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| **Benha University**  **Faculty of Science**  **جامعة بنهاDepartment of Zoology** | | | | | |
| **Course Specification**  431 Z: Fish biology and animal behavior | | | | | | |
| **A- Affiliation** | | | | | | |
| **Relevant program:** | Zoology & chemistry B.Sc. Program | | | | | |
| **Department offering the program:** | | | Department of Zoology | | | |
| **Department offering the course:** | | | Department of Zoology | | | |
| **Academic year/level:** | | | fourth level | | | |
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| B - Basic information | | | | | | |
| **Title:** Fish biology and animal behavior | | **Code:** 431 Z | | | **Year/level:** fourth level | |
| **Teaching Hours:** | | **Lectures:** 2 | | | **Tutorial:** 0 | |
|  | | **Practical:** 2 | | | **Total:** 3 h/week | |
| C - Professional information | | | | | | |
| **1 – Course Learning Objectives:** | | | | | | |
| At the end of this course the students will be able to study:   1. The major fish groups and its taxonomy. 2. Natural of fish feed. 3. The food and feeding habits. 4. The various organ modifications related to the habitat. 5. The age and growth determination and its relation with the feed types. 6. The fish fecundity. 7. The innate behaviour patterns. 8. The acquired behaviour patterns. 9. The social behaviour components. | | | | | | |

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| **2 - Intended Learning Outcomes (ILOS)** |
| **a - Knowledge and understanding:**  On successful completion of the course, the student should demonstrate knowledge and understanding of:  a1- List the major fish groups and its taxonomy  a2-Understand natural fish feed.  a3- Recognize the food and feeding habits.  a4- Identify the various organ modifications related to the habitat.  a5- Understand the age and growth determination and its relation with the feed types.  a6- Record the fish fecundity.  a7- Understand the innate and acquired behaviour patterns.  a8- Understand the social behaviour component. |
| **b - Intellectual skills:**  On successful completion of the course, the student should be able to.  b1- Interpret age of fish from scale or operculum or vertebral.  b2- Link between fish growth and feed types.  b3- Combine between fish morphology and its taxonomy.  b4- Combine between innate and acquired behaviour patterns.  b5- Interpet social behaviour component.  b6- Link between fish various organ modifications and its habitat. |
| **c- Practical and professional skills:**  On successful completion of the course, the student should be able to:  c1- Use microscopes to examine fish scales.  c2- Detect age of fish by varitey of methods.  c3- Describe fish morphology.  c4- Analysis fish blood.  c5- Taxonomy fish.  c6-Dissect fish.  c7- Identity fish maturity stage. |
| **d - General skills:**  On successful completion of the course, the student should be able to:  d1- Use information and communication technology effectively.  d2- Think independently, and solve problems on scientific basis.  d3- Work in a team effectively.  d4- Acquire self- and life-long learning.  d5- Modify sense of beauty and neatness.  d6- Effectively manage tasks, time, and resources. |

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| **3 - Contents** | | | |
| **Topic** | **Lecture hours** | **Tutorial hours** | **Practical hours** |
| The major fish groups and its taxonomy | 2 | - | 4 |
| Natural fish feed. | 2 | - | 0 |
| Study the food and feeding habits | 2 | - | 2 |
| The various organ modifications related to the habitat. | 2 | - | 0 |
| The age and growth determination and its relation with the feed types. | 2 | - | 8 |
| Fish reproduction and maturation. | 2 | - | 4 |
| The fish fecundity & Exam | 2 | - | 2 |
| Components of animal behaviour, Taxes, Reflexes | 2 | - | 0 |
| Innate behaviour patterns | 2 | - | 0 |
| Instinctive behaviour & Behaviour as response to stimulus | 2 | - | 0 |
| Motivated and Conflict behaviour | 2 | - | 0 |
| The acquired behavior pattern | 2 | - | 0 |
| The social behavior components 1 & exam. | 2 | - | 0 |
| The social behavior components 2 & exam. | 2 | - | 0 |
| Examination of fish blood. | 0 | - | 6 |
| **Total hours** | **24** |  | **26** |

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| **4 - Teaching and Learning methods:** |

