



University of Dubrovnik
Department for Aquaculture
Master in Mariculture
Summer semester for ERASMUS students

Academic year 2012./2013.

LIST OF TEACHERS AND COURSES

COMPULSORY

No.	Teaching professor	Course	Hours of Classes	ECTS
1.	Prof. Ivan Katavić, PhD	Aquaculture-status and perspectives	2+2	6
2.	Jakša Bolotin, PhD	Shellfish Culture	2+2	5
3.	Prof. Branko Glamuzina, PhD	Fish farming	2+2	5

ELECTIVE

No.	Teaching professor	Course	Hours of Classes	ECTS
1.	Nikša Glavić, PhD	Plankton Culture	2+2	6
2.	Prof. Branko Glamuzina, PhD	Genetics in Aquaculture	2+1	4
3.	Sanja Matić Skoko, PhD, Assoc. Prof.	Applied fish ecology	2+1	3
4.	Prof. Branko Glamuzina, PhD	Spawning and Hatchery	3+3	8
5.	Vlasta Bartulović, PhD, Asst. Prof.	Fish and Shellfish Reproduction	2+2	6
6.	Prof. Jakov Dulčić, PhD	Applied Fish and Shellfish Embryology	2+2	6
7.	Ana Gavrilović, PhD	Health and Welfare in Aquaculture	2+2	6
8.	Jurica Jug Dujaković, PhD, Asst. Prof.	Aquaculture technology	2+2	6
9.	Sanja Tomšić, PhD	Echinoderm Biology and Farming	2+1	3
10.	Nikša Glavić, PhD	Crustacean Biology and Farming	2+1	3



Course title	AQUACULTURE-STATUS AND PERSPECTIVES		
Course code	MARE 1		
Type of course	Lectures with seminars and exercises, field work		
Level of course	Compulsory course		
Year of study	I or II	Semester/trimester	Summer
ECTS	6 ECTS- 2 lectures, 1 practical work, 1 seminar work, 2 learning		
Name of lecturer	Prof. Ivan Katavić, PhD		
Learning outcomes and competences	Student adopts knowledge of past and present status of aquaculture in the world and recent activities and trends in Mediterranean aquaculture, considering new species and technologies.		
Prerequisites			
Course contents	Status of marine resources and short overview of aquaculture history. Present status of aquaculture in Mediterranean and Croatia Perspectives of aquaculture development in Europe and Croatia Application of the research in commercial practice Obstacles and problems in aquaculture development Future of aquaculture in Croatia		
Recommended reading	Bardach, J. E. 1997. Sustainable aquaculture. John Wiley & Sons Inc. 251 pp. Landau, M. 1992. Introduction to aquaculture. John Wiley&Sons, Inc. 440pp. Pillay, T. V. R. 1990. Aquaculture principles and practices. Fishing News Books. 575 pp. Swift, D. R. 1993. Aquaculture training manual. Second edition. Fishing News Books. 158 pp. Aquaculture. Elsevier. (international journal) INTERNET.		
Supplementary reading	Upon student interest in specific issues		
Teaching methods	Lectures, exercises		
Assessment methods	Exercises, final oral exam		
Language of instruction	English		
Quality assurance methods	Questionnaires		





