COURSE OBJECTIVES

- 1) To acquire the knowledge of insects and their problems.
- 2) To acquire the clear knowledge about the different types of insects and their causes.
- 3) To acquire the knowledge about the importance of controlling of diseases spreading insects.
- 4) To acquire the clear knowledge about the diseases and their control measures.

UNIT - I: Mosquitoes Biology

Life cycle – mating, host seeking, feeding, resting, oviposition behavior longevity, gonotrophic cycle, fecundity, survival. Salient features and distribution of important vector species of *Anopheles (An. stephensi, An. culicifacies, An. fluviatilis), Aedes (Ae. aegypti, Ae. albopictus), Culex (Cx. quinquefasciatus, Cx. tritaeniorhynchus), Mansonia (Ma. annulifera, Ma. uniformis)* – Diseases–symptoms – control measures.

UNIT – II: Sand-flies Biology

Life cycle mating, host seeking, feeding, resting, oviposition behavior longevity, gonotrophic cycle, fecundity, survival. Salient features and distribution of important vector species of Phlebotomus, Sergentomyia – Diseases – symptoms – control measures.

UNIT - III: Fleas Biology

Morphology, Life cycle and distribution of Fleas Salient features of important species of *Xenopsylla*, *Ctenocephalides*, *Pulex*, *Tunga* – Diseases – symptoms – control measures.

UNIT – IV: Bugs and Lice Biology

Morphology, Life cycle and distribution of Bed bugs, Triatomine bugs, Head louse, Body louse – Diseases – symptoms – control measures.

UNIT – V: Ticks and Mites Biology

Morphology, Ticks and Mites Biology of Ixodid and Argasid ticks – Salient features of *Haemaphysalis, Ixodes, Dermacentor, Rhipicephalus, Amblyomma.* Biology of mites – Salient features of *Sarcoptes, Leptotrombidium, Dermatophagoides* – Diseases – symptoms –control measures.

COURSE OUTCOMES

At the end of the course, the student will be able to

- 1) Understand the basic knowledge of vector biology
- 2) Understand and learn the prospect of vector biology as a self-employment venture.
- 3) Understand role and different types of vectors.
- 4) Acquired the knowledge about the Vector born diseases
- 5) Acquire the skill about various controlling methods of vector borne diseases

Text Books

- 1. Imms, A. D. (1977). A General Textbook of Entomology. ELBS, London.
- 2. Laird, M. (1988). The Natural History of Larval Mosquito Habitats. Academic Press Ltd., New York.
- 3. Marquardt, W.C. (2005). *Biology of Disease Vectors*, (2nd Edition). Doody Enterprises Inc., USA.
- 4. Rao, T.R. (1984). *The Anophelines of India*. Malaria Research Centre, ICMR, New Delhi.
- 5. Roy, D.N. and Brown, A.W.A. (1970). Entomology (Medical and Veterinary) Including Insecticides & Insects & Rat control; The Bangalore Printing & Publishing Co. Ltd., Bangalore
- 6. Service, M.W. (1984). *Mosquito Ecology-Field Sampling Methods*. Applied Science Publishing Ltd., London.
- 7. Service, M.W. (1993). *Mosquito Ecology- Field Sampling Methods*. Chapman & Hall, New York.
- 8. Service, M.W. (1996). Medical Entomology for Students. Chapman & Hall, London
- 9. Ward, J.V. (1992). Aquatic Insect Ecology. John Wiley & Sons, Inc., USA.
- 10. Williams, D.D. and B.W. Feltmate. (1992). Aquatic Insects. C.A.B. International, UK.

