BARASAT GOVT COLLEGE

POST GRADUATE DEPARTMENT OF ZOOLOGY

M.Sc. (Zoology) CBCS Syllabus

Program Specific Outcomes

The revised syllabus based on Choice Based Credit system (CBCS) has been designed and modified by the faculty members, PG Dept. of Zoology, Barasat Govt College and external expert members of several institutes and universities. The above said revised syllabus was approved by PGBOS, Dept. of Zoology, BGC and the competent authorities of the affiliating university (WBSU). The same has been introduced and implemented from the academic session 2019-2020 successfully.

- Understand the nature and basic concepts of cell biology, genetics, molecular biology, taxonomy, physiology, ecology, diseases, disease spreading agents and applied Zoology
- Understand the relationships among animals, plants and microbes
- Perform procedures as per laboratory standards in the areas of Taxonomy, Physiology, Ecology, Cell biology, Genetics, molecular Biology, Immunology, Applied Zoology, Clinical science, tools and techniques of Zoology, Toxicology, Entomology, Nematology Sericulture, Biochemistry, Fish biology, Animal biotechnology and research methodology
- Gains knowledge about research methodologies, effective communication and skills of problem-solving methods
- Dissertation/Project/Review/Laboratory Exchange Programme provides Knowledge gained on various aspects of zoology, intensive study on particular topic, development of oral/writing ability and communication, ability of compilation of scientific resources published in journals, preparation of power point presentation, competent to face mass interview.
- This program covers theoretical studies and practical proficiency training which may help in their placement at several pharmaceutical/ biotechnology/ microbiology/ based laboratory.
- This program will help the students in competitive exam like NET, SET, GATE and other PhD entrance examination.

BARASAT GOVERNMENT COLLEGE

POST GRADUATE DEPARTMENT OF ZOOLOGY

Course Outcome or Learning Outcome

Two Years M.Sc. Degree Course in Zoology CBCS

Syllabus, with effect from: 2019 – 2020

Semester	Course Names	Course Outcomes
I	**Paper Code: ZHT 101** **Non-Chordates – Structure & Function**	CO1. Understand the basic taxonomy and systematics and classification of Protozoa, Porifera, Cnidaria and Helminth groups. (Level 1 &2) CO2. Acquire knowledge about the biology of these taxonomic categories as well as about some acoelomate, pseudocoelomateparasites for their life cycles, epidemiology, pathology, diagnosis, symptoms and treatments. (Level 2) CO3. Gain knowledge about the basics of parasitology such as origin and evolution of parasitism, role ofvectors, parasitoids, host-parasite interactions etc.(Level 2) CO4. Critically analyze classification of coelomate invertebrates and the structure, function plus biology of these taxonomic categories as well. (Level 4) CO5.They will understand and create awareness about different vector borne diseases and the related life cycles, epidemiology, pathology, diagnosis, symptoms and treatments. (Level 5)
	Paper Code: ZHT 102 **Chordates – Structure & Function**	CO1. Understand the classification, structure, function and biology of chordates of different taxonomic classes. (Level 1 &2) CO2. Analyze relationship of different classes of vertebrates and identify up to order based upon external characteristics. (Level 3 &4) CO3. Understand the distribution of chordates in different continents and can explain the possible reason of it. (Level 4) CO4. Learn some special topics like metamorphosis, snakebites, parental care of amphibian, echolocation of mammals, poultry managements and different breeds of domestic animals.
	Paper Code: ZHT 103 **Animal Physiology & Biochemistry**	CO1. Understand the physiology of muscles, nerves, reproductive systems and bone. (Level 1 &2) CO2. Develop detail understanding of muscle structure and contraction mechanism, process of respiration and transport of gases. (Level 2) CO3. Understand and explain kidney structure and regulation of urine formation, heart structure and functioning. (Level 2 & 4) CO4. Explain about the importance and scope of biochemistry; the structure and biological significance of carbohydrates, amino acids, proteins, lipids and nucleic acids. (Level 4) CO5. Comprehend the structure and function of immunoglobulins and the concept of enzyme, its mechanism of action and regulation. (Level 2 & 4) CO6. Acquire the knowledge of DNA replication, transcription and translation, the preparation of models of peptides and nucleotides, biochemical tests for amino acids, carbohydrates, proteins and nucleic acids and measurement of enzyme activity and its kinetics. (Level 3 & 4)
	Paper Code: ZHT104 **Endocrinology and Neurobiology**	CO1. Learn details of endocrinology with definition and classification of hormones, their biosynthesis, receptors, mode of molecular actions,physiological function. feedback controls. (Level 1 &2) CO2. Explain the neuroendocrine system and predict its function with peripheral endocrine glands through feedback. (Level 2 & 4) CO3. Understand the structure of brain and improved methods to study it. (Level 2) CO4. Know the cause, symptom and treatment of neurodegenerative diseases (such as Alzheimer's and Parkinson's diseases) and mental illnesses. (Level 2,3) CO5. Apply the knowledge of neuroendocrinology for career development in higher education and research and development. (Level 5, 6)