Course title	SHELLFISH CULTURE		
Course code	MARE 2		
Type of course	Lecture, seminars, practice, practical training		
Level of course	Compulsory course		
Year of study	I or II	Semester/trimester	Summer
ECTS	5 ECTS – 2 lectures, 1 practice and practical training, 2 learning		
Name of lecturer	Jakša Bolotin, PhD		
Learning outcomes and competences	<p>The student has to adopt general and special knowledge on shellfish aquaculture, theoretical approach, terminology, functionality in the selected sea environments. Students should adopt knowledge on application of biological and ecological principles in shellfish aquaculture and needs for balancing of production within environmental capacities of selected environment. Special attention would be given to knowledge of applied approach of scientific studies and use of coastal ecosystem in aquaculture and other recent aquaculture technologies, as well as measures and needs sustainable crop and processing of shellfish.</p>		
Prerequisites			
Course contents	<p>Introduction – general knowledge on shellfish; Shellfish – biology Shellfish – ecology; Shellfish – production of spat to adults Oyster - <i>Ostrea edulis</i>, <i>Crassostrea gigas</i>, – biology and ecology, theoretical approach, prepositions for aquaculture Blue mussel – <i>Mytilus</i> spp. - biology and ecology, theoretical approach, prepositions for aquaculture Shellfish aquaculture technologies – general approach, spat collection (wild!), spawning, aquaculture lines, pergolars, net vs. cementing, aquaculture on land Depuration; Processing – collection at sea, cleaning, depuration tanks, marketing, field work – vs. lab work; Recapitulation of overall knowledge – field testing</p>		
Recommended reading	<p>Benović, A. 1997. The history, present condition, and future of the molluscan fisheries of Croatia. In C. L. MacKenzie, Jr., V. G. Burrell, Jr., A. Rosenfield, and W. L. Hobart (editors), The history, present condition, and future of the molluscan fisheries of North and Central America and Europe. U. S. Dep. Commer., NOAA Tech. Rep. NMFS 129, 217-226. C. L. MacKenzie, Jr., V. G. Burrell, Jr., A. Rosenfield, and W. L. Hobart (editors), The history, present condition, and future of the molluscan fisheries of North and Central America and Europe. U. S. Dep. Commer., NOAA Tech. Rep. NMFS 129, 217-226.</p>		
Supplementary reading	In accordance with the course coordinator.		
Teaching methods	Lectures, Power Point Presentations, films Practical work in marine hatcheries, Seminars, Literature analysis		
Assessment methods	Written test, oral examination		
Language of instruction	English		
Quality assurance methods	Questionnaire		



Course title	FISH FARMING		
Course code	MARE 3		
Type of course	Lectures with exercises and field work		
Level of course	Compulsory course		
Year of study	I or II	Semester/trimester	Summer
ECTS	5 ECTS - 2 lecture , 1 field work and practical training, 2 learning and seminars		
Name of lecturer	Prof. Branko Glamuzina, PhD		
Learning outcomes and competences	The students will be introduced to historical overview of fish aquaculture; in freshwater and sea water. Fish aquaculture in the world. Aquaculture of Mediterranean species; sea bass, sea bream and potential new species will be evaluated. Fish aquaculture perspectives in Croatia		
Prerequisites			
Course contents	<p>Introduction and historical overview of fish aquaculture Morphology, anatomy and physiology of fish Fish aquaculture world status, focus on salt water Sea bass, sea bream aquaculture Aquaculture of tuna and other fast-growing fish Aquaculture of eel and mullet Aquaculture of flatfish New species: porgies, grouper, amberjack and others Aquaculture systems: cages, offshore systems, land-based closed recycle systems Economical and market value of fish aquaculture</p>		
Recommended reading	<ol style="list-style-type: none"> 1. Pillay, T.V.R. 1990. Aquaculture principles and practices. Fishing News Books. 575 pp. 2. Swift, D.R. 1993. Aquaculture training manual. Second edition. Fishing News Books. 158 pp. 3. Barnabe, G. 1990. Aquaculture 1 and 2. Ellis Horwood Limited. 		
Supplementary reading	Upon student interest in specific fish species		
Teaching methods	Lectures, exercises		
Assessment methods	Exercises, final oral exam		
Language of instruction	English		
Quality assurance methods	Questionnaire		





