COURSE DETAILS

"BIOCHEMISTRY"

SSD BIOCHIMICA (BIO/10) *

** the SSD (scientific disciplinary sector) should be the one that is mentioned in the "Didactic Regulation of the Degree Course" and not necessarily the one of the teacher. In case of an integrated course, the SSD (scientific disciplinary sector) should be written above only if all modules of the course belong to the same SSD, otherwise the SSD is to be written alongside the MODULE (see below).*

DEGREE PROGRAMME: MEDICINE AND SURGERY (P11)

ACADEMIC YEAR 2025-2026

GENERAL INFORMATION–TEACHER REFERENCES

COORDINATOR: ROMANO MARIA FIAMMETTA

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Faculty	Position	Scientific Fields:	Phone 746-	Reception (day/time/building)	E-mail
Romano Maria Fiammetta	Full Professor	Biochemistry	3125	Tue 9.30-11.30 Bldg.19 Corpibassisud 1st floor	mariafiammetta.romano@unina.it
Pavone Luigi Michele	Full Professor	Biochemistry	3148	Thu 14-16 Bldg.19, 13thfloor	luigimichele.pavone@unina.it
Grosso Michela	Associate Professor	Biochemistry	4360/3140	Thu 14-16 Bldg.19A	michela.grosso@unina.it
Matassa Danilo Swann	Associate Professor	Biochemistry	3139	Mon 9.00-11.00 Bldg.19A, 3rdfl	daniloswann.matassa@unina.it
De Candia Paola	Associate Professor	Biochemistry	4596	Wed 9.30-12.30 Bldg.19A, 2ndfl	paola.decandia@unina.it

GENERAL INFORMATION ABOUT THECOURSE

INTEGRATED COURSE (IF APPLICABLE):N/A
MODULE (IF APPLICABLE): N/A
SSD OF THE MODULE (IF APPLICABLE): BIO/10
TEACHINGLANGUAGE: ENGLISH
CHANNEL (IF APPLICABLE): 01 SURNAME A-Z
YEAR OF THE DEGREE PROGRAMME (II):
SEMESTER (I, ANNUAL):
CFU: 9

REQUIRED PRELIMINARY COURSES (IF MENTIONED IN THE COURSE STRUCTURE "REGOLAMENTO")

none

PREREQUISITES (IF APPLICABLE)

For a correct understanding of the biochemical reactions that underlie biological processes, the student must be able to approach the chemical structure and reactivity of biomolecules.

LEARNING GOALS

The course's educational objectives are to provide students with the fundamental concepts of the biochemical and molecular mechanisms of metabolism. Such a formative path intends to allow the student to elaborate on metabolic regulation. Another educational objective of the course is to introduce students to knowledge of metabolic defects and provide them with the essential methodological tools needed to analyze metabolic defects. The study is directly preparatory to Human Physiology and Systematic Pathology of Organ.

EXPECTED LEARNING OUTCOMES (DUBLIN DESCRIPTORS)

Knowledge and understanding

The student must demonstrate knowledge and understanding of the biochemical and molecular mechanisms of metabolism. She/he must demonstrate that she/he knows how to deal with even complex discussions on topics concerning metabolic regulation, starting from the notions learned on biochemical processes. She/he must also know the tools and basic methodologies needed to study metabolism and its defects.

Applying knowledge and understanding

The student needs to show the ability to apply the knowledge acquired on the main biochemical methods for solving problems concerning the regulation of metabolism and defects of metabolism and infer decisions on more suitable biochemical methodologies for the diagnosis/prevention of the main human diseases.

COURSE CONTENT/SYLLABUS

Enzymes: classification; kinetic properties and parameters; enzymatic inhibition; regulatory enzymes. Water-soluble Vitamins and coenzymes. Principles of cellular metabolism and bioenergetic (1 CFU). Carbohydrate metabolism: glycolysis; gluconeogenesis; pentose phosphate pathway; disaccharides; glycogen synthesis and degradation; citric acid cycle; reactions and regulation (1 CFU). Lipid metabolism: digestion and transport; oxidation of fatty acids; Ketone bodies. Biosynthesis of fatty acids, triacylglycerols, membrane phospholipids, cholesterol; regulation. Fat-soluble vitamins (0,75 CFU). Protein metabolism: fate of amino groups and urea cycle; main degradation pathways and biosynthesis of amino acids (0,75 CFU). Nucleotide metabolism: de novo synthesis and salvage pathways; catabolism of purine and pyrimidine nucleotides (0,25 CFU). Oxygen transport and storage: hemoglobin and myoglobin (0,25 CFU). Bioenergetic and electron transport mechanisms; oxidative phosphorylation. Reactive oxygen species and molecular basis of aging (0,75 CFU). Molecular mechanisms of signal transduction (0,25 CFU). Biochemistry of tumor cells (0,5 CFU). Hormone biochemistry: the main endocrine systems. Peptide, thyroid, steroidal (gender differences), pancreatic hormones. (0,75 CFU) Tissue-specific metabolisms and their integration: liver, adipose tissue, muscle, nervous tissue (1,75 CFU). Biochemistry of the blood and coagulation proteins. Iron and heme metabolisms (0,5 CFU). Main methodologies for the study of the biochemical/molecular bases of human pathologies: optical, chromatographic and electrophoretic techniques (0,5 CFU).

