



COURSE DETAILS

"MATHEMATICS"

SSD MAT/05

DEGREE PROGRAMME: "VITICOLTURA ED ENOLOGIA"

ACADEMIC YEAR 2021-2022

GENERAL INFORMATION – TEACHER REFERENCES

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GENERAL INFORMATION ABOUT THE COURSE

YEAR OF THE DEGREE PROGRAMME : I

SEMESTER: I

CFU: 6

REQUIRED PRELIMINARY COURSES (IF MENTIONED IN THE COURSE STRUCTURE “ORDINAMENTO”)

Preliminar course of Mathematic

PREREQUISITES (IF APPLICABLE)

LEARNING GOALS

EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

Knowledge and understanding

The purpose of the course is to provide students with basic knowledge regarding calculation and the use of mathematical tools for applications to the disciplines of the course of study. In particular, the main knowledge provided they will be: basic tools of mathematical analysis (function of real variable, limit, derivative); analysis of graphs of elementary functions. The student will have to demonstrate that they know, understand and develop this knowledge independently.

Applying knowledge and understanding

The student must demonstrate that he is able to apply mathematical knowledge to the subjects characterizing the course of study and in particular: apply basic calculation tools of the analysis mathematics for solving problems in economics, biology, oenology, hydrology and chemistry; analyze graphs of elementary functions with particular reference to biological processes.

COURSE CONTENT/SYLLABUS

Preliminaries: Sets and operations; Numerical sets (N, Z, Q, R), representation of real numbers on the line.

Intervals. Maximum, minimum, highest and minor. Limited sets. Upper and lower extremes.

Cartesian plan.

(0,5 CFU)

Functions: Function Concept. Domain and codomain. Function graph. Sign of a function.

Limited, monotonous, symmetrical, periodic, injective, surjective, bijective, inverse, elementary, linear functions; absolute value,

quadratic and power functions, and square root function. Exponential, logarithmic, trigonometric and composite functions. (2 CFU)

Function Limits: Converging and diverging functions. Continuous functions. Elementary function limits.

Fundamental boundary theorems: uniqueness, theorem of sign permanence. Comparison Theorem. Infinite and infinitesimal limits. Limit operations. Limit of a composite function. Polynomial limits and rational functions. Limit Hierarchy. Indefinite forms. Asymptotes. Continuous function theorems: Weierstrass, zeros, intermediate values. (1,5 CFU)

Derivatives: Definition of derivative and derivable functions. Derivability and continuity. Geometric interpretation. Derivatives of elementary functions and calculation rules. Derivatives of Composite and Inverse Functions. Tangent line to the graph of a function. Fermat theorem. Stationary points. Characterization of monotone and constant functions in intervals. Concavity and convexity. Convexity criterion. De L'Hopital Theorem. (2 CFU)

READINGS/BIBLIOGRAPHY

Libro di testo consigliato: D. Benedetto, M. Degli Esposti, C. Maffei, Matematica per le Scienze della Vita, III edizione, Zanichelli.

TEACHING METHODS

The lessons will take place with lectures and exercises

EXAMINATION/EVALUATION CRITERIA

a) Exam type:

Exam type	
written and oral	X
only written	
only oral	
project discussion	
other	

In case of a written exam, questions refer to: (*)	Multiple choice answers	X
	Open answers	X
	Numerical exercises	X

(*) multiple options are possible

