DEPARTMENT OF ENTOMOLOGY

Courses and Curricula for M.S. in Entomology

Course code	Course Title	Credit hours
Compulsory courses		**18**
ENTO 501	Insect Taxonomy	3
ENTO 502	Insect Ecology	3
ENTO 503	Insect Physiology	3
ENTO 504	Biological Control	3
ENTO 505	Insecticide Toxicology	3
ENTO 506	Integrated Pest Management	3
Elective courses		**12**
ENTO 507	Insect Morphology	3
ENTO 508	Economic Entomology-1	3
ENTO 509	Host Plant Resistance	3
ENTO 510	Medical Entomology	3
ENTO 511	Pesticide Management	3
ENTO 512	Industrial Entomology	3
ENTO 513	Vegetables Pests	3
ENTO 514	Economic Entomology-II	3
ENTO 520	Research Methodology and Data Analysis	3
PLPA 511	Plant Virology	3
AGCH 505	Chemistry of Pesticides OR	3
	Related Courses from other Departments	
Research Semester		
ENTO 598	Seminar	**1**
ENTO 599	Research work for Thesis	**16**
	Total Cr. Hr.	**47**

January-June Semester

(Elective courses may be changed in different semesters)

Course Code	Course Title	Credit Hour	Remarks
ENTO 501	Insect Taxonomy	3	
ENTO 502	Insect Ecology	3	
ENTO 503	Insect Physiology	3	
ENTO 505	Insecticide Toxicology	3	
ENTO 509	Host Plant Resistance (Elective)	3	Out of the 8 courses offered, instructions are given to enroll in a total of 5 courses including 4 **Compulsory** courses
ENTO 510	Medical Entomology	3	
ENTO 512	Industrial Entomology (Elective)	3	
ENTO 511	Pesticide Management (Elective)	3	

July-December Semester

Course Code	Course Title	Credit Hour
ENTO 504	Biological Control	3
ENTO 506	Integrated Pest Management	3
ENTO 507	Insect Morphology (Elective)	3
ENTO 508	Economic Entomology-I (Elective)	3
ENTO 520	Research Methodology and Data Analysis (Elective)	3

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ENTO 501: Insect Taxonomy (Compulsory)

Credit hour: 3

History, zoogeography and evolution of insect terms; of taxonomy and systematics; principles and methods of zoological classification; rules of zoological nomenclature; major features of taxonomic publications; Classification and phylogeny of insects. Important genera and / or species of major orders; Collection and preservation of insects; Identification of immature stages of insects.

ENTO 502: Insect Ecology (Compulsory)

Credit hour: 3

Ecology-History, development and classification: population ecology: ecological systems: community diversity and distribution; Insects and its environment, ecological genetics; population estimation: pest surveillance, and momtonne and torecastine: interaction and stability; analysis of ecological data and; ecological management of the crop pest environment to reduce the insect pest population.

ENTO 503: Insect Physiology (Compulsory)

Credit hour: 3

Embryonic development in insects; integument and moulting; Physiology of digestive; respiratory, circulatory, excretory and nervous system; reproduction; growth and metamorphosis; sex determination in insects: locomotion in insects: insect nutrition; insect behavior: endocrine organs and hormone; exocrine glands, pheromones and defensive secretion in insects.

ENTO 504: Biological Control (Compulsory)

Credit hour: 3

History and present status of biological control; fostering pest through misuse of chemicals; insects pests and their natural enemies; advantages and constraints of biological control and desirable characters of biological control agents; Foreign exploration, importation and of natural enemies: maximizing biological control through augmentation and conservation of natural enemies. Microbial control of insect, evaluation of performance of natural enemies.

ENTO 505: Insecticide Toxicology (Compulsory)

Credit hour: 3

Background and review: general concept of insect toxicology; major insecticides and their classification. Uptake and distribution of insecticides; mode of action and metabolism, of insecticides; factors affecting insecticide toxicity; determination of toxicity, joint action of biologically active chemicals; insecticide formulations and their uses; insecticide resistance; biological evaluation of insecticides; safety measures of using insecticides.

ENTO 506: Integrated Pest management (Compulsory)

Credit hour: 3

Pest and management, History of pest control; Philosophy, basic principles and guidelines of integrated Pest management (1FM): Ecological basis of pest management: the economics of pest management, the quantitative basis of Pest management sampling and measures; analysis and modeling, in pest management: pest control tactics: cultural mechanical biological, genetic and

Legal control; host plant resistance; use of semio-chemicals and insecticides biotechnology and integrated pest management, training needs for IPM; role of extension entomology in IPM. Present status and prospects of integrated pest management in Bangladesh.