	Paper Code: ZHL 101 **Non-chordate and Chordate**	CO1. Develop an understanding of the characters used to classify besides being able to differentiate the organisms belonging to different taxa. (Level 1, 2 and 3) CO2. Examine and analyze the diversity and evolutionary history of a taxon through the construction of a basic phylogenetic/ cladistics tree. (Level 4, 5) CO3. Study the adaptive features of the nonchordates and chordates for their respective modes of life. (Level 3) CO4. Learn to understand the relative position of individual organs and associated structures through dissection of the invertebrate and vertebrate representatives. (Level 3)
	Paper Code: ZHL 102 **Biochemistry**	CO1. Learn the preparation of models of peptides and nucleotides and apply the knowledge in the day-today living and solve problems related to the topic. (Level 3) CO2. Estimate practical analysis of the qualitative test of functional groups in carbohydrates, proteins and lipids.(Level-5) CO3. Illustrate the mechanism of enzyme activity and its kinetics. (Level-4)
	Paper Code: ZHL 103 **Histology and Histochemistry**	CO1. Develop the skills of basics of histology and tissue staining (Eosin-Haematoxylin, PAS) along with the identification of several important tissues. (Level 3, 4) CO2. Learn the techniques of Trypan Blue & NBT cell viability tests and can apply in concerned industry. (Level 2, 3, 5, 6)

Semester	Course Names	Course Outcomes
II	**Paper Code: ZHT 201** **Developmental Biology & Gamete Biology**	CO1. Critically understand how a single-celled fertilized egg becomes an embryo and then a fully formed adult by going through three important processes of cell division, cell differentiation and morphogenesis. (Level 1, 2 and 3) CO2. Understand how developmental processes and gene functions within a particular tissue or organism. (Level 1, 2 and 3) CO3. Understand the basic features of early development such as fertilization, zygote formation, blocks to polyspermy, blastulation, gastrulation. (Level 3, 4 and 5) CO4. Understand types of regeneration, metamorphosis, ageing. (Level 1, 2 and 3) CO5. Understands different techniques and its application to study Development. (Level 1, 2 and 3) CO6. Explain the fundamental molecular events behind axis and pattern formation in animal. (Level 3 and 4)
	Paper Code: ZHT 202 **Cell, Tissue & Molecular Biology**	CO1. Understand the structure and functions of plasma membrane and endo-membrane systems. (Level 3, 4) CO2. Acquire knowledge about replication, transcription, translation, post transcriptional and posttranslational modifications, gene regulation, DNA repair mechanisms. (Level 1, 2) CO3. Understood the genome organization, including various types of genes and genetic disorders. (Level 2, 3) CO4. Describe the cell cycle and stages of cell division and functions of cell organelles. (Level 2) CO5. Gather Knowledge on various molecular tools and techniques like PCR, southern, northern and western blotting, recombinant DNA technology and microbiology techniques with applications in biomedical science, agriculture and environmental science. (Level 3, 4, 5, 6)
	Paper Code: ZHT 203 **Ecological Theories & Applications & Animal Behaviour**	CO1. Understand ecology as an essentialsubject in today's world where harsh consequences like climate change and role of genetically modified organisms cannot be ignored. (Level 2, 3) CO2. Understand different methods to estimate population size and population dynamics including metapopulation models, life tables and population pyramids; know waste in ecosystem management. . (Level 2, 3, 4) CO3. Describe various aspects of animal behaviour and chronobiology. (Level 2, 3, 4) CO4.Learn a wide range of theoretical and practical techniques used to study animal behavior. (Level 3, 4, 5)

