

Course Syllabus

1. **Program of Study** Bachelor of Science (Applied Mathematics)
College International College, Mahidol University
2. **Course Code** ICMA 322
Course Title Advanced Calculus
3. **Number of Credits** 4(4-0-8) (Lecture/Lab/Self-study)
4. **Prerequisite** None
5. **Type of Course** Required major course
6. **Session / Academic Year**
7. **Course Conditions** Maximum number of students is 30 per class.

8. Course Description

Real and complex number systems; functions; continuity; convergence; differentiation; integration.

9. Course Objectives

After successful completion of this course, students will be able to

- 9.1 understand advanced concepts of calculus;
- 9.2 prove some important theorems in calculus including Intermediate Value Theorem, Mean-Value Theorem, L' Hôpital's Rule, Taylor's Theorem, Fundamental Theorem of Calculus;
- 9.3 apply techniques of proofs and problem solving skills learned in this course to various problems in mathematics.

10. Course Outline

Week	Topics	Hours			Instructor
		Lectures	Lab	Self study	
1	Real and complex number systems, countable and uncountable sets	4	-	8	
2	Metric spaces, compact sets, connected sets	4	-	8	
3	Convergence sequences, subsequences, Cauchy sequences	4	-	8	
4	Upper and lower limits, series, series of nonnegative terms, root and ratio tests, power series	4	-	8	
5	Limits of functions, continuous functions	4	-	8	
6	Continuity and compactness, continuity and connectedness, Midterm Exam	4	-	8	
7	Derivative of a real function, Mean	4	-	8	

	Value Theorems				
8	Continuity of derivatives, L' Hôpital's rule, Taylor's theorem	4	-	8	
9-10	Riemann integrals, properties of integrals	6	-	12	
10-11	Integration and differentiation	4	-	8	
11	Review for final	2	-	4	
Final Examination					
Total		44	-	88	

11. Teaching Methods

Lectures

12. Teaching Media

Texts and handouts

13. Measurement and Evaluation of Student Achievement

Student achievement is measured and evaluated by

- 13.1 The ability to explain the advanced concepts of calculus;
- 13.2 The ability to prove some important theorems in calculus including Intermediate Value Theorem, Mean-Value Theorem, L' Hôpital's Rule, Taylor's Theorem, Fundamental Theorem of Calculus;
- 13.3 The ability to apply techniques of proofs and problem solving skills learned in this course to various problems in mathematics

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

Ration of mark

Homework and quizzes	20 %
Midterm Examination	40 %
Final Examination	40 %

14. Course evaluation

- 14.1 Students' achievement as indicated in number 13 above.
- 14.2 Students' satisfaction towards teaching and learning of the course using questionnaires.

15. Reference

- 15.1 Rudin W. Principles of mathematical analysis: McGraw-Hill; 1976.

16. Instructor

Dr. Aram Tangboondouangjit

17. Course Coordinator

Assoc. Prof. Dr. Chinda Achariyakul