■ CC21 - Infinitesimal Calculus II

GENERAL

SCHOOL	EXACT SCIENCES
DEPARTMENT	MATHEMATICS
LEVEL OF STUDIES	UNDERGRADUATE

COURSE CODE	CC21	**SEMESTER**	B
COURSE TITLE	INFINITESIMAL CALCULUS II		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**ECTS**
Lectures	5	8

COURSE TYPE	Scientific Field
PREREQUISITE COURSES	Infinitesimal Calculus I
LANGUAGE OF TEACHING AND EXAMINATIONS	Greek/English
THE COURSE IS OFFERED TO ERASMUS STUDENTS	YES
COURSE WEBSITE (URL)	http://eclass.uowm.gr/

LEARNING OUTCOMES

Learning Outcomes
After the successful completion of the course, the students: • will know the indefinite integral and its basic calculation techniques, • will know the definite integral (according to Riemann), • will apply the Fundamental Theorem of Integral Calculus for the calculation of the definite integral as well as the basic methods of changing variable and partial integration. • will apply the definite integral to calculate flat areas, and volumes of solids of revolution,

• will know the generalized integral and the basic convergence criteria of generalized integrals.	

General Competencies
• Search, analysis and synthesis of data and information, using the necessary technologies. • Making decisions. • Promotion of free, creative and inductive thinking.

CONTENT OF THE COURSE

Primitive function and indefinite integral. Definition of indefinite integral, basic properties, change of variable, integration by parts, integration of rational functions, integration of basic types of functions.

Definite integral (Riemann integral). Definition, properties, integrability criteria, mean value theorem, inequalities, Fundamental Theorem of Integral Calculus, change of variables. Applications of definite integrals. Calculation of the area of domains, the volume of solids of revolution and the length of arcs.

Generalized integrals. Types of generalized integrals and their calculation, basic properties, convergence criteria of generalized integrals of non-negative functions (comparison criterion, limit criterion, etc.), absolute convergence of generalized integrals, change of variable in the generalized integral.

TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHOD	In the classroom.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Software GEOGEBRA. e-Lectures. Use of e-class. Communication through face-to-face discussions and e-mails.
TEACHING ORGANIZATION	

Activity	**Semester Workload**
Lectures	65 hours
Individual Study	135 hours
Course Total (25 hours per ECTS)	200 hours

STUDENT EVALUATION	1. Written exam (progress) in the calculation of indefinite and definite integrals 30%. 2. Written final exam on all material 70%.

RECOMMENDED BIBLIOGRAPHY

1. THOMAS INFINITESIMAL CALCULUS, [George B. Thomas], Jr., Joel Hass, Christopher Heil, Maurice D. Weir. (Greek)
2. DIFFERENTIAL AND INTEGRAL CALCULUS, SPIVAK MICHAEL. (Greek)
3. General Mathematics - Infinitesimal Calculus, volume I, Athanasiadis Ch. E. Giannakoulias E. Giotopoulos S. Ch. (Greek)
4. Infinitesimal calculus, Briggs William, Cochran Lyle, Gillett Bernard. (Greek)
5. Kyventidis T., Integral Calculus of functions of one real variable, Ziti Press, 2005. (Greek)