COURSE SYLLABUS  
**MTH 251- CALCULUS I**

# GENERAL INFORMATION

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| Course name: Calculus I |  |
| Course name (in Vietnamese): |  |
| Course ID: MTH 251 |  |
| Knowledge block: |  |
| Number of credits: | 4 |
| Credit hours for theory: | 45 |
| Credit hours for practice: | 30 |
| Credit hours for self-study: | 90 |
| Prerequisite: None |  |
| Prior-course: None |  |
| Instructors: Prof. Nguyen Huu Anh |  |

# COURSE DESCRIPTION

The course is designed to provide students with the fundamental ideas of the differential and integral calculus on functions of one variable.

# COURSE GOALS

At the end of the course, students are able to

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| **ID** | **Description** | **Program LOs** |
| G1 | Recognize properties of functions and their inverses |  |
| G2 | Sketch the graph of a function by using transformations |  |
| G3 | Master the concepts of limits, continuity, derivatives, and its applications |  |
| G4 | Understand the concept of and evaluate definite integrals |  |
| G5 | Understand the Fundamental Theorem of Calculus and its Applications |  |
| G6 | Learning the Technique to compute Indefinite Integrals, and Approximate Integration |  |

# COURSE OUTCOMES

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| **CO** | **Description** | **I/T/U** |
| G1.1 |  |  |
| G1.2 |  |  |
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# TEACHING PLAN

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| **ID** | **Topic** | **Course outcomes** | **Teaching/Learning Activities (samples)** |
| 1 | **Chapter 1**   * 1. Four ways to represent a Function   2. Model and Curve Fitting   1,3 New Functions from Old Functions  1.4 Graphing Calculators and Computers |  | Lecturing |

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| 2 | 1.5 Exponential functions  1.6 Inverse Function and Logarithms  1.7 Parametric Curves |  | Lecturing |
| 3 | **Chapter 2**  2.1 The Tangent and Velocity Problems  2.2 The Limit of a Function  2.3 Calculating Limits Using Limit Laws  2.4 Continuity |  | Lecturing |
| 4 | 2.5 Limits Involving Infinity  2.6 Limits of Sequences  **Chapter 3**  3.1 Derivatives  3.2 The Derivative as a Function |  | Lecturing |
| 5 | 3.3 Differentiation Formulae  3.4 Derivatives of Trigonometric Functions  3.5 Rates of Changes in the Natural and Social Sciences  3.6 The Chain Rule |  | Lecturing |
| 6 | 3.7 Implicit Differentiation  3.8 Derivative of Logarithmic Functions  **Midterm Exam** |  | Lecturing |
| 7 | 3.9 Related Rates  3.10 Linear Approximations and Differentials  **Chapter 4**  4.1 Maximum and Minimum Values  4.2 The Mean Value Theorem. Derivatives and the Shapes of Curves |  | Lecturing |
| 8 | 4.3 Graphing with Calculus and Calculators  4.4 Indeterminate Forms and l’Hospital’s Rule  4.5 Optimization Problems  4.6 Application to Business and Economics |  | Lecturing |

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| 9 | 4.7 Newton’s Method  4.8 Antiderivatives  **Chapter 5**  5.1 Area and Distances  5.2 The Definite Integral |  | Lecturing |
| 10 | 5.3 Evaluating Definite Integrals  5.4 The Fundamental Theorem of Calculus  5.5 The Substitution Rule  5.6 Integration by Parts  5.7 Approximate Integration |  | Lecturing |
| 11 | Review |  | Q&A, Discussion |

For the practical laboratory work, there are 10 weeks which cover similar topics as it goes in the theory class. Each week, teaching assistants will explain and demonstrate key ideas on the corresponding topic and ask students to do their lab exercises either on computer in the lab or at home. All the lab work submitted will be graded. There would be a final exam for lab work.

# ASSESSMENTS

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| **ID** | **Topic** | **Description** | **Course outcomes** | **Ratio (%)** |
| **A1** | **Attendance & Discussion** |  |  | **30%** |
| A11 | Attendance in TA hours |  |  | 10% |
| A12 | Discussion | Each students must present the solution of at least one problem given in advance by the TA |  | 20% |
| A13 | Comment on the solutions presented by other students |  |  | bonus |
| **A3** | **Exams** |  |  | **70%** |
| A31 | Midterm exam | Closed book exam.  The questions cover Chapters 1, 2 and  Chapter 3 up to section 3.6 |  | 30% |
| A33 | Final exam | Closed book exam.  The questions cover the whole course.  However the main emphasize is on Chapters 3, 4 and 5 |  | 40% |

# RESOURCES

# Textbooks

* Calculus, Concepts and Contexts, James Stewart, Thomson Brooks/Cole, 2003 or later Edition
* Presentations Slides in Power Point

## **Softwares**

* Computer Algebra System MAPLE

# GENERAL REGULATIONS & POLICIES

* All students are responsible for reading and following strictly the regulations and policies of the school and university.
* Students who are absent for more than 3 theory sessions are not allowed to take the exams.
* For any kind of cheating and plagiarism, students will be graded 0 for the course. The incident is then submitted to the school and university for further review.
* Students are encouraged to form study groups to discuss on the topics. However, individual work must be done and submitted on your own.