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| **Intended Learning Outcomes** | | | **Lecture** | **Presentations & Movies** | **Discussions & Seminars** | **Practical** | **Problem solving** | **Brain storming** |
| **Knowledge & Understanding** | a1 | List the major fish groups and its taxonomy | x | 0 | 0 | x | 0 | 0 |
| a2 | Understand natural fish feed. | x | 0 | x | x | 0 | 0 |
| a3 | Recognize the food and feeding habits. | x | 0 | x | x | 0 | 0 |
| a4 | Identify the various organ modifications related to the habitat. | x | x | 0 | 0 | x | x |
| a5 | Understand the age and growth determination and its relation with the feed types. | x | x | x | x | 0 | x |
| a6 | Record the fish fecundity. | x | 0 | 0 | x | 0 | 0 |
| a7 | Understand the innate and acquired behaviour patterns. | x | 0 | x | 0 | 0 | 0 |
| a8 | Understand the social behaviour component. | x | 0 | x | 0 | 0 | 0 |
| **Intellectual Skills** | b1 | Interpret age of fish from scale or operculum or vertebral. | 0 | **0** | **0** | **x** | **x** | **0** |
| b2 | Link between fish growth and feed types. | x | **0** | **x** | **x** | **0** | **x** |
| b3 | Combine between fish morphology and its taxonomy. | x | **0** | **0** | **x** | **0** | **0** |
| b4 | Combine between innate and acquired behaviour patterns. | x | **0** | **x** | **0** | **0** | **0** |
| b5 | Interpet social behaviour component. | x | **0** | **x** | **0** | **0** | **0** |
| b6 | Link between fish various organ modifications and its habitat. | x | x | x | 0 | x | x |
| **Practical and professional Skills** | c1 | Use microscopes to examine fish scales. | 0 | 0 | 0 | x | x | 0 |
| c2 | Detect age of fish by varitey of methods. | 0 | 0 | 0 | x | x | 0 |
| c3 | Describe fish morphology. | 0 | 0 | 0 | x | 0 | 0 |
| c4 | Analysis fish blood. | 0 | 0 | 0 | x | x | 0 |
| c5 | Taxonomy fish. | x | 0 | 0 | x | x | 0 |
| c6 | Dissect fish. | 0 | 0 | 0 | x | 0 | 0 |
| c7 | Identity fish maturity stage. | x | 0 | 0 | x | 0 | x |
| **General Skills** | d1 | Use information and communication technology effectively. | 0 | 0 | 0 | 0 | x | 0 |
| d2 | Think independently, and solve problems on scientific basis. | 0 | 0 | x | x | x | x |
| d3 | Work in a team effectively. | 0 | 0 | 0 | x | x | 0 |
| d4 | Acquire self- and life-long learning. | 0 | 0 | x | 0 | x | x |
| d5 | Modify sense of beauty and neatness. | x | 0 | x | x | 0 | 0 |
| d6 | Effectively manage tasks, time and resources | x | 0 | x | x | 0 | 0 |

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| **5- Students’ Assessment Methods and Grading:** |

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| **Tools:** | To Measure | **Time schedule** | **Grading** |
| Mid-Term Exam | a1to a8, b2, b4, b5 and b6 | sixth week | 10 % |
| Oral exam | a1, a2, a7, b1, b2, b6 and b7 | Bi-weekly | 10 % |
| Semester Work | a1to a8, b2, b4, b5, b6 and d1 to d6 |  | 2 % |
| Practical exams | a1, a5, c1 to c7, b1 and b3 | Fourteenth week | 30 % |
| Written exam | a1to a8, b2, b4, b5 and b6 | Sixteenth week | 48 % |
| Total | | | 100 % |

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| **6- List of references:** |
| **6-1 Course notes**  Lecture and practical notes approved by Zoology Department.  **6-2 Required books**  - Methods for assessment of fish production in fresh waters, 3rd Ed. 1978, Lippincott Co. (Bgenal, T.)  **-** Archana Ruhela Malini Sinha ( 2010 ) Recent Trends in Animal Behaviour, 267, 10-B-Scheme, Opp. Narayan Niwas, Gopalpura By Pass Road, Jaipur-302018 . (ISBN: 978-93-80179-26-1)  **6-3 Recommended books**   1. Hart, Paul J B and Reynolds, John D (2002) Handbook of Fish Biology and Fisheries, Chapter 1, [The human dimensions of fisheries science.](http://books.google.co.nz/books?id=LVnWf6IEhcgC&pg=PA1&dq=FAO+%22Recreational+fishing%22&source=gbs_toc_r&cad=0_0&sig=rMjrBa7pwNAemA23TZNmA3mE8FU) Blackwell Publishing. [ISBN 0-632-06482-X](http://en.wikipedia.org/wiki/Special:BookSources/063206482X).   2. Bond, Carl E (1996) Biology of Fishes. Saunders. [ISBN 0-03-070342-5](http://en.wikipedia.org/wiki/Special:BookSources/0030703425). [Nelson, Joseph S](http://en.wikipedia.org/wiki/Joseph_S._Nelson) (2006) Fishes of the World. Wiley. [ISBN 0-471-25031-7](http://en.wikipedia.org/wiki/Special:BookSources/0471250317).  3. [Michael Barton](http://en.wikipedia.org/wiki/Michael_Barton_%28professor%29) (2007) Bond's Biology of Fishes, Third Edition. Julet. [ISBN 0-12-079875](http://en.wikipedia.org/wiki/Special:BookSources/0120798751)  4. [Pauly D](http://en.wikipedia.org/wiki/Daniel_Pauly), [Froese R](http://en.wikipedia.org/wiki/Rainer_Froese), Palomares ML and Stergiou KI [Fish on line](http://www.fishbase.org/FishOnLine/English/index.htm) A guide to learning and teaching ichthyology using the [Fish Base Information System](http://en.wikipedia.org/wiki/FishBase).  **6-4 Periodicals, Web sites, etc.** [www.fishbiologycongress.org](http://www.fishbiologycongress.org)[www.marinebiology.org](http://www.marinebiology.org) [www.fishbase.org](http://www.fishbase.org)  [www.db.angfa.org.au/](http://www.db.angfa.org.au/) |

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| **7- Facilities required for teaching and learning:** |
| * Fish biology Lab. * Chemicals and fish specimens. |

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| **Course coordinator:** | Prof. Dr. Sabry S. El-Serafy  Prof. Dr. Nasr allah H. abd el megeed |  |
| **Head of the Department:** | Prof. Dr. Aziza A.M. El-Shafey |  |
| **Date:** | 2013 / 2014 |  |