

Main course information	
Academic subject	Mathematics with elements of Probability and Statistics
Degree course	Biological science
Degree class	classe L-13
ECTS credits (CFU)	6+3
Compulsory attendance	Yes
Teaching language	Italian
Accademic Year	2019/2020

Professor/Lecturer	
Name & SURNAME	Grazia Raguso
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Tel.	0805442682
Tutorial time/day	on student' demand

Course details	Pass-fail exam/Exam with mark out of 30	SSD code	Type of class
	Exam with mark out of 30	MAT/03	Lecture/workshop

Teaching schedule	Year	Semester

Lesson type	CFU/ECTS	Lessons (hours)	CFU/ECTS Lab	Lab hours	CFU/ECTS tutorial/workshop	Tutorial/workshop hours	CFU/ECTS field trip	Field trip Hours
	9							

Time management	Total hours	Teaching hours	Self-study hours

Academic Calendar	First lesson	Final lesson

Syllabus	
Course entry requirements	
Expected learning outcomes (according to Dublin Descriptors) (it is recommended that they are congruent with the learning outcomes contained in A4a, A4b, A4c tables of the SUA-CdS)	
<i>Knowledge and understanding</i>	Acquisition of fundamental concepts of mathematics
<i>Applying knowledge and understanding</i>	Ability to use and transfer the theoretical notions acquired into more complex problems of the applied sciences.
<i>Making informed judgements and choices</i>	Ability to evaluate the consistency of the logical reasoning used in a demonstration. Ability to identify the right math tools to deal with specific problems in biology.
<i>Communicating knowledge and understanding</i>	Ability to use correct, appropriate, and clear language to effectively communicate the notions acquired
<i>Capacities to continue learning</i>	Acquisition of an appropriate study method by consulting the texts and resolving the exercises proposed by the course.

Syllabus	
Course content	<p>Functions and their graphs: functions; monotone functions; invertibility of a strictly monotonous function; maximum and minimum of a function; function limits; polynomial functions, fractional rationales, power, exponential and logarithmic, trigonometric.</p> <p>Fundamental theorems on limits (uniqueness of the limit; permanence of the sign; on operations; obligatory convergence.</p> <p>Continuous functions, discontinuous and their fundamental properties; Statements of Weierstrass theorems; the Existence of zeros, Theorem of Bolzano.</p> <p>Derivatives: definition, and geometric, physical and chemical meaning, computation of derivatives, statements of fundamental theorems on derivable functions and their geometric meaning (Rolle theorem, Lagrange theorems and consequences of Lagrange's theorem; de L'Hospital theorem); growth and decreasing, minimum and maximum; convexity, concavity, inflection points; asymptotes; study of the graph of a function.</p> <p>Integrals: anti-derivative or primitive, indefinite integral and properties; elementary integration rules, integrations by parts and by substitution; Definite integral and its geometric interpretation. Theorem: of the mean, of Torricelli, Fundamental formula of the integral calculus.</p> <p>UNIVARIATE STATISTICS</p> <p>Qualitative and quantitative data. Absolute, relative, percentage and cumulative frequencies. Bar charts, histograms, frequency tables. Fashion, median, quantiles, arithmetic mean and its properties. Geometric average and harmonic mean. Variance and its properties. Moments, asymmetry, kurtosis.</p> <p>MULTIVARIATE STATISTICS</p> <p>Two-dimensional data and their graphic representation. Covariance and correlation index. Linear regression.</p>
Course books/Bibliography	<p>D. Benedetto-M. Degli Espositi-C. Maffei, <i>Matematica per le Scienze della Vita</i>, Casa Editrice Ambrosiana..</p> <p>P. Marcellini- C. Sbordone, <i>Istituzioni di Matematica e Applicazioni</i>. Editore Liguori, Napoli.</p> <p>-P. Marcellini- C. Sbordone, <i>Esercitazioni di Matematica</i>, volI, I (parte I[^] e II[^]), Editore Liguori, Napoli.</p>
Notes	Suggested texts and notes available in the classroom
Teaching methods	Lectures and exercise sessions
Assessment methods (indicate	Evaluation of the learning process during the lecture period: ongoing tests that assess

at least the type written, oral, other)	the student's growth. - Written and oral exam
Evaluation criteria (Explain for each expected learning outcome what a student has to know, or is able to do, and how many levels of achievement there are	Acquisition of practical skills, ability to acquire information and know how to transform it, use of known material to solve new problems.
Further information	