Series of numbers with terms of any sign

3.4 Sequence of functions and functional series

3.5 Exponential series

**Midterm Test**

**References of Chapter 3: Chapter 12 [1], Chapter 5 [2], Chapters 18, 19, 20 [4]**

**Weeks 12-15:                    CHAPTER 4. MULTIPLE INTEGRAL**

*Chapter 4 provides an overview of integral of functions with  $n$  variables and how to calculate integral of functions with two variables, three variables.*

4.1 Double integral

4.1.1 Definition and properties

4.1.2 How to calculate double integral in Cartesian coordinate system

4.1.3 Formula for changing variable in double integral and applications of double integral

4.2 Triple integral

4.2.1 The concept of triple integral

4.2.2 How to calculate triple integrals in Cartesian coordinate system

4.2.3 Method of changing variables in triple integral

**Final Examination**

## 8. REQUIRED TEXTBOOK & COURSE MATERIALS

[1] Required: LE DINH THUY, NGUYEN THI QUYNH LAN (2012), *Advanced Mathematics for Economist*, National Economics University Publisher

## 9. RECOMMENDED TEXTS & OTHER READINGS

[2] ALPHA C. CHIANG (1995), *Fundamental Methods of Mathematical Economics*, Third edition, Mc. Graw-Hill, Inc.

[3] NGUYEN DINH TRI, TA VAN DINH, NGUYEN HO QUYNH (2008), *Advanced mathematics*, VietNam Education Publishing House.

[4] MICHAEL HOY, JOHN LIVERNOIS, CHRIS MC KENNA, RAY REES, THANASIS STENGO S (2001), *Mathematics for Economics*, The MIT Press Cambridge, Massachusetts, London, England.

## 10. ASSESSMENT & GRADING POLICY

Your course score will be determined as the following weighted average:

Item	Weight
Attendance	10%
Midterm	20%
Final Exam	70%
<b>Total</b>	<b>100%</b>

Grading Criteria: %		Letter Grade
96%-100%	A+	4,0
91%-95%	A	4,0
85%-90%	A-	3,7
81% - 84%	B+	3,3
7,6%-80%	B	3,0
71%-75%	B-	2,7
66%-70%	C+	2,3
61%-65%	C	2,0
55%-60%	C-	1,7
51%-54%	D+	1,3
46%-50%	D	1,0
40%-45%	D-	0,7
<39%	F/WU/IC	0,0

**\* Attendance policy:**

Attendance is required. You are responsible for everything that happens in the class. If you miss a class, ask your friends about materials covered in the class. The parts of the course are very well related to each other. It is a requirement that a student need to attend at least 80% time of course to have the right to take the final exam.

*Hanoi, 2016*

**HEAD OF DEPARTMENT**

**PRESIDENT**

(signed)

(signed)

**PhD. Tong Thanh Trung**

**Prof.Dr. Tran Tho Dat**