	Paper Code: ZHT204 **Biophysical Techniques & Biostatistics**	CO1. Gain knowledge about various tools & techniques used in biological systems and gives them insight about their use in research. (Level 2, 3, 4, 5, 6) CO2. Gain knowledge about statistical methods like measures of central tendencies, probability etc. and can use the best data analysis methods in their research projects. (Level 2, 3, 4, 5, 6) CO3. Recognize the difference between normal and skewed distribution and its use in parametric and non-parametric statistical tests. (Level 2, 3)
	Paper Code: ZHL 201 **Developmental Biology and Cell & Molecular Biology**	CO1.learn the different aspects of early, late and post embryonic developments. (Level 2) CO2. Build knowledge about implications of developmental biology in various fields, such as in teratogenesis, stem cell biology, in vitro fertilization, cryopreservation, cord blood transfusion etc. (Level 2, 3) CO3. Apply their knowledge in problem solving and future course of their career development in higher education and research. (Level 2, 3, 4) CO4. Get new avenues of joining research in related areas such as therapeutic strategies or related opportunities in industry. (Level 3, 4, 5, 6)
	Paper Code: ZHL 202 **Ecology & Biophysical Methods and Biostatistics**	CO1. Understand and be able to objectively evaluate the role of behaviour in the protection and conservation of animals in the wild. (Level 2, 3, 4, 5) CO2. Evaluate behavior of all animals, including humans, in the complex ecological world, including the urban environment. (Level 3, 4, 5) CO3. Engage in field-based research activities to understand well the theoretical aspects taught besides learning techniques for gathering data in the field. . (Level 3, 4) CO4. Analyse a biological problem, derive testable hypotheses and then design experiments and put the tests into practice. (Level 3, 4, 6) CO5. Get chances to solve the environmental problems involving interaction of humans and natural systems at local or global level viz, Sedgwick Rafter Counter method, BOD estimation etc. (Level 3, 4, 5, 6) CO6. Learn ecological implications on blood parasite, gut parasite, flat fish, tree frog, hermit crab, Balanus, Tea mosquito bug, Red Panda, Flying squirrel. (Level 2, 3,4) CO7. Learns about hypothesis testing and inferential statistics along with the problem-solving methods. (Level 3, 4, 5) CO8. Understand the various aspects of biostatistics such as central tendency, t-test, chi-square, ANOVA, correlations and regression. . (Level 2, 3, 4)
	Paper Code: ZHL 203 **Seminar**	CO1. Show competence in identifying relevant information, defining and explaining topics under discussion. (Level 3, 4, 6) CO2. Demonstrate complexity, insight, independent thought, relevance, and persuasiveness. (Level 3, 4, 6) CO3. Evaluate information and use and apply relevant theories. (Level 3, 4, 5, 6) CO4. Judge how much to say, speak clearly and audibly in a manner appropriate to the subject, ask appropriate questions, use evidence to support claims, respond to a range of questions, take part in meaningful discussion to reach a shared understanding. (Level 3, 4, 5, 6)

Semester	Course Names	Course Outcomes
III	**Paper Code: ZHT 301** **Insect Biology**	CO1. Remember and understand basic insect biology, evolution, trophic adaptations and comparative taxonomy. (Level 1 &2) CO2. Apply the knowledge of taxonomy to identify and classify insects. (Level 3 &4) CO3. Realise insects impact on society through their role as pests of agricultural, medical, and urban sectors as well as their beneficial roles in ecosystem. (Level 3, 4) CO4. Understand the concept of IPM strategy in different commercial crops and biological control for invasive pests, Remote Sensing Techniques in assessing crop damage and protection. (Level 2, 3, 4 and 5)