OUTCOME MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	3
CO2	2	3	2	2	2
CO3	3	3	3	3	3
CO4	3	2	3	3	2
CO5	3	3	3	3	3

COURSE OBJECTIVES

- 1) Give information about the poultry and its importance. It gives an idea for the self- employment opportunities to the students.
- 2) To understand the poultry industry based on the past, present and emphasis of future growth.
- 3) To understand with different systems of rearing commercial layers and broilers production and efficiently marketing.
- 4) Imparting knowledge of different types of feeds and feeding methods and common diseases and their control

UNIT - I: Scope and Classification

Introduction to poultry science – Origin and history of poultry species- Scope of the poultry: Chicken, turkey, duck and quail – Classification of Poultry – broiler, layer and breeder – Brooding and rearing – Natural and artificial hatching – Development of Poultry Industry in India

UNIT - II: Layer Production

Selection of site and location of layer farm – lay out of the farm – Systems of housing – types of roofs and materials – trusses for poultry houses – Design of different Poultry Houses for large and medium size layer farms – Cages and modified cages for egg type birds – Layer farm equipments – Management of layers during peak egg production and maintaining – Economic traits of egg-type chicken and their standardization– Packaging and transportation of eggs.

UNIT - III: Broiler Production

Systems of rearing broilers – Location, layout and design of Broiler houses – Broiler farm equipment – Lighting for broilers – Environmentally controlled broiler houses and their management – Economic traits of meat – type chicken and their standardization – Systems of Integration in broiler production and marketing – transport of broilers – Different ways of marketing of broilers – Organic broiler meat production.

UNIT - IV: Poultry Nutrition and Feeding

Poultry feed management – Principles of feeding – Nutrient requirements for different stages of layers and broilers – Macro and micro-nutrients – Feed formulation and Methods of feeding – Factors influencing the feed consumption of poultry – Commonly occurring anti nutrients and toxicants in poultry feed ingredients – Nutritional and metabolic disorders in poultry.

UNIT - V: Disease and Vaccination

Common Bacterial, Fungal and Viral infective diseases-Protozoan and Parasitic diseases - Preventive measures - diagnosis - vaccination - treatment and

control measures – Arthropod pests, ticks, mites and lice affecting poultry and their control measures.

COURSE OUTCOMES

At the end of the course, the student will be able to

- 1) Knowledge about the Prospects of Poultry Industry.
- 2) Knowledge about the commercial layer production systems, housing and equipments.
- 3) Knowledge about the commercial broiler production systems, housing and equipments.
- 4) Knowledge about the poultry nutrients and feeding of poultry farming and diseases and their control
- 5) Develop into entrepreneurship

Text Books

- 1. Babu, M. and L.T. Reetha, T. (2011). A Handbook on Poultry farming. Tamilnadu Veterinary and Animal Sciences University and Nehru Memorial College, Tiruchy.
- 2. Donald, B.D. and W.D. William Jr., (2007). Commercial Chicken Meat and Egg Production. 5th Edition. Springer India Pvt. Ltd., Noida.
- 3. Louis, H.M. (2003). *Modern Poultry Farming.* 1st Edition. International Book Distributing Company, Lucknow
- 4. Narahari, D. and R. Kumararaj. (2008). *Handbook of Applied Broiler Production.* 1st Edition. Poultry Punch Publication (I) Pvt. Ltd., New Delhi, India.
- 5. Naresh, M. (2015). *Poultry Nutrition and Management.* 1st Edition. Anmol Publications Pvt. Ltd., New Delhi.
- 6. Reddy, R.V. and B.T. Dinesh, (2004). *Handbook of Poultry Nutrition*. 1st Edition. International Book Distribution Co., Lucknow, India.
- 7. Saif, Y.M., A.M. Fadly, J.R. Glisson, L.R. McDougald, L.K. Nolan and D. E. Swayne. 2008. *Diseases of Poultry*, 12th Edition, Blackwell Publishing, Iowa
- 8. Sushil, P. (2012). *Handbook of Poultry Production*. 1st Edition. Enkay Publishing House, New Delhi.
- 9. Tomar, B.S. and N. Singh. (2007). A Text Book of Applied Zoology. Emkay Publications, Delhi.
- 10. Vegad, J.L. (2004). *Poultry Diseases: A Guide for Farmers and Poultry Professionals*. 2nd Edition. International Book Distributing Co., Lucknow, UP

