Università Politecnica delle Marche

Dipartimento Scienze della Vita e dell'Ambiente

FIRST LEVEL COURSE IN ORNAMENTAL AQUACULTURE

Di.S.V.A.
Via Brecce Bianche
60131 ANCONA
Tel. 0712204747-4331
www.univpm.it

PROPONENT

Dipartimento di Scienze della Vita e dell'Ambiente,

Università Politecnica delle Marche,

via brecce bianche 60131, Ancona, Italy.

THE COURSE

The degree will be issued upon attainment of 60 credits by the student. The student must attend a minimum of 75% of all classes and training activities.

1) **Lectures will be** given **in English** by international experts (25 credits). Specific topics will be discussed with an active participation of the students. The maximum number of participants is 20. Some classes will be integrated with practical courses to allow the participants to acquire "ad hoc" technical skills. Laboratories and scientific equipment are made available by the Universities and the associated companies that participate in this project.
2) **Traineeship** (18 credits) will be conducted in an associated company, Institute or University.
3) **Thesis:** 17 credits

Content of the course.

- Marine ornamental trade
- Reproductive biology and aquatic biotechnology applicable to fish
- Breeding and reproductive biology of Syngnathids
- Water chemistry and hatchery design
- Brood stock, larvae and fish nutrition
- Coral culture
- Production of live food
- Algae and aquatic plant physiology
- Infectious and parasitic diseases of ornamental fish and invertebrates
- Laws and rules for the ornamental trade

Scientific committee

Ike Olivotto- Coordinator, Dipartimento di Scienze della Vita e dell'Ambiente,Università Politecnica delle Marche, Ancona, Italy.

Mario Giordano, President of the course board, Dipartimento di Scienze della Vita e dell'Ambiente,Università Politecnica delle Marche, Ancona, Italy.

Oiana Carnevali-Scientific Advisor, Dipartimento di Scienze della Vita e dell'Ambiente,Università Politecnica delle Marche, Ancona, Italy.

Scope

This course intends to create a new professional profile related to the ornamental aquaculture sector. Graduates will be able to design, manage and run a marine ornamental facility, in addition to have a comprehensive knowledge of the organisms and of laws and regulations related to the marine ornamental trade. Great attention will be given to the sustainable culture of the organisms as well as to system and tank design.

Objectives

Participants will become acquainted with the main topics related to marine ornamental aquaculture, including fish, corals, algae and aquatic plant biology, and to facility design and management. After successful completion of the program, the participants will have the expertise to work for ornamental breeders, exporters, importers, public aquaria as well as conducting field activities. In addition to lectures, the student will receive practical training for a period of 450 hrs, in the facilities provided by associated companies/universities. This will allow the students to acquire practical skills and put the theoretical information received during he course into practice. In addition, it is possible (but not obligatory) for the students to spend 7 nights on an Indonesian reef to receive training on sampling and on laboratory techniques related to field work.

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WHERE, WHEN, WHO

Where

The program will have its base at Università Politecnica delle Marche, Departiment of Life and Environmental Sciences, via Brecce Bianche, 60131 Ancona, Italy.

Practical classes can be performed on the Indonesian reef, at the "Coral Eye resort", located on Bangka Island. Bangka is a small island situated north of Manado, on the northeastern tip of Sulawesi - Indonesia. Bangka is within the 'Coral Triangle', the global epicentre of marine biodiversity. Bangka is very well known for its idyllic beaches and famous dive spots that are attracting scuba divers from all over the world. The resort is well equipped for field and laboratory activities and is provided with:

Dry lab: A big open space with air conditioning and ample work surfaces, supplied with lab equipment, chemical reagents, plastic supplies, stereoscopic and compound microscopes.

Wet lab: Directly facing the sea and connected to the dry lab, has a big concrete tank, different size aquarium and a flow-through seawater system to refill aquariums.

Reef lab: Situated on the coral reef in front of the centre, easily accessible from the pier.

When

The participants will have to pre-register by November 7th, 2016.

Registration must be completed between December 1st and December 12nd, 2016.

Classes will take place in the first part of the year (January-May 2017). Practical training will be conducted from May to September. The students will take their final exam in October.

Who

The student eligible for registration to the course must have obtained a bachelor degree (3 year course) in Biology, Veterinary medicine, Aquaculture, Natural Sciences, Environmental Sciences or Zootechnic productions. Candidates will be admitted to the course after evaluation of their credentials and, if necessary, after a short interview that will take place at the Università Politecnica delle Marche, Department of Life and Environmental Sciences, via Brecce Bianche, 60131 Ancona, Italy.

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The course is intended for students that want to improve their skills, people already running an ornamental fish importer/exporter/shop, scientists working in private and public aquaria.

CLASSES

CLASSES	HRS	CFU
1 Marine ornamentals trade	16	2
2 Water chemistry and Hatchery design	20	2,5
3 Reproductive biology of fish, aquatic biotechnology, induced spawning and optimization of environ. conditions	20	2,5
4 Brood stock, larval and fish nutrition	16	2
5 Coral culture and nutrition	16	2
6 Production of live food	16	2
7 Breeding and Rreproductive biology of Syngnathids	16	2
8 Algae and aquatic plant physiology	16	2
9 Infectious and parasitic diseases of ornamental fish and invertebrates	16	2
10 Laws and rules for the ornamental fish trade	8	1
TOTAL	**160**	**20**
PRACTICAL CLASSES to be chosen between 1 or 2	**HRS**	**CFU**
1)		
Water chemistry and Hatchery design and production of live food	8	1
Reproductive biology of fish	8	1
Disease and parasitology in fish and invertebrates	8	1
Visit of a public aquarium	16	2
2)		
Field activity on coral reef (Indonesia) as practical course of classes 1-10	40	5

Table 1: classes and credits.

