ZOOLOGY

Skill Based Elective I (A) (Semester IV)

APICULTURE

Objectives:

To enlighten the students about the honey bees, its life style, the social behaviour and colonization. The students may be benefitted by the culture practices and the economic importance.

UNIT I

History and scope of Bee keeping. Present status of Apiculture in India. Honeybee – Systematic position – Species of Honey bees – Morphology and Life history. Stinging apparatus and bee poisoning

UNIT II

Bee colony – Castes – natural colonies and their yield. Bee foraging: Pollen and nectar yielding plants. Honey bee – behaviour – swarming – Pheromones.

UNIT III

Apiary Management – Artificial bee hives – types – construction of space frames – Selection of sites – Handling – Maintenance – Instruments employed in Apiary

UNIT IV

Honey – Composition – Honey extraction, seasonal maintenance- uses. Bee wax and its uses – National and International markets for Honey and Wax. Natural enemies and diseases of honey bees and their control measures.

UNIT V

Apiculture as Self - employment venture –financial assistance and funding agencies – Economics of Apiculture and Management.

Text Books:

1. Abrol, D. P. 1997. Bees and Beekeeping in India. Kalyani Publishers, Ludhiana.
2. Rare, S. 1998 – Introduction to Bee keeping, Vikas Publishing house.

Reference Books:

1. Cherian, R. & K.R. Ramanathan, 1992 – Bee keeping in India
2. Singh, S. 1982 – Bee Keeping – ICAR
3. Mishra, R.C. 1995. Honey Bees and Their Management in India. ICAR, New Delhi.
4. Sharma, P. and Singh L. 1987 – Hand book of bee keeping, Controller Printing and Stationery,
5. Shukla, G.S. and Upadhyay, V.B. 1997. Economic Zoology. Rastogi Publications, Meerut.
6. Arumugam, N., Murugan, T., Johnson Rajeshwar, J. and Ram Prabhu, R. 2009. Applied Zoology.
7. Saras Publication, Nagercoil.
8. Amsath, A. and Marimuthu Govindarajan, 2013. Apiculture. Lambert Academic Publishing.

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Skill Based Elective I (B) (Semester IV)

AQUACULTURE

Objectives:

Ensure active student participation in activities connected with basic aquaculture practices. Provide basic understanding of biological, chemical and environmental concepts pertaining to culture aquatic organisms.

UNIT I

History, definition, scope and significance of aquaculture. Present status and trend for aquaculture in world and in India. Basic Fish farm design and construction. Types of farming: extensive, intensive and semi intensive culture. Integrated farming.

UNIT II

Water quality maintenance. Importance and composition of feeds: types of feeds - wet and dry feeds. Selection of candidate species for aquaculture. Cultivable species of fishes, crustaceans, molluscs and algae.

UNIT III

Fish culture: Catla, Rohu and Mirigal sp., Oyster culture: Pinctada. sp., Prawn culture: Penaeus and Macrobrachium sp.

UNIT IV

Fish diseases and management: Common bacterial, viral, fungal, protozoan and crustacean diseases, their symptoms and treatment.

UNIT V

Harvesting and transport. Quality control and norms of MPEDA for export of fishes. Preservation techniques- Canning and Freezing. By products. Marketing the fish to local markets and for export.

Text Books:

1. Santhanam, R., N. Sugumaran and P. Natarajan. 1987. A manual of Fresh water aquaculture. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Shanmugam, K. 1992. Fishery Biology and Aquaculture. Leo Pathipagam, Madras.

Reference Books:

1. Jameson, J.D. and R.Santhanam (1996). Manual of ornamental fisheries and farming technology. Fisheries College and Research Institute, Thoothukudi.
2. Mitchell Beazley, 1998. The complete guide to tropical aquarium fish care. Read and Consumes Book Ltd., London.
3. Jingran V.G., 1991 : Fish and Fisheries in India – Hindustan Publ. Co. New Delhi – India.
4. Day, F, 1978 : Fishes of India Vol. I & II, William Danisan & Sons, India.
5. Gupta, S.K and Gupta, P.C. 2006. General and Applied Ichthyology. S.Chand and company Ltd. New Delhi.

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Skill Based Elective II (A) (Semester V)

SERICULTURE

Objective :

To impart training to our students both on site and off site on the technique of silkworm rearing, cocoon production and silk reeling from sericulture. To kindle the young minds to become self -employers.

UNIT I

Introduction: Sericulture: Definition, history and present status; silk route. Prospects of Sericulture in India: Sericulture industry in different states of India - Employment potential in mulberry and non-mulberry sericulture. Mulberry: Classification, distribution and common varieties of mulberry used in India.