	Paper Code: ZHT 302 Parasitology, Immunology & Microbiology	CO1. Understand the basic principles of bacteriology, virology, mycology, immunology and parasitology including the nature of pathogenic microorganisms,pathogenesis, diagnosis, transmission, prevention and control of diseases. (Level 1 & 2) CO2. Can realise the antigens, antibodies, complement system, cellular and molecular pathways that leads to humoral and cell-mediated immunity including role of MHC. (Level 1 &2) CO3. Can relate the immunity related diseases with molecular biological events of immune system. (Level 3 & 4) CO4. Understand tumor immunity and about vaccines. (Level 1 & 2) CO5. Understand the principles and methods of food preservation, production of different fermented foods, different food borne diseases: their causative agents, foods involved, symptoms and preventive measures. (Level 1, 2, 3)
	Paper Code: ZHT 303 Fish Biology	CO1. Understand the diversity and biology of fishes (both freshwater and marine) and fisheries management. (Level 1 & 2) CO2. Describe the major groups of fishes and their evolutionary relationships. (Level 1 & 2) CO3. Describe the morphology, physiology, and biology of fish. (Level 1 &2) CO4. Apply basic strategies to manage fish populations. (Level 3) CO5. Understand the cause and pattern of Fish migration. (Level 1 & 2)
	Paper Code: ZST 301 Environmental Physiology	CO1. Learn the biological and physiological mechanisms by which animals adapt to their environment. (Level 1 & 2) CO2 Explain how different species of animals may cope with changes in their environment. (Level 2 & 3) CO3. Learn to manage livestock and other domestic animals under various environmental conditions. (Level 3, 4, 5, 6)
	Paper Code: ZST 303 Toxicology	CO1. Define and differentiate between natural chemicals and synthetic chemicals, compare how wide spread they are and discuss perceptions of their effects. (Level 2, 3, 4 and 5) CO2. Describe attributes and characteristics of chemicals that maket hem harmful. (Level 2, 3) CO3. Demonstrate an understanding of the core concepts of the science of toxicology, including hazard identification, exposure assessment, dose-response assessment and an understanding of the mechanisms of action and effects of toxic chemicals at multiple levels of biological organization. (Level 2, 3, 4 and 5) CO4. List and discuss factors influencing the toxic effects of chemicals. (Level 3, 4 and 5) CO5. Analyze, interpret and evaluate health riskfrom exposure to a variety of chemical hazards, describe technical aspects and experimental approaches in toxicological research, testing and risk assessment. (Level 3, 4 and 5)
	Paper Code: ZHL 301 Entomology & Fisheries	CO1.Prepare insect & fish keys by their own and identify the same with the help of supplied keys. (Level 2, 3) CO2. Perform morphometric measurement of fishes. (Level 2, 3, 4) CO3. Isolate soil micro arthropods by using Tullgren Apparatus. (Level 2, 3, 4)
	Paper Code: ZHL 302 Parasitology, Immunology & Microbiology	CO1. Develop skills to identify various parasites and microbes, their method of fixation & staining. (Level 2, 3) CO2. Understand the principle and protocols of various immunological techniques that include study of primary and secondary antibody response in haemagglutination test, characterization of purified immunoglobulin preparation by SDS-PAGE, test for cell mediated immune response by measurement of MI response, PCR technique etc. (Level 2, 3) CO3. Develop the skill to isolate and prepare peritoneal macrophages from rat/mice. (Level 2, 3) CO4. Identify immunological tissues, attain efficiency in laboratory techniques to prepare culture of bacteria and counting of colonies. (Level 2, 3, 4)
	Paper Code: ZET 301 Elective: Ecology & Environmental Biology	CO1. Learn the in-depth knowledge of ecology and ecosystems, population ecology, community ecology, causes of biodiversity degradation and its Conservation. (Level 2, 3,4, 5) CO2. Gain knowledge on our natural resources and their Management, various energy resources & its applications. (Level 2, 3, 4) CO3. Can apply the basic concepts of ecology for conservation of nature and natural resources. (Level 2, 3)

	Paper Code: ZET 301 **Elective: Parasitology & Immunology**	CO1.learn to describe the mechanisms for transmission, virulence and pathogenicity in pathogens and diagnose the causative agents, describe pathogenesis and treatment for important diseases like malaria, leishmaniasis, trypanosomiasis, toxoplasmosis, schistosomiasis, cysticercosis, filariasis etc. (Level 2, 3) CO2. Assess the importance of incidence, prevalence and epidemiology in microbiological diagnostic activities. (Level 2, 4 ,5) CO3. Develop skills for diagnosis of diseases and treatment of patient or host and Highlight advance research in the field of parasitology and Immunology. (Level 2, 3, 4, 5, 6)
	Paper Code: ZEL 301 **Elective: Ecology &** **Environmental Biology**	CO1. Gain the knowledge of performing quantitative parameters in terrestrial and aquatic systems, quantification of LD50/LCt50 value of any toxic chemical. (Level 2, 3, 4, 5) CO2. Evaluation of effect of toxicant on animal tissues (histochemical and biochemical changes), development of skills for preparation of vermi bed for composting. (Level 3, 4, 5).
	Paper Code: ZEL 301 **Elective: Parasitology & Immunology**	CO1. Understand the fundamental complement of numerous diseases which have significant impact on human health. (Level 2, 3) CO2.Learn the techniques of animal handling, injection of antigen along with preparation of serum and isolation of spleen, thymus and bone marrow cells. (Level 2, 3,4) CO3.Develop the skill for parasite fixation, staining and mounting. (Level 2, 3) CO4. Highlight interesting research ideas towards the advancement and enrichment of knowledge in the field of Parasitology. (Level 2, 3, 4, 5, 6)

