ACADEMIC YEAR 2025/2026

General information	
Name of the integrated course	**MANAGEMENT AND RECOVERY TECHNIQUES OF PROTECTED MARINE SPECIES**
Integrated teaching modules	**Management techniques of the sea fauna under treatment; Environmental and marine toxicology.**
Degree course	Animal Science (L38)
Academic Year	III
European Credit Transfer and Accumulation System (ECTS)	5 (ECTS lessons: 3; ECTS exe/lab/tutor: 2)
Language	Italian
Period of teaching	II semester (02/03/2026 – 19/06/2026)
Attendance	Mandatory

Teacher	**e-mail address**	**phone**
Antonio V.F. Di Bello	antonio.dibello@uniba.it	+39 0805713816
Carmela Valastro	carmela.valastro@uniba.it	+39 0805713211
Olimpia Lai	olimpia.lai@uniba.it	+39 0805713924

Headquarters	Campus of Veterinary Medicine, S.P. per Casamassima km 3, 70010 Valenzano (Ba)
Virtual headquarters	Microsoft Teams (access code: bnzy7q1 - mj6qar3i)
Tutoring (time and day)	Tuesday: 01:00 pm-03:00 pm and Wednesday: 01:00 pm-03:00 pm by appointment via email.

Syllabus	
Learning Objectives	The teaching course aims to acquire by the student a good basic knowledge for the management and recovery of protected marine species. To explain the hazards associated with the exposure of aquatic ecosystems and protected marine species (sea turtles, cetaceans, pinnipeds, pelagic birds) to various xenobiotic pollutants of natural and anthropic origin (including drugs), contaminating the environment and the relative trophic chains, in order to protect the health and well-being of the subject species and global biodiversity. The teaching also aims to provide the student with a full and mature understanding of the importance of a rigorous knowledge of the mechanisms, restrictions, prohibitions and operative/organizational models prescribed by the current legislation ruling the diffusion of xenobiotics of anthropogenic origin in aquatic ecosystems.
Course prerequisites	The student must have adequate knowledge and skills concerning the General Pathology and Pathophysiology, Drug Law, Pharmacovigilance and Toxicology, Biosafety and Health Management exams. Finally, knowledge and competence related to the basic knowledge of the subject would be appropriate.

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Contents of the teaching module: **Management techniques of the sea fauna under treatment** Teacher: **Antonio V.F. DI BELLO** **Carmela VALASTRO** **Lectures** **ECTS: 2** **Hours: 16** **Practical activities** **ECTS: 1** **Hours:1**	Outline of the rules governing the protection of sea turtles. Bases of anatomy of sea turtles. Bases of physiology of sea turtles. Biosecurity standards for the management of marine reptiles. Restraint of sea turtles. Compilation of medical records. Monitoring of the main vital parameters (respiratory rate, temperature, application of electrodes for ecg). Nutrition status assessment. Evaluation and removal of ectoparasites, epibionts and epiphytes from the surface of animals. Evaluation of the main reflexes and reactivity of the animals. Evaluation of the movement of animals out of water and in water, of normal or altered buoyancy and of the ability to dive. Management of relaying tanks (water quality, water salinity calculation). Preparation and administration of the food by mouth or by tube feeding. How to carry out microbiological, cloacal, ocular and wound swabs, provide assistance for blood sampling. Wound cleaning and disinfection. Positioning for radiographic, ultrasound and CT examinations. Management of surgical instruments during wound curettage and minor surgery. Assistance to the veterinarian during turtle anesthesia. The practical activities of Management techniques of the sea fauna under treatment take place at the Sea Turtle Clinic. The students divided into small groups are followed by the teachers and collaborators. Each student is asked to individually carry out the practical activities covered by the exercise and to discuss them with the teachers or assistants.
Contents of the teaching module: **Environmental and marine toxicology** Teacher: **Olimpia LAI** **Lectures** **ECTS: 1** **Hours: 8** **Practical activities** **ECTS: 1** **Hours: 10**	Introduction to aquatic toxicology; Interactions between environmental factors and toxicity; Causes of contamination of the aquatic environment; Sources of pollution and transport in the environment; Metals, metalloids and organometallic compounds; Inorganic (including the causes of eutrophication) and organic pollutants; Drug residues; Nanomaterials; Ionizing radiations; Bioavailability of xenobiotics in the aquatic environment; Uptake of xenobiotics in the aquatic environment: trophic chains; Bioindicators, biomarkers; Distribution and accumulation of xenobiotics in aquatic species; Mechanisms of detoxification and excretion; Effects on organisms: oxidative stress, effects on membranes, apoptosis and necrosis, neurotoxicity, immunotoxicity, effects on reproduction, genotoxicity, teratogenesis, carcinogenesis, behavioural effects; Effects on populations: epidemiology, demographic effects, population genetics; Effects on communities and aquatic ecosystems; Marine protected species: hints of biology, trophic chains, routes of exposure to xenobiotics, risks for Mediterranean populations; Mass stranding; Petroleum; Algal biotoxins: The practical lessons of Environmental and marine toxicology take place, depending on the specific activity to be carried out, in a classroom (e.g.: documentary films followed by group discussion), in a laboratory (e.g.: performing simple screening tests for residues detection); they also require each student to be actively involved in the execution and / or discussion of the topics covered by the exercise.