Course title	PLANKTON CULTURE		
Course code	MARE 4		
Type of course	Lecture, seminars, practice, practical training		
Level of course	Elective course		
Year of study	I or II	Semester/trimester	Summer
ECTS	6 ECTS - 2 for theory, 2 practical training and exercise, 2 learning		
Name of lecturer	Nikša Glavić, PhD		
Learning outcomes and competences	Gaining theoretical and practical knowledge on plankton culturing (phytoplankton and zooplankton) and feeding of larval stages of fish, crustaceans and shellfish.		
Prerequisites			
Course contents	Basics of systematics of phytoplankton and zooplankton species used as food for larval fish, crustaceans and shellfish. Ecology and ecophysiology of phytoplankton and zooplankton. Relation between cultured plankton size and the size of mouth opening in larval fish and crustaceans. Physical-chemical parameters in culture, methods of culture, basics of population dynamics of cultured plankton species. Selection and preparing of inorganic culture media for phytoplankton. The start of feeding of larval stages and the duration of feeding with living plankton. Relation between biochemical composition of plankton food and plankton-fed organisms.		
Recommended reading	<p>Glavić, N. 2003. Utjecaj temperature i slanosti na veličinu kolnjaka <i>Brachionus plicatilis</i> O. F. Muller. Magistarski rad, Sveučilište u Zagrebu, 61 pp.</p> <p>Laing, I. and B. T. Hepper 1983. A simple method for the production of marine algae in polyethylene bags. Fish. Not., MAFF Direct. Fish. Res. Lowestoft, 73: 1-11.</p> <p>Lucas, J. S., and Southgate, P., C. 2003. Aquaculture, Farming aquatic animals and plants. Fishing news books</p> <p>Kožul, V, and Skaramuca, B. 1997. The effects of temperature stress on populations of the rotifer <i>Brachionus plicatilis</i> Muller in culture. Natura Croatica, 6 (4): 437-446.</p>		
Supplementary reading	<p>Peres, J-M., Gamulin Brida, H. 1973. Biološka oceanografija. Školska knjiga. Zagreb, 493 pp.</p> <p>Treer, T., Safner, R., Aničić, I. i Lovrinov, M. 1995. Ribarstvo. Nakladni zavod Globus. Zagreb, 464 pp.</p>		
Teaching methods	Lectures and laboratory work.		
Assessment methods	Essay and oral exam.		
Language of instruction	English		
Quality assurance methods	Questionnaire		





Course title	GENETICS IN AQUACULTURE		
Course code	MARE 5		
Type of course	Lectures with exercises		
Level of course	Elective course		
Year of study	I or II	Semester/trimester	Summer
ECTS	4 ECTS - 2 lectures, 1 practical exercises, 1 learning		
Name of lecturer	Prof. Branko Glamuzina, PhD		
Learning outcomes and competences	General introduction to genetics and principles of inheritance. Application of general principles in aquaculture. The role of genetics and genetic diversity in population preservation in natural as well as artificial (mariculture) settings. Case studies in selected organisms.		
Prerequisites			
Course contents	Fundamental knowledge Principles of inheritance Chromosome mechanics and manipulation Principles of quantitative genetics Measurement of genetic variation Molecular tools Applications in aquaculture Androgenesis, gynogenesis ploidisation- triploids and tetraploids Hybridization and its use in culture Manipulation of sexual phenotype Planning of breeding programs Threats of aquaculture in terms of biodiversity Practical exercises Statistical analysis of genetic data Handling and analyzing genetic data Case studies in finfish, shellfish and crustaceans		
Recommended reading	<i>Kirpichnikov, V.S. 1981. Genetic Bases for Fish Selection. Springer-Verlag, New York, New York, USA</i> Tave, D. 1993. Genetics for Fish Hatchery Managers, 2 nd ed. Van Nostrand Reinhold, New York, USA. Tave, D. 1999. Inbreeding and brood stock management. Fish.Tech.Paper, 392. FAO, Rome.		
Supplementary reading	Upon student interest		
Teaching methods	Lectures, exercises		
Assessment methods	Exercises, final oral exam		
Language of instruction	English		
Quality assurance methods	Questionnaire		