Semester	Course Names	Course Outcomes
IV	**Paper Code: ZHT 401** **Taxonomy, Biodiversity & Conservation Biology**	CO1. Acquire an in-depth knowledge on taxonomic categories, taxonomic characters (kinds, measurements, weighting & analysis), numerical taxonomy (phenetic and cladistic schools), construction of phenogram and cladogram, polarity decision, parsimony, out group comparison, phylogenetic groups (monophyly, paraphyly, polyphyly). (Level1, 2, 3) CO2. Determine genetic distance, phylogenetic trees, trends in taxonomy (cytotaxonomy, chemotaxonomy, molecular taxonomy, basics of barcoding. (Level1, 2, 3) CO3.Applications of DNA barcode, constraints of DNA taxonomy; parataxonomy), ICZN (its operative principles,interpretation and application of important rules, Zoological Nomenclature), procedures and keys in taxonomy. (Level 2, 3) CO4.Understand the diversity and relationships in animal world, to develop a holistic appreciation on the phylogeny, diversity of life, ability to look at and study organismic diversity at various levels species, genetic and ecosystem, valuation of biodiversity, learn to measure and estimate biodiversity, learn to assess wildlife treat status and issues, threats responsible for decimation of biodiversity & wildlife, how to tackle issues of sustainable development and conservation of biodiversity & wildlife, conservation of wildlife. (Level 2, 3,4,5)

	Paper Code: ZHT 402 **Evolutionary Biology & Population Genetics**	CO1.Understand the process and theories in evolutionary biology. (Level1, 2) CO2. Develop an interest in the debates and discussion taking place in the field of evolutionary biology. (Level 3, 4, 5) CO3. Understand the emergence of land vertebrates, origin and evolution of primates and man. (Level1, 2) CO4. Gain knowledge in theory and analytical methods in population genetics. (Level 2, 3, 4) CO5. Solve biological problems with the help of population genetics. (Level 3, 4, 5) CO6. Identify relevant question in population genetics and can propose strategies to solve the problems, use previously acquired knowledge (mathematics, statistics and programming) to solve genetic problems. (Level 3,4, 5, 6)

	Paper Code: ZHT 403 **Applied Biology & Biotechnology**	CO1.Understand the cell & animal tissue culture, microbial fermentation and production of small and macromolecules, soil micro arthropods : types and their role in soil formation and soil fertility. (Level 2, 3, 4) CO2.Gain in depth knowledge of vector biology : resurgence of Malaria, major malaria vectors of India : their distribution, bio ecology, potentiality and present susceptibility status, bioremediation and phytoremediation, biosensors, vaccine development, modern culture techniques of fish & management, vermiculture. (Level 3, 4, 5)
	Paper Code: ZST 403 **Genetic diseases/disorders & Management**	CO1.Learn the fundamental genetics like Mendelian and Non-Mendelian inheritances, linkages, mutations, sex determination of various animals, extra chromosomal inheritances, transposable genetic elements etc. (Level 2, 3, 4, 5) CO2. Understand the various aspects of several genetic disorders, health problem caused by one or more abnormalities in the genome and their management. (Level 2, 3, 4, 5) CO3. Understand the basis of the genetic abnormalities, ranging from minuscule to major -- from a discrete mutation in a single base in the DNA of a single gene to a gross chromosomal abnormalityinvolving the addition or subtraction of an entire chromosome or set of chromosomes. (Level 3, 4, 5)
	Paper Code: ZST 404 **Tools & Techniques**	CO1. Understand the purpose of the technique, its proper use and possible modifications/ improvement. (Level 2, 3, 4, 5) CO2.Learn the theoretical basis of technique, its principle of working and its correct application and also comprehend the construction, repair and adjustment of any equipment required for a technique. (Level 2, 3, 4, 5) CO3.Learn the accuracy of technique, maintenance of laboratory equipment's/ tools, safety hazards and precautions. (Level 2, 3, 4) CO4. Understand the technique of cell and tissue culture, preparation of solution of given percentage and molarity, process of preparation of buffer.(Level 2, 3, 4, 5) CO5. Learn the techniques of separation of amino acids, proteins and nucleic acids. (Level 2, 3, 4, 5)
	Paper Code: ZHL 401 **Taxonomy, Biodiversity & Wildlife including Field Training**	CO1. Prepare taxonomic keys (Insect/Fish as a model), estimate species density, diversity index – Shannon Index, Richness Index, Relative abundance, Species evenness, Similarity Index. (Level 2, 3, 4, 5) CO2. Analyse Dominance Diversity Index, perform sampling and census technique, pug mark analysis for wildlife in the field. (Level 2, 3, 4, 5) CO3. Know use and application of global positioning system (GPS) and laser range finder in the study of biodiversity. (Level 2, 3, 4) CO4. Participate in field excursion and preparing field note book on the estimation/assessment of biodiversity of any terrestrial or aquatic ecosystem. (Level 2, 3, 4, 5, 6)
	Paper Code: ZHL 402 **Comprehensive Viva**	CO1. Develop skills to face interview panel. (Level 3, 4) CO2. Gain knowledge in every aspect of the subject. (Level 3, 4) CO3 Learn how to converse, present thought and answer impromptu questions before an expert panel. (Level 3, 4)