ENTO 507: Insect Morphology (Elective)

Credit hour: 3

Insect structure; body form, segmentation; integument and body wall processes: head, thorax, abdomen and their appendages and modifications; Digestive, respiratory and circulatory, nervous and reproductive system and sense organs and muscle. Evolutionary changes in morphological characters in insects of different orders.

ENTO 508: Economic Entomology-1(Elective)

Credit hour: 3

Bio-ecology, nature of damage and control measures of major insect and mite pests of field crops.- vegetables, fruits and stored products. Transmission of insect borne diseases in plants. Economics of pest attack and control. Crop loss assessment in pest infested field and estimation of economic threshold. Cost-benefit analysis.

ENTO 509: Host Plant Resistance (Elective)

Credit hour: 3

Host plant resistance to insects: host plant selection: insect and host plant interactions: secondary plant metabolites fcr insect resistance; mechanisms of resistance; types of resistance; factors affecting expression of resistance; plant breeding for resistance to insects; steps in developing resistant varieties; successful uses of insect resistant cultivars, *host plant* resistance in insect pest management.

ENTO 510: Medical Entomology (Elective)

Credit hour: 3

Pest species and insect vectors of diseases of man and domestic animals and their taxonomic classification, life-cycle, medical importance and control measures: mosquitoes, black flies, sandflies.'biting midges, horseflies, tsetse flies, houseflies. stableflies, flies and myiasis, fleas,, *lice,* bedbugs, triatcmine bugs, cockroaches, *soft* ticks, hard ticks, scabies mites, scrub typhus mites, miscellaneous mites.

ENTO 511: Pesticide Management (Elective)

Credit hour: 3

Pesticide in Agro-ecosystem: Selection and use of pesticides in crop pest management. Factors influencing the effectiveness of insecticides. Limitations of pesticides- pest resurgence, secondary pests outbreak, adverse effects on beneficial species.

Formulation and quality control of pesticides: Formulation of insecticides and its role in pest management. Registration, import, stocking, labeling, handling of pesticides. International rules of quality control.

Pesticide application techniques: Pesticide application methods, Movement, measurement and sampling of spray droplets, and aerial droplet size. Drift control of pesticide droplets.

Pesticide in environment; Pesticides residues in food, soil, water and air and its tolerance level to domestic animals, fish and wildlife. Problems of human health. International rules of pesticides tolerance to non - target animals and humans..

Bioassay of Pesticides: Purpose of bioassay, direct assays, quantitative dose-response relationship, Pesticide dumping: Disposal of used containers and unused pesticides.

ENTO 512: Industrial Entomology (Elective)

Credit hour: 3

Sericulture: Economic importance; Larval morphology and anatomy of silkworm; External morphology and descriptions of digestive system; glands and reproductive system; rearing techniques of mulberry-and eri silkworm; composition of silk; technique of race improvement. Moriculture-varieties, cultivation and management practices.

Apiculture: History, economic importance of bee keeping, morphology and anatomy of honeybee rearing and management of bee colony. Honey extraction. Lac-culture, economic importance, biology, culture techniques and lac products.

ENTO 513: Vertebrate Pests (Elective)
Credit hour: 3

Bio-ecology, damage assessment and control of vertebrate pests laying emphasis on the rodents of field crops and storage.

ENTO 514: Economic Entomology –II (Elective)
Credit hour: 3

Bio-ecology, nature of damage, control measures of major insect and mite pests of forest, ornamental plants, narcotic crops, spices and condiments.

ENTO 520: Research Methodology and Data Analysis (Elective)
Credit hour: 3

Statistical concepts and components of Entomological research. Purposes of conduction of research, planning of research and identification of researchable problems. Qualities and classification of research. Steps in experimental research. Sampling techniques-Simple Random Sampling, Stratified Random Sampling, Systemic Sampling, and Cluster Sampling. Basic principles of experimental design, layout and randomization of experiments, types of experimental design-Completely randomized design (CRD), Randomized completely block design (RCBD) and Latin square design (LSD). Missing plot techniques. Factorial experiments, Split plot design and Strip-plot design. Data transformation. Correlation and regression analysis, analysis of covariance. Survey methodology. Methods of data collection, calculation and processing. Statistical computer packages for analysis of experimental data and interpretation of research results. Graphical representation of experimental data. Instructions in Thesis/Dissertation/ scientific paper writing.