UNIT II

Types of silkworms, distribution of races- exotic and indigenous races. Commercial races: Multivoltine, bivoltine and hybrid races used in India. Morphology and Life cycle of *Bombyx mori*. Structure of silk gland and secretion of silk – Chemical composition of silk.

UNIT III

Silkworm rearing house and appliances: Rearing house - Early age rearing and Late age rearing. Appliances : Rearing trays, ant-wells, rearing stands and racks, paraffin papers, rubber foam pads, net, chopsticks, feathers. Types of mountages, Spinning, harvesting and storage of cocoons.

UNIT IV

Pests of silkworm: uzi fly, dermistid beetle-control and preventive measures. Silkworm diseases: protozoan, viral, fungal and bacterial diseases and their control and preventive methods.

UNIT V

Sericulture organizations in India. Silk Industry- commercial classification of silk and silk thread wastes and their marketing. By-products of sericulture used as compost, animal feed, in Biogas plants and in pharmaceutical products.

Text Books:

1. Ganga, G. and Sulochana Chetty, J. 2003. An Introduction to Sericulture (2nd Edition). Oxford and IBH Publishing co. Pvt-Ltd., New Delhi.
2. Taxima, Y. 1972. Hand Book of Silkworm Rearing. Fuji Publication, Tokyo.

Reference Books:

1. Ullal, S.R. and Narasimhanna, M.N. 1979. Hand book of Practical Sericulture. Central Silk Board, Bombay.
1. Jolly, M.S. (Ed) Appropriate sericultural Techniques, CSR & TI, Mysore.
2. Narasimhanna, M.N. 1988. Manual of silkworm egg production. CSB, Bangalore
3. Wupang-chun and da-chung. 1988.Silkworm rearing, pub. By FAO, Rome
4. Sengupta K. 1989.A guide for bivoltine sericulture:, Director , CSR & TI, Mysore
5. Krishnaswamy, 1986. Improved method of rearing young age silkworm: S. reprinted CSB, Bangalore.
6. Shukla, G.S. and Upadhyay, V.B. 1997. Economic Zoology. Rastogi Publications, Meerut.
7. Tomar, B.S and N.Singh. A Text Book of Applied Zoology. 2007. Emkay publications. Delhi.

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Skill Based Elective II (B) (Semester V)

POULTRY FARMING

Objectives:

To impart training to our students, both on site and off site on the techniques of poultry and dairy farming. To create interest in the young minds to become entrepreneurs after graduation.

UNIT I

Introduction to poultry science –poultry growth in India. Annual egg production in India.
Nomenclature of breeds of fowl, - selection of breeds – Housing - equipment requirements for poultry sheds, deep litter system, laying cages.

UNIT II

Brooding and rearing –brood temperature, space and duration; feed, water and space allowance, debeaking – vaccination. Management of growers, layers, broilers – lighting of chicks, growers and layers. Summer and winter management - Culling.

UNIT III

Food stuffs for poultry in relation to protein, amino acids, minerals (Ca and P), vitamins and fibre content. Food Additives - Feed formulations for chicks, growers, phase I to phase III layers and broilers.

UNIT IV

Poultry diseases and their management: Ranikhet (New Castle) disease, Fowl pox, Avian Leucosis, Tick fever, Tuberculosis, Fowl Cholera, Avian leucosis, Infectious coryza .

UNIT V

Nutritive values of eggs and meat: Quality, Preservation and Marketing of eggs, meat and poultry manure —– Economics of Poultry farming. Problems in poultry production.

Text Books:

1. Sunil Kumar Das (1994) – Poultry production, CBC Publishers and Distributors, Delhi – 110032.

Reference Books:

1. Banerjee G.C. (1992) A textbook of animal husbandary, Oxford and IBM Publishing Co., New Delhi.
2. Arumugam, N., Murugan, T., Johnson Rajeshwar, J. and Ram Prabhu, R. 2009. Applied Zoology. Saras Publication, Nagercoil.
3. Shukula, G.S. and Upadhyay V.B. (1997) Economic Zoology, Rakesh Rastogi Meenit.
4. Indian Poultry Industry year book 1975 – 76. By Sakunt bak B.Gupta, C-34, New Bactak Road, New Delhi – 110 005.
5. Tomar, B.S. and Singh, N. 2007. A Text Book of Applied Zoology. Emkay Publications, Delhi.
6. Arumugam, N., Murugan, T., Johnson Rajeshwar, J. and Ram Prabhu, R. 2009. Applied Zoology. Saras Publication, Nagercoil.
7. Ahsan, J. and Sinha, S.P. 2003. A Hand book on Economic Zoology. S. Chand & Company Ltd., New Delhi.
8. Babu, M. and Lurthu Reetha, T. 2011. A Handbook on Poultry farming. Tamilnadu Veterinary and Animal Sciences University and Nehru Memorial College, Tiruchy.
9. Intensive Poultry Management for egg production. Bulletin NO. 152, Her majesty stationery office, London.

