UZO-467   Fish Feed Management   **Cr. (2)**

Course Objectives

The objectives of the course are:-

1. To elaborate the significance of fish feeding.
2. To impart the basic principles of artificial feed preparation.
3. To train the students in fish feed formulation procedures and feeding practices.
4. To understand the fate of different nutrients in fish metabolism.

Learning outcomes:

Upon successful completion of the course, the student will be able to:

1. Illustrate the importance of artificial fish feed.
2. Formulate feed and rationing for various age groups.
3. Calculate feed conversion ratio, feed efficiency and digestibility.
4. Analyze nutrient concentration in feed and feed ingredients while preparing fish feed.

Course Contents:

1. Need of supplementary/ artificial feeding of fish.
2. Scope of artificial feeding in fish.
3. Metabolism of feed nutrients (Protein, Lipid, Carbohydrate) in fish.

4. Feeding practices, Different types of feeders.
5. Diet preparation and processing techniques.
6. Estimation of apparent nutrient digestibility.
7. FCR and FE indices.
8. Feed ration and frequency, judging fish feeding response.
9. Food acquisition and patterns of estimation of food requirements.
10. Feed processing and manufacturing: floating and sinking feed.
11. Feed packaging, transportation and storage problems of feed stuff.

Teaching-Learning Strategies
Teaching will be a combination of class lectures, class discussions, and group work. Short videos /films will be shown on occasion.

Assignments
The sessional work will be a combination of written assignments, class quizzes, presentation, and class participation/attendance.

Assessments and Examination
Sessional Work: 25 marks
Midterm Exam: 35 marks
Final term Exam: 40 marks

Books Recommended
1. Fitzsimmons, K., R.S.N. Janjua and M. Ashraf, 2015. *Aquaculture Handbook—Fish Farming and Nutrition in Pakistan.*
2. John Halver. 2013. Fish Nutrition, ELSEVIER.
3. Tom Lovell. 2013. Nutrition And Feeding of Fish, Springer.Ojha, J.S. 2006. Aquaculture Nutrition and Biochemistry. GeetaSomaniAgrotech Publishing Academy, Udaipur, India.
4. Lovell, T., 2012. Nutrition and Feeding of Fish. 2nd Ed. SpringerScience, USA
5. Pillay T V R, M N Kutty. 2005. Aquaculture: Principles and Practices.Balckwell Publishing. UK.
6. Reddy, M.S. and Sambasiva K.R.S. 1999. A Textbook of Aquaculture.Discovery Publishing House, N. Delhi.
7. Shammi, Q.J. and Bhatnagar, S. 2002. Applied Fisheries, Agro bios, India.
8. Ali, S.S. 1999. Fresh Water Fisher Biology. Naseem Book Depot, Hyderabad.

UZO-468   Fish Feeding Management (Lab.)   Cr. (1)

Course Objectives
The objectives of the course are:-
1. To elaborate the significance of fish feeding.
2. To impart the basic principles of artificial feed preparation.
3. To train the students in fish feed formulation procedures and feeding practices.
4. To understand the fate of different nutrients in fish metabolism.

Learning outcomes:
Upon successful completion of the course, the student will be able to:
1. Identify potential fish feed ingredients and their sustainability.
2. Formulation of fish feed and rationing for various age groups.
3. Calculate feed conversion ratio, feed efficiency and digestibility.
4. Analyze nutrient concentration in feed and feed ingredients while preparing fish feed.

Course Conents:

1. Collection and identification of fish feed ingredients.
2. Ration calculation for fish feeding based on body weight, body lengthetc.
3. Proximate analysis of feed and feed ingredients i.e. moisture, dry matter, crude protein, crude lipid, carbohydrates and ash contents.
4. Formulation of fish feed.
5. Feeding methods; introduction and demonstration of demand and belt feeders.

Teaching-Learning Strategies

Teaching will be a combination of class lectures, class discussions, and group work. Short videos /films will be shown on occasion.

Assignments

The sessional work will be a combination of written assignments, class quizzes, presentation, and class participation/attendance.

Assessments and Examination

Sessional Work: 25 marks
Midterm Exam: 35 marks
Final term Exam: 40 marks

Books Recommended

1. Fitzsimmons, K., R.S.N. Janjua and M. Ashraf, 2015. *Aquaculture Handbook—Fish Farming and Nutrition in Pakistan.*
2. John Halver. 2013. Fish Nutrition, ELSEVIER.
3. Tom Lovell. 2013. Nutrition And Feeding of Fish, Springer.Ojha, J.S. 2006. Aquaculture Nutrition and Biochemistry. GeetaSomaniAgrotech Publishing Academy, Udaipur, India.
4. Lovell, T., 2012. Nutrition and Feeding of Fish. 2nd Ed. SpringerScience, USA
5. Pillay T V R, M N Kutty. 2005. Aquaculture: Principles and Practices.Balckwell Publishing. UK.
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7. Shammi, Q.J. and Bhatnagar, S. 2002. Applied Fisheries, Agro bios, India.
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