Course title	APPLIED FISH ECOLOGY		
Course code	MARE 6		
Type of course	Lectures with exercises		
Level of course	Elective course		
Year of study	I or II		Summer
ECTS	3 ECTS-1 lectures, 1 practical exercises, 1 learning		
Name of lecturer	Sanja Matic Skoko, PhD, Assoc. Prof.		
Learning outcomes and competences	Students acquire basic knowledge about the fish ecology with their implementation in the field of aquaculture, fishing, aquariology.		
Prerequisites			
Course contents	Introduction. The evolution Ecological factors. Trophic ecology. Food chain. Ecology of larval and juvenile stages. Moving. Migration. Recruitment. Reproduction. Life forms. Organization. Behavior. Coastal and special habitats. Zoogeography. Use: Aquaculture. Fishing. Management. Aquariology.		
Recommended reading	<ol style="list-style-type: none"> 1. Diana, J.S., 2003. Biology and ecology of fishes. Cooper Publishing Group, 496p. 2. Jardas, I., 1996. Jadranska ihtiofauna. Školska knjiga, Zagreb, 533p. 		
Supplementary reading	<ol style="list-style-type: none"> 3. Ercegović, A., 1949. Život u moru. JAZU, Zagreb, 412p. 4. Moyle, P.B. and Cech, J.J.Jr, 1996. Fishes. An introduction to ichthyology. Prentice Hall, New Jersey, 589p. 5. Pérès J.-M. and H. Gamulin Brida, 1973. Biološka oceanografija. Školska knjiga, Zagreb, 467p. 6. Sale P.F. (ed.), 1991. The ecology of fishes on Coral Reefs. Academic Press, inc., London, 754p. 7. Wilson, E.O. 1992. The diversity of life. Penguin books, London. 406 p. 		
Teaching methods	Lectures, Power Point Presentations Practical work in chemical laboratory		
Assessment methods	Oral and written examination		
Language of instruction	English		
Quality assurance methods	Questionnaire		





Course title	SPAWNING AND HATCHERY		
Course code	MARE 7		
Type of course	Lectures with exercises and field work		
Level of course	Elective course		
Year of study	I or II	Semester/trimester	Summer
ECTS	8 ECTS - 3 lectures and exercises, 2 practical work, 1 seminar, 2 learning		
Name of lecturer	Prof. Branko Glamuzina, PhD		
Learning outcomes and competences	The students will adopt fundamental and applied biological knowledge on artificial spawning of marine organisms, especially fish and shellfish, and technological base of juvenile production. The students must accept knowledge to organize and lead production in typical marine hatchery.		
Prerequisites			
Course contents	Status of marine juvenile production in the world Biological bases of artificial reproduction Rearing technologies of early stages Artificial spawning, hormonal and other treatments Larval and post larval culture, juvenile culture; Food and feeding in hatchery Technological bases of marine fish (case: sea bass and sea breams) and marine shellfish (case: flat oyster) hatchery Culture methods; Water quality and recirculation Economical analysis of hatchery production		
Recommended reading	<ol style="list-style-type: none"> 1. Barnabe, G. Aquaculture, Volume 1 i 2., 1990. Ellis Horwood Series in Aquaculture and Fisheries Support. Str. 900. 2. Bromage, N.R. i Roberts R.J., 1995. Broodstock management and egg and larval quality. Blackwell Science. Str. 424 3. Glamuzina, B., 1998. Umjetno mriješćenje i karakteristike ranih razvojnih stadija kirnje goleme, <i>Epinephelus marginatus</i>. Doktorska disertacija, Zagreb. Strana 152. 4. Moretti, A., Pedini Fernandez-Criado, M., Cittolin, G., and Guidastry, R., 1999. Manual on hatchery production of seabass and gilthead seabream. Volume 1. Rome, FAO. 1999. 194 p. 		
Supplementary reading	<ol style="list-style-type: none"> 1. Shelton, W.L., 1989. Management of finfish reproduction for aquaculture. <i>Aquatic. Science</i>, 4:497-535. 		
Teaching methods	Lectures, Power Point Presentations, films Practical work in marine hatcheries, Seminars, Literature analysis		
Assessment methods	Written test, oral examination		
Language of instruction	English		
Quality assurance methods	Questionnaire during and at the end of course		





