KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)
Re-accredited by NAAC with 'A+' Grade (4th Cycle)

College of Excellence (UGC)

Affiliated to Bharathiar University

Coimbatore – 641 029

DEPARTMENT OF ZOOLOGY (Aided)

COURSE OUTCOMES (CO)

M.Sc. ZOOLOGY

For the students admitted

In the Academic Year 2024-2025

Programme Code: 06	**M.Sc., Zoology**			
Core Paper 1. Comparative Anatomy of Invertebrata and Chordata				
Batch 2024 - 2025	Hours/Week 5	Total Hours 75	Credits 5	Employability

Course Objectives

1. To make the students learn the functional morphology of invertebratesand chordates.
2. To impart the significance of Invertebrate and Chordate organization and their evolving adaptations in organ systems.
3. To understand the functional aspects of different systems of invertebrates and vertebrates in a comparative basis.

Course Outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**CO1**	Remember the organization, significance and evolving adaptations of Coelom in Invertebrates.
	CO2	Understand the processes and mechanisms of digestive system, respiratory and excretory systems of invertebrates.
	CO3	Apply the concept of circulatory, nervous and reproductive systems in Invertebrates.
	CO4	Analyze the physiological functions of integument, digestive, respiratory and skeletal system of vertebrates.
	CO5	Evaluate the comparative anatomy of circulatory, nervous and urinogenital system of vertebrates.

Programme Code: 06	**M.Sc., Zoology**			
Core Paper 2. Animal Physiology				
Batch 2024 - 2025	Hours/Week 5	Total Hours 75	Credits 5	Employability

Course Objectives

1. To get knowledge about the structure and functions of various systems
2. To understand the physiology of digestion, respiration, circulation and muscle fibres.
3. To study the structure and functions of endocrine glands.

Course Outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**CO1**	Know the importance of nutrients and digestion.
	CO2	Understand the physiology of respiration and circulation.
	CO3	Impart knowledge on the role of renal organs in excretion.
	CO4	Describe the muscle structure and function.
	CO5	Evaluate the structure of reproductive and endocrine glands.

Programme Code: 06	**M.Sc., Zoology**			
Core paper 3. Cell and Molecular Biology				
Batch 2024 - 2025	Hours/Week 5	Total Hours 75	Credits 5	Employability

Course Objectives

1. To study the cell membrane, cytoskeleton structure, nucleus and their functions.
2. To impart knowledge on protein synthesis.
3. To include knowledge on the cell cycle, apoptosis, programmed cell death and cancer biology.

Course Outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**CO1**	Get the knowledge about cell organelles and their functions
	CO2	Understand the various functions adapted inside the cells.
	CO3	Apply knowledge on molecular mechanisms of protein synthesis
	CO4	Describe the cell cycle, cell signaling pathways of cell death
	CO5	Evaluate the knowledge on the cancer biology and molecular mechanism of cancer treatment

Programme Code: 06	**M.Sc., Zoology**			
Core Paper 4. Microbiology and Immunology				
Batch 2024 - 2025	Hours/Week 5	Total Hours 75	Credits 4	Employability

Course objectives

1. To aware the knowledge of microorganisms in water, soil, sewage and human body and sterilization techniques
1. To observe the importance of microorganisms in agriculture, food processing and medicine
2. To inculcate the basic knowledge of immunology and disorders in human being

Course outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**COI**	Outline the classification, importance and application of microorganisms
	CO2	Observe the role of microorganisms on food processing, environment, microflora on human health and disinfectation methods
	CO3	Illustrate the students pathology and microbial response.
	CO4	Analyse the techniques for the infectious disease diagnosis
	CO5	Make awareness of immunity and immune response.

Programme Code: 06	**M.Sc., Zoology**			
Core Paper 5. Molecular Genetics				
Batch 2024 - 2025	Hours/Week 5	Total Hours 75	Credits 4	Employability

Course Objectives

1. To get knowledge about the components of genetic material.
2. To know about genome and their role in inheritance
3. To understand the relation between genes and diseases.