Biosafety rules for the attendance of practical activities.	Access to laboratories, stables and Sea Turtle Clinic will be allowed only to students wearing protective clothing (disposable coats and gloves and, when required, also footwear) and that have read the biosafety manual.

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Materail for the personal study	
Books and bibliography	Sea Turtle Health & Rehabilitation di C. Manire, T. Norton, B. Stacy, C. Innis, C. Harms (2017); J. Ross Publishing. Vos J.G., Bossart G.D., Fournier M., O'Shea T. Toxicology of Marine Mammals, Taylor & Francis, 2003 Gupta R.C. "Veterinary Toxicology, Second Edition: Basic and Clinical Principles". Academic Press-Elsevier, 2nd Edition (2012) Nikinmaa M. "An introduction to aquatic toxicology". Academic Press-Elsevier (2014) Gupta R.C. "Biomarkers in toxicology". Academic Press-Elsevier (2014) Gulland F.M.D., Dierauf L.A., Whitman K.L. CRC Handbook of Marine Mammal Medicine, Third Edition. CRC Press, Taylor & Francis Group (2018) Class notes; PDF presentations available in Google Drive and Microsoft Teams
Additional materials	The additional teaching material will be provided by teachers at the beginning of the course and will be available in the Microsoft Teams platform.

Work schedule			
Hours			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Individual study
125	*24*	*20*	*81*
ECTS			
5	*3*	*2*	*/*

Teaching strategy	Theoretical lessons are held in a classroom equipped with multimedia tools such as a PC, projector, internet connection, in order to show, at the same time as the explanation, power point slides and explanatory videos. In order to facilitate student learning and make it as meaningful as possible, the topics of each lecture are problematized and contextualized with situations from real everyday life. Possible curiosities and/or questions of students are taken as the starting point for further in-depth discussion of a topic. The practical activities of Management techniques of the sea fauna under treatment take place at the Sea Turtle Clinic. The students divided into small groups are followed by the teachers and collaborators. Each student is asked to individually carry out the practical activities covered by the exercise and to discuss them with the teachers or assistants. In Environmental and marine toxicology the practical lessons take place, depending on the specific activity to be carried out, in a classroom (e.g.: documentary films followed by group discussion), in a laboratory (e.g.: performing simple screening tests for residues detection); they also require each student to be actively involved in the execution and / or discussion of the topics covered by the exercise.

Expected learning outcomes	
Knowledge and understanding ability	At the end of the course, the student will have knowledge and understanding ability related to: • Knowledge of the main threats to protected marine species; • Knowledge of how to recover specimens of protected marine species found in difficulty;