SCHEDULE OF THE COURSE

Week	Day time p.m. 3.30-5.10	Prof	Formal Lectures
1st Oct 6th-10th, 2025	Mon, Oct 6th	Romano	Introduction
	Tue, Oct 7th	Pavone	
	Wed, Oct 8th	Pavone	Key principles of enzyme structure, kinetics, and regulation
	Thu, Oct 9th	Pavone	
	Fri, Oct 10th	Pavone	Introduction to metabolism
2nd Oct 13th-17th, 2025	Mon, Oct 13th	Grosso	Thermodynamics/bioenergetics (principles)
	Tue, Oct 14th	Romano	Structural/biological features of the most relevant proteins of biomedical interest
	Wed, Oct 15th	Romano	
	Thu, Oct 16th	Romano	Molecular mechanisms of signal transduction; hormone receptors
	Fri, Oct 17th	Romano	
3rd Oct 20st-24th 2025	Mon Oct 20th	Grosso	
	Tue, Oct 21st	Grosso	
	Wed, Oct 22nd	Grosso	Catabolism and anabolism of carbohydrates and regulation
	Thu, Oct 23rd	Grosso	
	Fri, Oct 24th	Grosso	
4th Oct 27th- Oct 31st, 2025	Mon, Oct 27th	DeCandia	Catabolism of lipids and regulation
	Tue, Oct 28th	DeCandia	
	Wed, Oct 29th	Matassa	Anabolism of lipids and regulation
	Thu, Oct 30th	Matassa	
	Fri, Oct 31st	Romano	Integration and regulation of metabolism
5th Nov 3rd-7th, 2025	Mon, Nov 3rd	Matassa	Heme metabolism
	Tue, Nov 4th	DeCandia	Respiratory chain and oxidative phosphorylation. Reactive oxygen species
	Wed, Nov 5th	DeCandia	
	Thu, Nov 6th	DeCandia	
	Fri, Nov 7th	Romano	Catabolism and anabolism of amino acids and

			regulation
6th Nov 10th-14th, 2025	Mon, Nov 10th Tue, Nov 11th Wed, Nov 12th Thu, Nov 13th Fri, Nov 14th	Romano Romano Romano Pavone Pavone	 Catabolism and anabolism of amino acids and regulation Catabolism and anabolism of nucleotides and regulation
7th Nov 17th-21st, 2025	Mon, Nov 17th Tue, Nov 18th Wed, Nov 19th Thu, Nov 20th Fri, Nov 21st	Matassa Matassa Matassa Romano Romano	Evaluation test Cancer metabolism Hormones and hormonal regulation of metabolism
8th Nov 24th- Nov 28th, 2025	Mon, Nov 24th Tue, Nov 25th Wed, Nov 26th Thu, Nov 27th Thu, Nov 28th	Romano Romano Pavone Pavone Grosso	Hormones and hormonal regulation of metabolism Tissue/organ-specific metabolism: Liver Tissue/organ-specific metabolism: Adipose Tissue-Obesity
9th Dec 1st- 5th, 2025	Mon, Dec 1st Tue, Dec 2nd Wed, Dec 3rd Thu, Dec 4th Fri, Dec 5th	Grosso Romano Romano Romano DeCandia	Tissue/organ-specific metabolism: Adipose Tissue-Obesity Tissue/organ-specific metabolism: Muscle Tissue/organ-specific metabolism: Brain Tissue/organ-specific metabolism: Blood/coagulation
10th Dec 9th- 12th, 2025	Mon, Dec 9th Tue, Dec 10th Wed, Dec 11th Thu, Dec 12th	DeCandia Matassa Matassa DeCandia	Tissue/organ-specific metabolism: Blood/coagulation Basic principles of methodologies Evaluation test

READINGS/BIBLIOGRAPHY

- Lehninger Principles of Biochemistry, Cox M.M and Nelson D.L. 8th ed - Biochemistry- Jeremy M. Berg, John L. Tymoczko, Lubert Stryer, 10th ed. - Medical Biochemistry- John Baynes PhD e Marek H. Dominiczak MD Dr Hab Med FRCPath with STUDENT CONSULT Online Access, (Medial Biochemistry) 2014, 4 ed - Medical Biochemistry- Baghavan N.V. 4th ed.

TEACHING METHODS

For the teaching of Human Biochemistry, frontal lectures (80%, interactive didactic activity in small groups (ADI) (10%) are provided, self-evaluation test (10%)

Tools for teaching delivery (multimedia, online material).

EXAMINATION/EVALUATION CRITERIA

*For **integrated courses**, this field should encompass all modules, with indication of the relative weight of each module on the final mark. For integrated courses, this field should be coordinated by the reference teacher for the course.*

a) Exam type:

*For **integrated courses**, there should be one exam.*

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	
	Numerical exercises	

(*) multiple options are possible

b) Evaluation pattern:

Individual assessment will be based on a written questionnaire and an oral presentation of the topics of the lessons (with final mark from 18 to 30/30). - Students must pass the written test (with a mark ≥18/30)