

Main course information	
Academic subject	General and Nutrition Enzymology
Degree course	Master's Degree in Bio-sanitary Sciences – (Nutrition Curriculum)
Degree class	LM-6
ECTS credits (CFU)	6
Compulsory attendance	yes
Teaching language	Italian
Accademic Year	2019/2020

Professor/Lecturer	
Name & SURNAME	Marina Roberti
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Tutorial time/day	TUESDAY, WEDNESDAY 12-13 THURSDAY 16-17

Course details	Pass-fail exam/Exam with mark out of 30	SSD code	Type of class
	Exam with mark out of 30	BIO 10	Lecture/workshop

Teaching schedule	Year	Semester
	I	II

Lesson type	CFU/ECTS Lessons	Lessons hours	CFU/ECTS lab	Lab hours	CFU/ECTS tutorial/workshop	Tutorial/workshop hours	CFU/ECTS field trip	Field trip Hours
		5.5	44	0.5	6	0	0	0

Time management	Total hours	Teaching hours	Self-study hours
	150	50	100

Academic Calendar	First lesson	Final lesson

Syllabus	
Course entry requirements	Basic knowledge of general and inorganic chemistry, organic chemistry, biochemistry and molecular biology
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 in-depth knowledge on the functioning of enzymes in vivo and in vitro and on their application to diagnostics and in the field of nutrition, as well as on the criteria and methods of purification, characterization and engineering of enzymes. Acquisition of the mastery of theoretical tools for the interpretation of biochemical processes.
<i>Applying knowledge and understanding</i>	Acquisition of the ability to apply knowledge on the functioning of enzymes in the field of diagnostics and nutrition, as well as the ability to apply knowledge on the purification, characterization and engineering of enzymes in the context of basic biochemical research.
<i>Making informed judgements and choices</i>	Acquisition of independent judgment in the evaluation of experimental data concerning biochemical problems related to the functioning of enzymes or their use in the diagnostic and nutritional field
<i>Communicating knowledge and understanding</i>	Improvement of the disciplinary vocabulary in the biochemical and enzymology field, as well as the ability to describe biochemical phenomena and problems with clarity and precision even to “non-experts”
<i>Capacities to continue learning</i>	Acquisition of the ability to deepen and update one's own knowledge independently, by

**Syllabus**

<p>Course content</p>	<p><b>General enzymology:</b> Structure-function relations in enzymes. Enzymatic catalysis. Enzymatic kinetics. Reversible and irreversible inhibitions, graphic study methods and their applications in the health field. Enzymatic regulation. How proteases work. Enzymatic dosage of the substrate and the activity.</p> <p><b>Methods applied to protein and enzymatic characterization:</b> Spectrophotometry. Fluorimetry. Purification strategies. Chromatographic techniques. Elements of molecular structuring and modeling.</p> <p><b>Enzymatic diagnostics applied to nutrition and human nutrition:</b> application examples of enzymatic assays. Exogenous and endogenous enzymes of food relevance.</p> <p><b>Effect of nutraceuticals, cofactors and xenobiotics on enzymatic activities:</b> application examples on isolated enzymes and in the cellular context.</p> <p><b>Recombinant enzymes and protein engineering:</b> Production strategies for recombinant enzymes. Site-specific mutagenesis. Protein stability studies and their applications. Engineered enzymes and their applications.</p> <p><b>Cellular enzymology:</b> folding, chaperones, peptidyl-prolyl-isomerases, PDI, binding of prosthetic groups, post-translational modifications. Protein quality control. Ubiquitin and proteasome. Outline of misfolding pathologies.</p> <p><b>Outline of enzymatic defects of metabolism.</b></p>
<p>Course books/Bibliography</p>	<p>Nelson e Cox, Principi di biochimica di Lehninger (Zanichelli); Galzigna, Elementi di Enzimologia (Piccin); Pagani e Duranti, Enzimologia: dai fondamenti alle applicazioni (Piccin); Cozzani e Dainese, Biochimica degli alimenti e della nutrizione (Piccin) lecture notes</p>
<p>Notes</p>	<p>If necessary, as a support, lesson ppt will be provided (which do not represent a handout)</p>
<p>Teaching methods</p>	<p>Frontal lessons with the use of PowerPoint. Laboratory sections with the use of suitable equipment and computer media.</p>
<p>Assessment methods (indicate at least the type written, oral, other)</p>	<p>Oral interview that addresses at least three topics covered in the course. Since the subject includes the description of graphs, chemical reactions, etc., for these, in the interview, an illustration will still be required on paper or blackboard.</p>
<p>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)</p>	<p>For a positive assessment the student will have to demonstrate:</p> <ul style="list-style-type: none"> <li>- to have mastered the knowledge on the functioning, characterization and engineering of enzymes,</li> <li>- to know how to apply this knowledge to diagnostics and in the field of nutrition,</li> <li>- to know how to express oneself with a correct disciplinary vocabulary,</li> <li>- autonomy of judgment and ability to integrate the knowledge of the course, as well as those of the course and those of the other disciplines.</li> </ul>
<p>Further information</p>	