Lectures and practical classes: 25 credits distributed as indicated in table 1. The official language of the course is English. Exam**:** Students will be evaluated through multi-choice tests that will be performed at the end of the lectures.

Practical Training: 18 credits in an associated company/University

Thesis and final discussion: 17 credits

TOTAL: 60 credits

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PROGRAM OF THE LECTURES:

1) **Marine ornamentals trade** (07G)

Focus will be on the structure and organisation of the marine aquarium trade. The students will learn about market needs, existing capacity in aquaculture and gaps that need to be closed and how aquaculture can help to overcome sustainability challenges in this trade. This class will also review the best practices in handling and transport. Economic aspects and ethical rules will be discussed as well.

2) **Reproductive biology of fish, aquatic biotechnology, induced spawning and optimization of environmental conditions** (05A-B)

The sexuality and main reproductive strategies of fish and invertebrates will be discussed, with emphasis on their costs and benefits. Demersal and pelagic spawning will be discussed in detail, with additional information on embryology and early larval development.

Diversity of reproductive biology, neuroendocrine control of reproduction, photoperiod and phototherapy, use of hormones and drugs for induction of spawning, and improved management of production. Environmental stressors and best practice to minimize adverse impact of contaminants and stressors. Use of transgenic fish and recombinant growth hormone to improve growth response and food conversion efficiency.

3) **Breeding and reproductive biology of Syngnathids** (05B-07G)

The aim of this class is to provide a general knowledge on Syngnathid fishes (taxonomy, evolution, biology, ecology, reproduction and mating systems) and to describe rearing systems and techniques for their cultivation, especially for seahorses.

4) **Water chemistry and Hatchery design** (08A-07G)

This class will address the problems associated with salinity, pH, nitrogen cycle, micro and macronutrients availability. Basic hydraulic knowledge. Filtration systems and water quality: mechanical, biological, sterilization, protein skimmers. Lightening. Technical basis for the development of a filtration unit and for the setup of a hatchery.

5) **Brood stock, larval and fish nutrition** (05B-05D-07G)

Basic concepts and methodology in determination of nutrient requirements. General overviews of feeding, digestion, and metabolism. Considerations of the macronutrients and micronutrients with particular emphasis on biochemistry and the role on gametes quality and fish growth and welfare.

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6) **Coral nutrition** (05B-05D)

The main nutritional requirements in terms of lipids, proteins and carbohydrates will be addressed during these classes. The biochemical cycles of these molecules will be discussed in relation to corals. Particular attention will be given to preys that can be ingested assimilated in captive conditions and by corals, as well as the importance of photosynthesis in the autotrophic process. Light, water chemistry and water flow will be discussed as well.

7) **Production of live food including some practical classes** (05B-07G)

The transition from an endogenous to an exogenous feeding by the larvae will be discussed in the context of physiology of the digestive system in fish. A detailed overview of possible live preys for the marine ornamental aquaculture will be described with particular emphasis on their nutritional profiles. Biological characteristics, culture, advantages and disadvantages of rotifers, Artemia salina, ciliates and copepods. Production of resting stages and their use in aquaculture. Enrichment procedures.

8) **Algae and aquatic plant physiology** (05A)

The physiology of nutrient acquisition will be addressed in order to provide an overview of the conditions that facilitate or inhibit growth and proliferation of aquatic photosynthetic organism. Special attention will be give to C, N and S acquisition and assimilation and their consequences on growth and cell composition. This information will allow the student to understand the conditions that are required for the cultivation of ornamental plants, for the control of invasive microalgae and for the production of algal biomass to be used as feed in aquaculture

9) **Infectious and parasitic diseases of ornamental fish and invertebrates including practical classes** (07H)

Etiopathogenesis and clinical course of the most common infectious and parasitic diseases of ornamental fish and invertebrates will be presented and discussed. Students will acquire knowledge and practical skills on diagnosis, prevention and control of transmissible diseases of fish and invertebrates kept in aquarium.

10) **Laws and rules for the ornamental species trade** (07G)

The CITES Convention: application and enforcement - Role of customs and police officers: CITES Operational Manual - Case studies.

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Price

The course fee is 3000 euros. This includes classes, laboratory activities and a 7 nights stay on a coral reef in Indonesia (*Coral Eye research centre & Accommodation Bangka Island, North Sulawesi Indonesia* including breakfast, lunch, dinner, 3 divings, diving equipment, **but not airfare**) or, in alternative, a 40 hrs laboratory activity at Università Politecnica delle Marche. Participants are requested to indicate their choice of practical activities (in Indonesia or in Ancona) when registering.

How to subscribe

WEB PAGE: http://www.disva.univpm.it/content/master-aquaculture

CONTACTS:

Ike OLIVOTTO (course coordinator)

Telephone: +39-0712204643

Email: master.aquaculture@univpm.it