

# Entomological Aspects in UGC Choice-based Credit System (CBCS) Curriculum at Tamil Nadu Educational Institutions

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**Abstract:** *The University Grants Commission (UGC) has suggested to offer choice based credit systems (CBCS) to all its stakeholders of educational institutions offering courses with language papers, core papers, elective papers, allied papers, non-major electives (NME), skill-based elective (SBE) for under-graduates (UG) and core, electives and special papers at the post-graduate (PG) level. As per the UGC model curriculum, Apiculture and Sericulture are considered Skill-Enhancement courses whereas Insect, Vector and Diseases as Discipline Specific Electives (DSE). Most of the universities at Tamil Nadu are offering entomology as core paper or elective paper or special paper. However, a few universities are offering entomology or entomology related papers as allied subject. The objectives of the courses are to study the insect pests, agricultural and medical importance and their control measures; to study the economic importance of insects as vectors, pollinators, predators and parasites and integrated pest control components. As an alternative, entomological aspects are offered through "Economic Zoology" where Apiculture, Sericulture and Lac culture are included. At PG level, the entomology paper has been offered as core paper (theory and practical) or as elective paper. Further, entomology related papers like Sericulture or Apiculture are offered as elective or special or optional paper. Autonomous colleges are offering entomology in UG, PG and M.Phil. level with usual generic names or with attractive terms. General / Applied Entomology has been also offered as allied subject. In M.Phil entomology has been offered as special paper in a few autonomy colleges. These were discussed in details.*

**Keywords:** Core papers, Elective papers, Allied papers, Non-major electives (NME), Skill-based elective (SBE), Apiculture, Sericulture, Lac culture, Special paper

## 1. Introduction

The subject entomology is common in teaching and research [1], particularly in forestry universities [1], non-plant protection sciences [2]. Considering the importance of entomology all universities introduced either in undergraduate or post-graduate or in both levels [4]. The University Grants Commission (UGC) and most of the state government establishments including Tamil Nadu State Council for Higher Education (TANSCH) came forward to introduce Choice Based Credit System (CBCS) in all affiliated universities and colleges for UG and PG courses. The aim of CBCS is to provide ample choice of subjects to students, based on the weighed credit point system. Value essential features of CBCSs are standardization of UG and PG degree courses to internally accepted levels, focus on skill-based curriculum, emphasis on value education, institution-industry collaborations, etc.

The general structure of UG curriculum under CBCSs is as follows: Part I: Tamil/Other languages; Part II: English; Part III: Core Subjects (major), allied subjects (ancillary) and electives (special papers) / project; Part IV: Non-major electives (NME), skill-based elective (SBE), environmental studies (compulsory paper introduced by UGC), value education and Part V: Extension activities. In addition, it was also suggested to introduce as many extra credit courses (ECC) as possible which are open to all the UG students. Entomology, the study of insects has developed into a very large division of the animal sciences owing to their huge proportion in the animal kingdom and their importance in the applied fields. Very recently, the need for introducing entomology curriculum in Indian universities was discussed [5]. The aim of this study is to

know the level of entomology content in the curriculum of UG and PG courses at educational institutions of Tamil Nadu.

## 2. Methodology

Utilizing web page of various educational institutions (nine universities and 37 autonomous colleges), available course pattern as well as curriculums was downloaded and considered for the present work. Personal contacts were also made to know about entomology aspects in the curriculum of various education institutions as mentioned above. Relevant information on entomology related aspects of Part III, and IV was sorted out and tabulated, analysed and presented here. Some data was analysed statistically and expressed in per cent value.

## 3. Observations

Most of the courses aimed to inculcate : to familiarize the students to familiarize, identify insects of economic importance and to know their external and internal features, equip the students with knowledge of insect pests of economically important crops, stored grains, household, man and animals and management of the same and to provide the concepts of beneficial insects (silkworm, lac insect, honey bees), insects of medicinal and aesthetic value, insect pollinators, scavengers and weed feeders.

Analyses of collected data reveals that in 2015, UGC suggested including Insect, Vector and Diseases and Applied Zoology (Insects of Economic and Medical Importance- 2 units) as discipline paper; Apiculture / Sericulture as skill enhancement courses in B.Sc. Zoology.

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During the first semester all colleges (both autonomous and non-autonomous) have included general classification of Insect (taxonomy), detailed type study and economically important invertebrates including insects. Various systems of cockroach were taught to Zoology and Botany students at UG level. Importance of insect taxonomy in education and research was stressed [6-8].

Metamorphosis of insects was included in UG syllabus by more than 90% of the institution in Animal Physiology paper. Similar observation was also recorded in PG syllabus. Sericulture, Apiculture, Economic Entomology and Pest Management, Applied Entomology were included as Elective paper. Moreover, Sericulture was also included as special or applied paper in UG course. Economic entomology was considered as Allied paper for UG students. In entomology curriculum, Applied Entomology (12.5%), General and Applied Entomology (12.5%), Sericulture (25%) as elective paper as suggested in other countries [9].

Under SBE, Apiculture was introduced into all affiliated colleges of Thiruvalluvar University of Tamil Nadu. Similarly, Applied and Storage Entomology or Sericulture was offered as optional/supportive course in Periyar University. Thiruvalluvar University and Manonmaniam Sundaranar University have included Economic Zoology and Economic Entomology, respectively as core paper in UG curriculum (25%) where sericulture, apiculture and lac culture constitute more than 60% of the syllabus. Medical Entomology was offered as ECC in Bharathiyar University.

Under PG curriculum, one among the core papers is Entomology (44.44%). Entomology curriculum was part of the main curriculum in more than 40% of M.Phil. courses in Autonomous colleges.

Autonomous colleges have introduced entomology curriculum in their courses either as individual paper or along with other papers: Biotechnology and Sericulture (core paper); Bio-farming (2 units entomology) (elective). They also have many innovative titles: Agricultural Pest management, Storage pest management, Biopesticides, Insect Pest Management, Commercial Zoology, etc. Further, the autonomous colleges, government-aided colleges and universities have been introducing entomology fields based on the faculties. However, recent development in entomology was also place an important role for introduced new courses related to entomology field as considered in other countries [10].

#### 4. Conclusion

Considering the observations referred to above, we concluded that Entomology has been included in B.Sc., M.Sc. and M.Phil. courses in various educational institutions at Tamil Nadu. Basic as well as applied aspects of entomology are included in the syllabus. Sericulture, Apiculture and Lac culture were focused industrial aspects of entomology. However, we recommend including a few most recent developments in the field of entomology. They can be incorporated in the syllabus to make the students

know recent developments and how they utilized for human welfare.

#### 5. Recommendations

Following areas / field can be introduced in science colleges and universities:

- Sterilization technology for pest and vector control
- Modern techniques for pest control management
- Various biological values of insects
- Insect resistant plants and transgenic crops to insect pests
- Quarantine entomology can be strengthened in UG and PG curriculum
- Conservation of pollinating insect should be included
- Molecular concepts of Insect Genome System and its applications in bio-diversity studies
- Modern concepts of insecticide resistance and genotoxicity in various insect populations.
- Synthetic diets for insect for promotion of their natural growth and culture and concepts of insect as food
- Inputs from stakeholders can be considered before introduce new syllabus in entomology

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