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	• Knowledge of the methods of approach and containment relating to protected marine fauna; • Knowledge of the most commonly used intervention methods for the management of protected marine fauna. • principles that regulate the interaction of xenobiotics with protected species living in aquatic environments that are exposed to these substances (sea turtles, cetaceans, pinnipeds, pelagic birds); • factors that contribute to determining and influencing the type and intensity of the effects resulting from the xenobiotic-organism interaction; • main national and community legislative references governing the release of xenobiotic substances in aquatic environments and their impact on the resident species; • processes of interaction and origin of the various xenobiotic substances; • principles that regulate the movement of pollutants along the trophic chains; • trophic biology of protected aquatic species that originates their exposure to toxic pollutants.
Applied knowledge and understanding ability	At the end of the course, the student will be able to: • Ability to recognize the main causes that lead a specimen of protected marine fauna to be in a state of difficulty; • Ability to identify and solve the main management problems relating to protected marine species; • Ability to support the veterinarian in identifying the best strategies to cope with different situations; • conscious, responsible and virtuous approach to the activities linked to production and industrial practices that imply or could imply the spread of toxic xenobiotics in aquatic environments and the exposure of protected animal species to the aforementioned substances, whether of natural and/or anthropic origin, concomitant with contamination of the trophic chains of the target species.
Soft skills	**Autonomy of judgment** • At the end of the course, the student should be able to understand the different critical situations related to the correct management of protected marine species and to propose a correct management plan in the different circumstances; • prediction of the behaviour of a xenobiotic after spreading in the aquatic environment and exposure of target species, as well as prediction of how the intervention of certain factors may change its behaviour and the biological response arising from it; • choice and adoption of the most appropriate remedial actions in case of animal exposure to toxic xenobiotics (to the extent of what the professional figures formed by this bachelor's degree course are allowed to do). **Communication skills** • Acquisition of the skills and the correct scientific terminology to be able to correctly relate to veterinarians, biologists and wildlife technicians, as well as the ability to work in a team, adopting adequate communication and interaction strategies.; • communicate with the Public Veterinary Service of Animal Health in case of reporting distressed or dead subjects of target species;

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	• Moreover, by means of this teaching, students will learn how to fill in the documentation (either paper or digital) required by authorities in case of reporting, rescuing or death of target protected species. **Capacity of self-learning** • Acquire the ability to autonomously improve one's knowledge through further studies and in-depth studies, more advanced courses and training periods at structures specialized in the care and recovery of protected marine fauna.

Assessment and feedback	
Methods of assessment	Knowledge and skills acquired by students are verified by oral examination focusing on at least three different topics of the program, furthermore, the knowledge and skills acquired will be assessed in the final phase of the course through the involvement of students in the management and care of the specimens present in the Sea Turtle Clinic.
Evaluation criteria	• *Knowledge and understanding ability:* (grade from da 1 to 8) ○ Know the correct ways of approaching marine fauna under treatment and be able to recognize the different critical situations; ○ to know the concepts and principles underlying the interaction of toxic substances with living organisms. ○ to know the problems that can derive from the interaction of drugs and toxic substances with marine species. ○ to know the origin and the modalities of formation of the various toxic substances and the principles that regulate the movement of pollutants along the marine trophic chains. • *Applied knowledge and understanding ability:* (grade from da 1 to 8) ○ Knowing how to identify the appropriate modes of action in the presence of a specimen of marine fauna in difficulty; ○ having understood how it is possible to intervene to reduce the exposure of marine protected species to toxic substances of natural or anthropic origin and / or reduce the contamination of food chains, as well as assist the staff in the marine protected species rescue centers. • *Autonomy of judgment* : (grade from da 1 to 3) ○ To be able to formulate a judgment regarding the best management procedure of the specimens under treatment according to the different circumstances; ○ critical reasoning skills on the study carried out.; ○ ability to autonomously formulate one's own opinion. • *Communication skills* (grade from da 1 to 3) ○ Knowing how to appropriately use the specific terminology useful for interacting within a work group; ○ ability to discursively organize one's knowledge. ○ ability to present one's reasoning effectively and linearly. ○ ability to use specialist vocabulary competently • *Capacity to continue learning* (: (grade from da 1 to 8) ○ To be able to rework the concepts learned to adapt them to new situations and to be able to draw on the sources available for their management; ○ To improve his knowledge of the topics through advanced courses and training periods in marine protected species rescue centers.

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Criteria for assessment and attribution of the final mark	The assessment of the learning achieved takes place through an oral interview aimed at ascertaining the degree of knowledge of the proposed topics. The final grade is awarded out of thirty. The exam is passed when the grade is greater than or equal to 18. The final grade of the integrated exam is the result of the collegial assessment relating to the two courses. In any case, the student must acquire a mark greater than or equal to 18/30 for each part of the exam relating to the two courses. The highest marks will be awarded to students who demonstrate good presentation, critical reasoning and appropriate language skills.
Other comments	

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