Course title	FISH AND SHELLFISH REPRODUCTION		
Course code	MARE 8		
Type of course	Lectures with exercises		
Level of course	Elective course		
Year of study	I or II	Semester / trimester	Summer
ECTS	6 ECTS- 2 lectures, 1 practical work, 1 seminar work, 2 learning		
Name of lecturer	Vlasta Bartulović, PhD, Asst. Prof.		
Learning outcomes and competences	To learn basic knowledge on fish and shellfish reproduction; oogenesis and spermatogenesis in nature and captivity. The basic methods of artificial reproduction and treatments; hormonal and ecological factors manipulation must be adopted.		
Prerequisites			
Course contents	Introduction Reproductive organs and cells Reproductive development of fish and shellfish-gametogenesis, spawning Biological factors in reproduction (glands, hormones, organs) Reproduction cycle in captivity-problems and solutions Manipulation of reproduction in culture		
Recommended reading	<ol style="list-style-type: none"> 1. Cabrita, E., Robles, V., Herráez, P. 2008. Methods in Reproductive aquaculture Marine and Freshwater species. CRC Press Taylor & Francis group, Boca Raton, 549 pp. 2. Mellinger, J. 2002. Sexualite et Reproduction des Poissons. CNRS EDITIONS, Paris, France, 349 pp. 3. Spencer, B. E. 2002. Molluscan shellfish farming. Blackwell Publishing, 274 pp. 4. Glamuzina, B., 1998. Umjetno mriješćenje i karakteristike ranih razvojnih stadija kirnje goleme, <i>Epinephelus marginatus</i>. Doktorska disertacija, Zagreb. Strana 152. 		
Supplementary reading	<ol style="list-style-type: none"> 1. Shelton, W.L., 1989. Management of finfish reproduction for aquaculture. <i>Aquatic. Science</i>, 4:497-535. 		
Teaching methods	Lectures, Power Point Presentations, films Practical work in marine hatcheries, Seminars, Literature analysis		
Assessment methods	Written test, oral examination		
Language of instruction	English		
Quality assurance methods	Questionnaire		





Course title	APPLIED FISH AND SHELLFISH EMBRIOLOGY		
Course code	MARE 9		
Type of course	Lectures with exercises		
Level of course	Elective course		
Year of study	I or II	Semester/trimester	Summer
ECTS	6 ECTS – 3 lectures and exercises, 3 learning with consultations		
Name of lecturer	Prof. Jakov Dulčić, PhD		
Learning outcomes and competences	Students will acquire basic knowledge and competences in fish and shellfish embryology with their applications in fisheries biology, aquaculture and fishery industry. It is necessary to familiarize students with concepts of: life-cycle, reproductive organs, development of reproductive cells, development of gonads, basic embryological processes, effect of ecological factors on embryological development and developmental stages of fish and shellfish which are sensitive and significant processes in nursing and husbandry of young. Knowing basic concepts in embryology is a prerequisite for understanding biology and ecology and their responses to environment.		
Prerequisites			
Course contents	Introduction to embryology. Basic morphological stages and developmental stages of the ontogenetic systems. Reproductive systems and reproduction. Structure, shape and size of eggs. Fecundity. Parthenogenesis and gynogenesis. Gamete and gametogenesis. Basic embryonic stages. Environmental influences of the embryonic development. Early life history stages. Growth.		
Recommended reading	Gilbert, S.F. 2003. <i>Developmental Biology</i> . Seventh Edition, Sinauer Associates, 838 pp. Spencer, B.E. 2002. <i>Molluscan shellfish farming</i> . Blackwell Publishing. p. 274. Depeche, J. et R. Billard. 1994. <i>Embryology in fish. A review</i> . Editions speciales de la Societe francaise d'ichthyologie, 123 pp. Ćurčić, B. 1984. <i>Razviće životinja</i> . Naučna knjiga, Beograd.		
Supplementary reading	Bond, C.E. 1997. <i>Biology of Fishes</i> . Saunders College Pub. 576 pp. Selected scientific papers		
Teaching methods	Lectures, exercises		
Assessment methods	Exercises, final oral exam		
Language of instruction	English		
Quality assurance methods	Questionnaires		