	Paper Code: ZET 401 **Elective: Ecology & Environmental Biology**	CO1. Develop the concept of ecological modelling, autecology of species, habitat ecology, ecotoxicology & public health, environmental monitoring & impact assessment management of environmental quality. (Level 2, 3, 4, 5) CO2. Understand the importance of bio diversity and the consequences of bio diversity loss, learn about the judicious utilisation of natural resource, follow the concept of green technology and the eco-friendly practises andother prospects of environment protection. (Level 3, 4, 5) CO3. Understand and practice appropriate legal/regulatory and ethical issues in the context of the work environment. (Level 3, 4, 5) CO4. Design research projects to collect information to assess the of current practices, and interpret the results of a statistical analysis of data, and use this to make informed decisions. (Level 3, 4, 5, 6)
	Paper Code: ZET 401 **Elective: Parasitology & Immunology**	CO1. Acquire broad understanding of immune system and parasites; Types of immunity, antigens-antibodiesand their properties. Complement system, MHC's andimmune responses. (Level 1, 2) CO2. Understand the types of hypersensitivity reactions and auto immune diseases. (Level 1, 2) CO3. Develop concepts of tumour immunology and transplantation immunology. (Level 1, 2) CO4. Elucidate the fundamental complement of numerous diseases (caused by diverse ecto and endoparasites) which have significant impact on human health. (Level 1, 2, 3) CO5. Understand vector host interactions of many important neglected tropical diseases like Malaria, Filaria, Dengue, Kala-azar etc. (Level 2, 3, 4)
	Paper Code: ZEL 401 **Elective: Ecology & Environmental Biology**	CO1.Gain the knowledge of performing productivity determination of different ecosystems. (Level 2, 3) CO2. Evaluate Diversity Index of terrestrial/aquatic communities, develop statistical methods and can use different software for ecological analysis. (Level 3, 4, 5) CO3. Develop field study methods for wildlife study & participate in field excursion and prepare field note book on the estimation of biodiversity of any terrestrial or aquatic ecosystem. (Level 3, 4, 5)
	Paper Code: ZEL 401 **Elective: Parasitology & Immunology**	CO1. Develop skill of whole mount preparation of trematode and cestodes. (Level 3, 4, 5) CO2. Learn the technique of isolation of peritoneal macrophage, immunofluorescence and FACS. (Level 3, 4, 5) CO3. Compare a normal and transformed cell and draw cell using camera lucida. (Level 3, 4, 5) CO4. Raise antisera in animal. (Level 3, 4) CO5. Follow disease diagnosis and pathogen identification through different experiments using advanced tools in different research laboratories. Convey the aim, methods, results, and conclusions of a scientific experiment by presenting a lab report. (Level 3, 4, 5, 6)
	Paper Code: ZEL 402 **Dissertation/Project/Review/Laboratory Exchange Programme**	CO1.Gain in-depth knowledge in the major field of study. Comprehend how to address a problem and design experiments to reach specific conclusions. (Level 3, 4, 5) CO2. Create, analyze and critically evaluate different technical/research solutions. (Level 4, 5, 6) CO3. Clearly present and discuss the conclusions by preparing power point presentation. (Level 3, 4) CO4.Develop oral/writing ability, ability of compilation of scientific resources published in journals. (Level 3, 4, 5, 6)