Course Outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**CO1**	Get knowledge about the structure, organization and functions of genetic materials.
	CO2	Understand the expression, regulation and mutation of gene.
	CO3	Apply the knowledge on the role of genes in heritability and its measurements
	CO4	Analyze the importance of viral oncogenes, regulation of gene expression and signal transduction by oncoproteins.
	CO5	Evaluate the knowledge on inheritance, gene mapping and genetic disorders.

Programme Code: 06	M.Sc., Zoology			
Core Paper 6. Biostatistics and Research Methodology				
Batch 2024 - 2025	Hours/Week 5	Total Hours 75	Credits 4	Skill development

Course Objectives

1. To Creates awareness on collection, analysis of data and interpretation of results.
2. To Describe the statistical methods and probability distribution relevant for Molecular data analysis
3. To know the methodology of research and skill development for report writing.

Course Outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**CO1**	Describe the tools of Biostatistics and Bioinformatics
	CO2	Understand the data collection methods, test of significance and the Biological databases
	CO3	Apply the knowledge in Biostatistics and Bioinformatics tools to analyse the Biological data
	CO4	Analyze the various techniques in the biological research
	CO5	Evaluate the knowledge on identifying the research problems, interpretation and reporting

Programme Code: 06	**M.Sc., Zoology**			
Core Practical I. Comparative Anatomy of Invertebrates and chordates, Animal Physiology and Cell and Molecular Biology				
Batch 2024 - 2025	Hours/Week 5	Total Hours 150	Credits 3	Employability

Course Objectives

1. To acquire knowledge on the morphological features of Invertebrates and chordates
2. To determine the physiological action in relation to temperature, pH and osmotic pressure.
3. To gain practical knowledge about primary metabolites and its estimation in higher organisms.

Course Outcomes

On successful completion of course the students will be able to

K3 to K5	**CO1**	Get knowledge about the role of morphological features of invertebrates and chordates.
	CO2	Understand about the physiological changes in relation to temperature, pH and Osmotic Pressure.
	CO3	Apply the practical knowledge on Animal Physiology, Cell and Molecular Biology and Molecular Genetics techniques.
	CO4	Analyze the knowledge on primary metabolites in higher organisms.
	CO5	Evaluate the student's knowledge on physiological and Cell and Molecular Biology parameters.

Programme Code: 06	**M.Sc., Zoology**			
Core Practical 2. Microbiology and Immunology, Molecular genetics, Biostatistics and Research Methodology				
Batch 2024 - 2025	Hours/Week 5	Total Hours 150	Credits 3	Employability

Course Objectives

1. To gain knowledge on microbial culture techniques and importance of immune system response.
2. To apply the molecular genetic techniques and its applications in biology.
3. To acquire knowledge on the importance of statistics, interpretation ofthe biological data and report writing.

Course Outcomes (CO)

On successful completion of course the students will be able to

K3 to K5	**CO1**	To understand knowledge on various microbial cultural techniques.
	CO2	To acquire knowledge on immuno techniques.
	CO3	To apply the practical knowledge on Molecular Genetics techniques.
	CO4	To analyse the knowledge on data collection.
	CO5	To interpret and evaluate the data using statistical tool.

Programme Code: 06	**M.Sc., Zoology**			
Core Paper 7. Entomology				
Batch 2024 - 2025	Hours/Week 5	Total Hours 75	Credits 5	Employability

Course objectives

1. To enrich information about the taxonomic position of Insects.
2. To inculcate knowledge on morphology, anatomy, and physiology of insects.
3. To upgrade knowledge about the economics of beneficial insects, pests of agriculture, stored grain pests and their control measures.

Course outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**COI**	Classify insects up to order
	CO2	Understand the anatomy and physiology of Insects.
	CO3	Apply the knowledge on physiology, reproduction biology and Endocrine system of insects.
	CO4	Analyze the economics of beneficial insects.
	CO5	Provide knowledge about the control and management measures of Insect pests.