Course title	HEALTH AND WELFARE IN AQUACULTURE		
Course code	MARE 10		
Type of course	Lectures with exercises		
Level of course	Elective course		
Year of study	I or II	Semester/trimester	Summer
ECTS	6 ECTS- 2 lectures, 1 practical work, 1 seminar work, 2 learning		
Name of lecturer	Ana Gavrilović, PhD		
Learning outcomes and competences	The aim of the course is adoption of theoretical and practical knowledge on health management, disease prevention and animal welfare in commercial aquaculture		
Prerequisites			
Course contents	<p>Importance of health management and biosecurity measures in aquaculture Animal welfare in aquaculture; Physiology /pathophysiology of cultured animals Water quality and environmental aspects of disease Epizootiology; Immunology; Monitoring of cultured animals, sampling for diagnostic testing; Infectious non-infectious diseases; Prevention and treatment of diseases; Implementation of Best Management Practices in different culture systems: pond and cage culture, flow-trough, recirculation (fish health, aquaculture chemicals, feed management, equipment maintenance, biosecurity, transportation and handling, predator management) EU Legislation and OIE recommendations Marketing of safe aquaculture products: case studies-shellfish and fish</p>		
Recommended reading	<p>Brown, L. 1993. Aquaculture for veterinarians: fish husbandry and medicine. Pergamon press. Pillay, T. V. R. 1990. Aquaculture principles and practices. Fishing News Books. Roberts, R. J. 1989. Fish pathology. Bailliere Tindall. Swift, D. R. 1993. Aquaculture Training Manual. Fishing News Books, Oxford. Subasinghe, R. 1997. Fish Health and Quarantine, p. 45-49. <i>Review of the State of World Aquaculture</i>. FAO Fisheries Circular No. 886. Rome, FAO. Jahncke, M.L., Garret, E.S., Reilly, A., Martin, R.E., Cole, E. 2002. Public, Animal, and Environmental Aquaculture Health Issue. Wiley-Interscience. A John Willey & Sons, Inc., Publication Lee Delabbio, J. 2003. Biosecurity in the Recirculation Sector of Finfish Aquaculture in the United States and Canada. Blacksburg, Virginia. Hollingsworth, C. S. et al. 2006. Best Management Practices for finfish Aquaculture in Massachusetts. UMass Extension Publication AG-BPFA. Fijan, N. 2006. Zaštita zdravlja riba. Poljoprivredni fakultet Sveučilišta u Osijeku. EU regulations and OIE Manuals.</p>		
Supplementary reading	Upon student interest in specific issues		
Teaching methods	Lectures, exercises, field trip		
Assessment methods	Exercises, final written test		
Language of instruction	English		
Quality assurance methods	Questionnaires		



Course title	AQUACULTURE TECHNOLOGY		
Course code	MARE 11		
Type of course	Lectures with practical training and field work		
Level of course	Elective course		
Year of study	I or II	Semester/trimester	Summer
ECTS	6 ECTS – 2 lectures, 2 field work and practical training, 2 learning		
Name of lecturer	Jurica Jug Dujaković, PhD, Asst. Prof.		
Learning outcomes and competences	The student will learn technology of sea farming, including equipment selection and maintenance. Different culture systems, from extensive to super-intensive, and their role in production will be evaluated		
Prerequisites			
Course contents	Basics of aquaculture Site and species selection Aquacultural systems Farm design and construction Additional equipment Aeration and oxygenation in aquaculture Recirculating systems Water quality and purification Food and feeding Technology of reproduction		
Recommended reading	1. Bardach, J.E. 1997. Sustainable aquaculture. John Wiley & Sons Inc. 251 pp. 2. Landau, M. 1992. Introduction to aquaculture. John Wiley&Sons, Inc. 440pp. 3. Pillay, T.V.R. 1990. Aquaculture principles and practices. Fishing News Books. 575 pp. 4. Swift, D.R. 1993. Aquaculture training manual. Second edition. Fishing News Books. 158 pp. 5. Barnabe, G. 1990. Aquaculture 1 and 2. Ellis Horwood Limited.		
Supplementary reading	Upon student interest in specific technologies		
Teaching methods	Lectures, exercises		
Assessment methods	Exercises, final oral exam		
Language of instruction	English		
Quality assurance methods	Questionnaire		



