

## Course Syllabus

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| <b>1. Program of Study</b>       | Bachelor of Science Program<br>Bachelor of Arts Program<br>Bachelor of Business Administration Program<br>Bachelor of Nursing Science Program  |
| <b>Faculty/Institute/College</b> | Mahidol University International College   |
| <b>2. Course Code</b>            | ICNS 102   |
| <b>Course Title</b>              | Principles of Mathematics  |
| <b>3. Number of Credits</b>      | 4(4-0-8)(Lecture/Lab/Self study)   |
| <b>4. Prerequisite (s)</b>       | ICNS 100 or equivalent   |
| <b>5. Type of Course</b>         | General Education Course   |
| <b>6. Session</b>                | 3 <sup>rd</sup> trimester  |
| <b>7. Conditions</b>             | -  |
| <b>8. Course Description</b>     | A brief review of trigonometry; limits and continuity; differentiation and its techniques; derivatives of functions such as trigonometric, logarithmic, exponential and inverse trigonometric; sketching graph; applications of the derivative; antiderivative and integration; area under a curve and between two curves.   |
| <b>9. Course Objective (s)</b>   | After successful completion of this course, students should be able to <ol style="list-style-type: none"> <li>9.1 describe the number system, solve inequalities and absolute value problems.</li> <li>9.2 do operations on functions and draw graphs.</li> <li>9.3 find limits of algebraic and trigonometric functions.</li> <li>9.4 explain the relationship between tangents, derivatives and rates of change.</li> <li>9.5 find derivatives of algebraic and trigonometric functions using the definition and differentiation formula.</li> </ol> |

9.6 find higher order derivatives, increments and differentials.

9.7 apply derivatives to solve problems in related rates, extreme values, approximations and curve sketching.

9.8 integrate algebraic and trigonometric functions.

9.9 find areas under a curve and between curves.

## 10. Course Outline

Week	Topic	Hour			Instructor
		Lecture	Lab	Self-Study	
1	Real Numbers, intervals, inequalities, absolute value and graph	4	0	8	Nardtida
2	Slope of a line, equations of straight lines, distance, circle, equation of the form $y = ax^2 + bx + c$	4	0	8	Nardtida
3	Operations and graphs of function, intuitive approach to limits	4	0	8	Nardtida
4	Computational techniques for limits, continuity, limits and continuity of trigonometric functions, tangent lines	4	0	8	Nardtida
5	Rates of change, derivative, technique of differentiation, derivative of trigonometric functions	4	0	8	Nardtida
6	Midterm examination Chain rule, implicit differentiation	4	0	8	Nardtida
7	$\Delta$ -notation, differentials, related	4	0	8	Nardtida

	rates, intervals of increase and decrease, concavity				
8	Relative extrema, first and second derivative tests, graphs of polynomials and rational functions, maximum and minimum value of a function, applied maximum and minimum problems	4	0	8	Nardtida
9	Rolle's Theorem, Mean Value Theorem, antiderivatives, definite integrals, integration by substitution, sigma notation	4	0	8	Nardtida
10	Areas as limits, definite integral, First Fundamental Theorem of Calculus, evaluating definite integrals by substitution	4	0	8	Nardtida
11	Mean Value Theorem of Integrals, Second Fundamental Theorem of Calculus, area between two curves Review	4	0	8	Nardtida
	Total	44	0	88	Nardtida
Final examination					

## 11. Teaching Method (s)

11.1 Lecturing with student participation in solving problems and participation in questions and answers.

## 12. Teaching Media

12.1 Transparencies.

12.2 Workouts and notes on blackboards.

### 13. Measurement and evaluation of student achievement

Student achievement is measured and evaluated by

13.1 the ability to describe the number system, solve inequalities and absolute value problems.

13.2 the ability to do operations on functions and draw graphs.

13.3 the ability to find limits of algebraic and trigonometric functions.

13.4 the ability to explain the relationship between tangents, derivatives and rates of change.

13.5 the ability to find derivatives of algebraic and trigonometric functions using the definition and differentiation formula.

13.6 the ability to find higher order derivatives, increments and differentials.

13.7 the ability to apply derivatives to solve problems in related rates, extreme values, approximations and curve sketching.

13.8 the ability to integrate algebraic and trigonometric functions.

13.9 the ability to find areas under a curve and between curves.

Student's achievement will be graded according to the faculty and university standard using the symbols: A, B+, B, C+, C, D+, D, and F.

Students must have attended at least 80% of the total class hours of this course.

Assessment made from the set-forward criteria:- students with 80% or more will receive

Grade A.

Ratio of mark

Participation 10 %

Midterm 40 %

Final 50 %

Total 100 %

### 14. Course evaluation

14.1 Students' achievement as indicated in number 13 above.

14.2 Students' satisfaction toward teaching and learning of the course using questionnaires.

### 15. Reference (s)

1. Anton, Howard . (1984) . Calculus (4<sup>th</sup> ed) .John Wiley & Sons : New York,

2. Keedy and Bittinger, Algebra and Trigonometry : A Functions Approach., Addison-

Wesley. Publishing Company, Reading, Massachusetts.

3. Thomas, George B., Dr. .Elements of Calculus and Analytic Geometry, revised ed :  
Addison & Wesley Publishing Company, Inc.

**16. Instructor (s)**

16.1 Assoc. Prof. Nardtida Tumrasvin

**17. Course Coordinator**

Assoc. Prof. Nardtida Tumrasvin