Programme Code: 06	**M.Sc., Zoology**			
Core Paper 8. Evolution				
Batch 2024 - 2025	Hours/Week 5	Total Hours 75	Credits 5	Employability

Course Objectives

1. To understand the evolutionary significance.
2. To understand the concept and mechanisms of Evolution.
3. To study the various phyletic evolution and adaptive radiation

Course Outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**CO1**	Understand the significance of Evolution
	CO2	Knowledge on Evolution process
	CO3	Apply the methods of calculating Zoological Time Scale
	CO4	Analyze the comparative anatomy and physiological systems evolution
	CO5	Evaluate the student's to acquire knowledge on evolution process

Programme Code: 06	**M.Sc., Zoology**			
Core Paper 9. Developmental Biology				
Batch 2024 - 2025	Hours/Week 4	Total Hours 60	Credits 5	Employability

Course objectives

1. To learn about the developmental stages of an embryo.
2. To obtain the knowledge of fertilization and differentiation of mammals.
3. To understand the organogenesis, nutrition, regeneration and teratogenesis of mammals

Course outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**COI**	Explain about the spermatogenesis oogenesis and ovulation in human
	CO2	Assess the knowledge on embryonic nutrition
	CO3	Distinguish various organs and physiology of Human
	CO4	Experiment the mechanism of induction, major events during regeneration and teratogenesis
	CO5	Explain the mechanism of fertilization, metabolic activities and molecular changes in cleavage process in human

Programme Code: 06	**M.Sc., Zoology**			
Core Paper 10. Environmental Biology and Toxicology				
Batch 2024 - 2025	Hours/Week 6	Total Hours 75	Credits 5	Employability

Course Objectives

1. To create awareness about the environmental quality and monitoring.
2. To obtain information about various toxicants and their impacts in the environment.
3. To enrich the students on environmental quality measures and environmental laws.

Course Outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	CO1	Explain the biosphere.
	CO2	Understand the various types of pollutants, their impacts on the terrestrial and aquatic environment, animals and Human beings, and control and management measures.
	CO3	Explain the energy flow, natural resources and their conservation.
	CO4	Analyse the knowledge in monitoring the quality of the environment and to promote bioremediation. Analyze and evaluate the toxicity of pollutants on living organisms.
	CO5	Evaluate the quality management and awareness of the environment.

Programme Code: 06	**M.Sc., Zoology**			
Core Paper 11. Aquaculture				
Batch 2024 - 2025	Hours/Week 5	Total Hours 75	Credits 5	Entrepreneurship

Course Objectives

1. To explore the aquatic resources of the edible and economically important organisms.
2. To make use of the inland waters and marine potential to substitute the protein requirements by the human population.
3. To provide self employment opportunities and knowledge for students.

Course Outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**COI**	Get knowledge about the production of cultivable candidate fish species
	CO2	Understand the global, national, traditional and modern techniques related to fishes for food security
	CO3	Apply practical knowledge into the aquaculture field to enhance production level
	CO4	Analyze students theoretical and technical knowledge useful for teaching, research, extension and entrepreneurship in the field of Aquaculture
	CO5	Evaluate the student's theoretical and technical knowledge useful for teaching, research, extension and entrepreneurship development.

Programme Code: 06	**M.Sc., Zoology**			
Core Paper 12. Endocrinology				
Batch 2024 - 2025	Hours/Week 5	Total Hours 60	Credits 4	Employability

Course Objectives

1. To make the students learn the objectives and scope of Endocrine system.
2. To understand the general principles of endocrinology.
3. To get knowledge about the structure and functions of various endocrine glands and its hormones.

Course Outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**CO1**	Acquire knowledge of the hormones and its role in coordination of activities in the biological systems.
	CO2	Understand the structure and functions of pituitary glands.
	CO3	Apply the knowledge on physiological mechanism of Thyroid, parathyroid and its role in metabolism.
	CO4	Analyze the hormonal regulation of Adrenal glands and pancreas.
	CO5	Evaluate the hormonal control of reproductive cycles.

Programme Code: 06	**M.Sc., Zoology**			
Core Practical. 3 - Entomology, Evolution and Developmental Biology				
Batch 2024 - 2025	Hours/Week 5	Total Hours 150	Credits 3	Employability

Course Objectives

1. To learn the morphology, anatomy and physiology of Insects and its role in crop production.
2. To explore and understand the evolutionary significance of different animals.
3. To study the developmental stages of embryos in animals.

