Ph. D. Syllabus in the Department of Agricultural Entomology

Sl. No.	Course code	Name of the course	Credits
1	ENT 601	Advanced Economic Entomology and Integrated Pest Management	4+0
2	PPT 601	Research Methodology and Techniques in Plant Protection	4+0
3	PPT 602	Research Prelims	4+0

ENT 601 Advanced Economic Entomology and Integrated Pest Management 4+0

Objective:

To enable the students to get acquainted with the advanced parts of applied entomology related to commercial entomology**,** Integrated Pest Management modules for various agriculturally important crops, their assessment through statistical analysis etc. they will also learn about the various management strategy especially eco-friendly means of control.

Syllabus:

General account (importance, seasonal history, biology, nature of damage and symptoms) of the pests of cereals, pulses, oilseeds, fibre and stored grain pests. General account (importance, seasonal history, biology, nature of damage and symptoms) of the pests of vegetables, fruits and plantation crops. A brief account of Industrial Entomology (Sericulture, Apiculture and Lac culture). Principles of sampling and surveillance; database management and computer programming, simulation techniques and system analysis and modelling. Studies on parasites, predators, parasitoids and entomopathogens. Colonization, conservation and augmentation of natural enemies. Genetic engineering and new technologies – their progress and limitations. Scope and limitations of bio-intensive and ecological based IPM programmes. Application of IPM to farmer's real time situations. Penetration and distribution of insecticides in insect systems; insecticide selectivity; factors affecting toxicity of insecticides. Bio-chemical and physiological target sites of insecticides in insects. Developments in bio-rational, bio-pesticides and newer molecules; their modes of action and structure – activity relationships; activation, synergism and potentiation. Joint action of insecticides; activation, synergism and potentiation. Problems associated with pesticide use in agriculture; pesticide resistance mechanisms and resistant management strategies (IRM); Pest resurgence and outbreaks; persistence and pollution; health hazards and other side effects. Identification of different insect-pests, natural enemies. Isolation and mass multiplication of natural enemies and entomopathogens. Bioassays of recent insecticidal molecules and botanicals. Rearing of mulberry silkworm. Growth and development study.

Learning Outcome:

After the successful completion of the course the students will be able to get acquainted with the different techniques of management of crop pest in an integrated way. They will also learn about the ecofriendly means of insect pest control and commercial entomology.

PPT 602 Research Prelims 4+0

Objective:

Collection of literature and preparation of two review articles. Preparation of synopsis of research topic. Final registration seminar (including methodology of trial and experiments). Data analysis and preparation of MS for thesis

Syllabus:

Collection of literature and preparation of two review articles. Preparation of synopsis of research topic. Final registration seminar (including methodology of trial and experiments). Data analysis and preparation of MS for thesis

Learning Outcome:

The students will get an idea about writing an abstract and synopsis which will further help them in writing their thesis and perform data analysis.

PPT 601 Research Methodology and Techniques in Plant Protection 4+0

Objective:

To enable the students to solve a research problem systematically and acquainting them how to prepare a holistic plan of work for research. Also to provide training in choosing methods materials, scientific tools and techniques relevant to the solution of the problem including application of suitable statistical analysis

Syllabus:

*Module A is compulsory and any one of Module B or C depending on problem to be allocated in the specialized area.

Module A: 1+0

Research – Concept and classification; Categories of research and societal needs; Agricultural Research Systems in India as well as other developing countries; Plant Protection Societies and International Plant Protection. Methodologies for recording and collection of data, data analysis and interpretation of data; graphical representation of data. Use of mathematical and statistical tools for analysis of data. Maintenance of pathogen cultures and pests, vectors etc. Statistical methods relevant to plant protection experiments

Module C: Agricultural Entomology 3+0

Study of different abiotic and biotic factors influencing the pest's population. By establishing different co-efficient of correlations (r) for different combinations of parameters, analysis of multiple co-relation among the significant parameters, determination of Adjusted 'R^2'. Formulation of mathematical simulated models and regression models for predicting the peak period based on weather parameters and ultimately to develop forewarning or forecasting models with regard to key pests on different crops. Survey and Surveillance. How to conduct roving survey, fixed plot survey and retrospective survey. Qualitative and quantitative survey. Sampling: Unrestricted random sampling, stratified random sampling, Sequential sampling and sampling procedure. Measurement of pest population. Absolute estimate and relative estimates, population indices; different dispersion parameters and their significance, the nature of simple, size of sample and number of samples. Release and capture methods (Linchon Index). Determination of different biodiversity indices with relation to insect-pest management. Richness indices, diversity indices and evenness indices. Calculation of Gain threshold, EIL, ETL, Life tables (age specific and stage specific) and determination of key mortality factors and manoeuvring them in the recent pest management technology. Behavioural study of different insect-pests like, fruit flies, pulse beetle, tetranychid mites etc.

Learning Outcome:

After the completion of the course the students will be able draw the objectives of the research work, their plan of work, proper training methods and tools which are adequate for reaching out the objectives.