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Skill Based Elective III (A) (Semester V)

VERMICULTURE

Objective:

1. To create interest in the young minds to become self-employers /entrepreneurs of farming practices in his/her native places after graduation.
2. To train them the culture practices of earthworm and vermicomposting.

UNIT I

Diversity and distribution of earthworms in India. Ecological classification of earthworms: Epigeic, Anecic and Endogeic earthworms with examples - Various species involved in vermiculture in India – Exotic and Indigenous species of Earthworms: *Eudrilus eugeniae, Eisenia fetida, Perionyx excavatus* and *Lampito mauritii* - Advantages of vermiculture.

UNIT II

General body structure of earthworm: *Lampito mauritii* Morphology – Coelom – Body wall – Locomotion Food and feeding of earthworms: Humus feeders, Humus formers, Saprophages, Detritivores, Geophages, – Excretion – Respiration – Digestive, Circulatory, Nervous and Reproductive systems – Cocoon formation.

UNIT III

Earthworms in sustainable agriculture – Organic farming – Earthworm activities – soil fertility and texture – soil aeration – water percolation – Decomposition and moisture. Organic wastes: Municipal, Agricultural and other wastes – Animal dung – Requirements/Materials required for vermiculture – preparation of pre-digested materials – selection of suitable earthworm species

UNIT IV

– Vermicomposting methods: pit method, heap method, window method etc. - optimal culture conditions required – Protection from sunlight, rain, predators and parasites –Harvesting, packing and storage of Vermicompost – Chemical Nutrient composition of vermicompost - Methods of application to crop plants. Advantages of using vermicompost and their benefits to environment.

UNIT V

Vermicomposting at home – Vermicomposting on the farm – small scale and large scale – case studies – saleable products of vermiculture: Vermicompost,

Earthworms – Economic returns – Self-employment venture: Prospects of vermiculture as a self-employment venture.

Text Books:

1. Ismail, S.A. 2005. The Earthworm Book. Other India Press. Goa.
2. Gupta, P.K. 2005. Vermicomposting for sustainable agriculture, Agrobios [India], Jodhpur, India 210p.

Reference Books:

1. Bhatnagar, R.K. and Palta, R.K. 1996. Earhtworm vermiculture and vermicomposting. Kalyani Publishing. Luthiana. India. 106p.
2. Talashilkar, S.C. and Dosani, A.A.K. 2005. Earthworms in agriculture. Agrobios (India), Jodhpur.
3. Ranganathan, L.S. 2006.Vermibiotechnology. From Soil Health to Human Health. Agrobios (India), Jodhpur.

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Skill Based Elective III (B) (Semester V)

DAIRY FARMING

Objective:

To create interest in the young minds to become self-employers /entrepreneurs of farming practices in his/her native places after graduation. To train them the benefits of dairy animal rearing and their products.

UNIT I

Indigenous Breeds of Cattles – Draft breeds: Amrithamahal, Kangayam, Nagore, Malvi and Hallikar; Indigenous Dairy breeds: Deoni, Gir, Sindhi and Sahiwal.

UNIT II

Indigenous Dual purpose breeds: Haryana, Krishna Valley Breed and Ongole; Exotic Dairy breeds: Jersey, Holstein-Friesian, Ayrshire and Brown Swiss.

UNIT III

Housing of Dairy Animals – Hygienic Maintenance of Dairy sheds - Feeding stuff –Wet and Dry feeds available for Dairy Cattles - Maintenance of rations – Feeding of young stock – Important Pests and Diseases of Cattles.

UNIT IV

Breeding – Important traits for breeding - Cross breeds – Breeding and Cattle Improvement Programmes in India - Reproduction in Cattles: Artificial Insemination – Advantages of Artificial Insemination in Cattles.

UNIT V

Nutritive values, Quality, Preservation and Marketing of dairy products – Value addition in Milk and their marketing - By-products of dairy farming and their uses.

Text Book:

1. Tomar, B.S. and Singh, N. 2007. A Text Book of Applied Zoology. Emkay Publications, Delhi.

Reference Books:

1. Shukla, G.S. and Upadhyay, V.B. 1997. Economic Zoology. Rastogi Publications, Meerut.
2. Ahsan, J. and Sinha, S.P. 2003. A Hand book on Economic Zoology. S.Chand & Company Ltd., New Delhi.
3. Arumugam, N., Murugan, T., Johnson Rajeshwar, J. and Ram Prabhu, R. 2009. Applied Zoology. Saras Publication, Nagercoil.

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