OUTCOME MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5
C01	2	3	3	3	3
CO2	3	3	3	2	3
CO3	3	3	3	2	3
CO4	3	3	2	3	2
CO5	3	2	3	3	3

COURSE OBJECTIVES

- 1) To make the students to understand the various kinds of waste management.
- 2) To make the students to know the basic knowledge about various waste to energy conversion techniques
- 3) Study the principles behind remedial measures for waste management and recycling of wastes.
- 4) Understand the concept of bioremediation

UNIT - I: Solid Waste Management

Industrial and municipal solid wastes; basic concepts – collection, transportation and disposal – open dumping, ocean dumping, land filling, incineration and pyrolysis, composting and vermicomposting, recycling and reuse.

UNIT - II: Liquid Waste Management

Domestic and industrial requirements of water – generation of waste stream – physical chemical and biological characteristics – primary, secondary and tertiary (advanced) treatments – activated sludge process, trickling filters – anaerobic digestion – treated effluents – water reclamation techniques – treated effluent standards for disposal into environment.

UNIT - III: Hazardous Wastes Management

Biomedical wastes – sources, types, storage and management. Nuclear and radioactive wastes – sources, types hazards, storage and management. Electronic wastes (E-wastes) – sources and types, constituents, recycling of e-wastes.

UNIT - IV: Industrial Effluent Management

Effluent characteristics and treatment methods employed at different industries – sugar and distillery, Dairy industry and paper and pulp industry. Common effluent treatment plants (CETPs).

UNIT - V: Recycling of Wastes and Biodegradation

Recycling of wastes for industrial, agricultural and domestic purposes; Recycling of metal wastes, recycling of paper, plastic, leather, chemical and other industrial wastes; Flysh utilization; Degradation of pesticide, Xenobiotics, insecticide, fungicide, herbicide, plastics and polymers.

COURSE OUTCOMES

At the end of the course, the student will be able to

- 1) Understanding of the management of solid and liquid wastes from municipal and industrial sources.
- 2) Acquired the knowledge about Biomedical waste and its Management.
- 3) Apply the principles of remedial measures of recycling, reuse and recovery from the wastes.

- 4) Understand the Industrial effluent treatment and management.
- 5) Acquired the skill to manage the hazardous waste.

Text Books

- 1. Ahmed, N.F., M.Qureshi and O.Y. Khan. (2006). *Industrial and Environmental Biotechnology*, Horizon Press.
- 2. Casarett, A.P. (1988). Radiation Biology. Englewood Cliffs, New Jersey.
- 3. Davis, M.L. and D.A. Cornwell (1991). *Introduction to Environmental Engineering.* (II Ed), McGraw-Hill International Editions.
- 4. Freeman, S. (1990). Industrial Pollution Prevention, McGraw Hill Pub. Co. New Delhi.
- 5. Liu, D.H.F. and B.G. Liptak. (2000). *Hazardous Wastes and Solid Wastes*, Lewis Publishers, New York.
- 6. Mishra, P.C (1980). Soil Pollution and Soil Organisms, Asian publishing House.
- 7. Reddy, P.J. (2011). Municipal Solid Waste Management Processing Energy Recovery Global Examples, 1st Edition, CRC Press
- 8. Scragg, A. (2005). *Environmental Biotechnology*. (II Ed). Oxford University Press. Inc.
- 9. Sharma, B.K. and H. Katur. (1995). *Environmental Chemistry*. (I Ed). Goel Publishing House.
- 10. Tandon, H.L.S. (1995). *Recycling of Crop, Animal, Human and Industrial Wastes in Agriculture*. Fertilizer Development and Consultation Organisation.

CO/PO	PO1	PO2	PO3	PO4	PO5
CO1	2	3	3	3	3
CO2	3	3	3	2	3
CO3	3	3	3	2	3
CO4	3	3	2	3	2
CO5	3	2	3	3	3

OUTCOME MAPPING