Course title	ECHINODERM BIOLOGY AND FARMING		
Course code	MARE 12		
Type of course	Lecture, seminars, practice, practical training		
Level of course	Elective course		
Year of study	I or II	Semester/trimester	Summer
ECTS	3 ECTS - 1 lecture, 1 practical training, 1 learning		
Name of lecturer	Sanja Tomšić, PhD		
Learning outcomes and competences	Apart from acquiring knowledge of their anatomy and biology as well as their role in the ecosystem, students will gain knowledge in the field of echinoderm aquaculture, necessary for independent work on aquaculture farms. Particular attention will be given to echinoid, sea urchin aquaculture; their reproductive characteristics, culture methods and methods in feed production and feeding. Students will learn about echinoid aquaculture trends in the world as well as the potential for their aquaculture in Croatia.		
Prerequisites			
Course contents	Taxonomy, anatomy and biology, physiology, reproduction, breeding And culture of juveniles, aquaculture of consumable products.		
Recommended reading	<p>Scientific and expert journals in aquaculture: Aquaculture, Aquaculture Research, Fish Farming International.</p> <p>Publication series, CIHEAM Options Mediterraneae.</p> <p>Lawrence, J.M. 2001. Edible Sea Urchins: Biology and Ecology. Elsevier, Amsterdam</p> <p>Lovatelli, A. 2004. Advances in sea cucumber aquaculture and management, FAO Fisheries Department, Rome Italy</p> <p>Barnabe, G. 1990. Aquaculture 1 and 2. Ellis Horwood Limited. Fallu R. 1991.</p> <p>Caddy, J. F. 1989. Marine invertebrate fisheries - their assessment and management. 6. Wiley-interscience publications, John Wiley & Sons. 752 pp.</p> <p>Pillay, T. V. R. 1990. Aquaculture principles and practices. Fishing News Books. 575 pp.</p> <p>Swift, D. R. 1993. Aquaculture Training Manual. Fishing News Books, Oxford. 158 pp.</p>		
Supplementary reading	In agreement with teaching professor		
Teaching methods	PowerPoint presentations, educational films, practical training		
Assessment methods	Written test, oral examination		
Language of instruction	English		
Quality assurance methods	Questionnaire		





Course title	CRUSTACEAN BIOLOGY AND FARMING		
Course code	MARE 14		
Type of course	Lecture, seminars, practice, practical training		
Level of course	Elective course		
Year of study	I or II	Semester/trimester	Summer
ECTS	3 ECTS - 1 lecture, 1 practical training, 1 learning		
Name of lecturer	Nikša Glavić, PhD		
Learning outcomes and competences	Theoretical and practical knowledge of different species biology and aquaculture that is needed for independent work in farms. Covers the culture of penaeids, lobsters, spiny lobsters, crayfish and crabs, in freshwater and marine recirculating systems. An overview on system design and operation, stocking, feeding, water quality and marketing is provided.		
Prerequisites			
Course contents	Systematics and taxonomy of Crustaceans; Anatomy of Crustaceans; Biology of Crustaceans; Ecology of Crustaceans; Physiology of Crustaceans; Economical meaning; Reproduction; Life cycles; Feeding and growth; Farming techniques and technology; Economic aspects of farming; The history of Crustacean farming with emphasis on Mediterranean area; Trends in the Crustacean aquaculture; Analysis of world trade market; Farming perspectives in Croatia.		
Recommended reading	Lee, D.O.C., Wickins J.F. 1992. Crustacean Farming. Blackwell Scientific Publications. Wyban, J.A., Sweeney, J.N. 1992. Intensive shrimp production technology. Argent Press.		
Supplementary reading	Bardach, J.E., Ryther J.H., McLarney W.O. 1972. Aquaculture – farming and hisbandry of freshwater and marine organisms. John Wiley & Sons, Science editions. 868pp. Barnabe, G. 1990. Aquaculture 1 and 2. Ellis Horwood Limited. Fallu R. 1991. Abalone Farming. Fishing News Books. Blackwell Science Ltd. Caddy, J.F. 1989. Marine invertebrate fisheries - their assessment and management. Wiley-interscience publications, John Wiley & Sons. 752 pp. Guillame, J., Kaushik S., Bergot P., Métailler R. 1999. Nutrition et alimentation des poissons et crustacés. Inra-Ifremer. Pillay, T.V.R. 1990. Aquaculture principles and practices. Fishing News Books. 575 pp. Swift, D. R. 1993. Aquaculture Training Manual. Fishing News Books, Oxford. 158 pp.		
Teaching methods	Lectures and practice		
Assessment methods	Oral and written examination		
Language of instruction	English		
Quality assurance methods	Questionnaire		