Course outcomes (CO)

On successful completion of course the students will be able to

K3 to K5	**CO1**	To study the taxonomy of Insects and their importance, evolutionary significance in animal kingdom and the basic Concepts of embryo development.
	CO2	To familiarize the methods adopted to identify the insects
	CO3	Acquire the knowledge on pest control practices and the importance of beneficial insects in crop production.
	CO4	Analyse the process of embryo development and chromosomal analysis during the development of embryos. Understand the evolution of Human.
	CO5	Evaluate the impact of different insects on crop production and influence of various factors on development of embryos. Exploring the different species of animal group in the museum.

Programme Code: 06	**M.Sc., Zoology**			
Core Practical 4 - Environmental Biology and Toxicology, Endocrinology, Aquaculture				
Batch 2024 - 2025	Hours/Week 5	Total Hours 150	Credits 5	Employability

Course Objectives

1. To observe the quality of the water and soil.
2. To study the biological importance of endocrine glands in vertebrates.
3. To know the toxicity testing methods and students to Pollution Control Board and wetlands.

Course Outcomes (CO)

On successful completion of course the students will be able to

K3 to K5	**CO1**	Get knowledge in determining the physical characteristics of the water and soil.
	CO2	Understand the importance of endocrine glands in vertebrates.
	CO3	Apply the toxicity of pollutants on animals and to expose the students in the field study.
	CO4	Analyse the qualitative analysis of pollution indicator organisms in aquatic environment.
	CO5	Evaluate the water quality parameters in pond, river and sewage.

Programme Code: 06	**M.Sc., Zoology**			
Core Project Work and *Viva - Voce*				
Batch 2024 - 2025	Hours/Week	Total Hours 75	Credits 2	Skill development

Course Objectives

1. To acquire the basic knowledge about research and carry out research problems in the field of zoology.
2. To explore the ability to plan, carryout innovation in project
3. To improve the knowledge on various research methods in zoology

Course Outcomes

On successful completion of course the students will be able to

K3 -K5	**CO1**	Use foundational practical knowledge to carry out research in the specified area.
	CO2	Understand the techniques to be used to carry out the specific research work.
	CO3	Apply the learned techniques to carry out the experiments and obtain the result.
	CO4	Analyse the result by using biostatistical tools and interpret the result.
	CO5	Evaluate the analysed result and conclude the study and highlight its significant outcome

MAJOR ELECTIVE PAPERS

1. Biophysics and Bioinformatics
2. Animal Parasitology
3. Wildlife Ecology and Management
4. Poultry Science and Management

Programme Code: 06	M.Sc., Zoology			
Major Elective 1. Biophysics and Bioinformatics				
Batch 2024 - 2025	Hours/Week 5	Total Hours 75	Credits 5	Employability

Course Objectives

1. To study the principle of biophysics, principles and working mechanism of bioinstruments.
2. To understand the role of instruments in biological research.
3. To Acquire the knowledge on the Biological databases and learn the impact of bioinformatics tools on molecular structure prediction and drug discovery

Course Outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**CO1**	Explain the principles and application of various instruments for biological Science.
	CO2	Understand the Knowledge on applications of instruments
	CO3	Apply the application knowledge on various instruments
	CO4	Analyse the various biological databases and its impact on molecular structure prediction
	CO5	Discuss the significance of Biostatistics and Bioinformatics tools in the biological data analysis and molecular structure prediction and drug discovery

Programme Code: 06	M.Sc., Zoology			
Major Elective 2. Animal Parasitology				
Batch 2024 - 2025	Hours/Week 5	Total Hours 75	Credits 5	Employability

Course Objectives

1. To inculcate knowledge about parasitic infectious diseases.
2. To impart knowledge on protozoan and helminth parasitology.
3. To enrich the knowledge on vector biology, immunology, genetics and molecular biology of parasites.

Course Outcomes

On successful completion of course the students will be able to

K1 TO K5	**CO1**	Discuss the role of parasites and their role in transfer of diseases
	CO2	Understand the common parasitic diseases and life threatening conditions caused by parasites.
	CO3	Apply knowledge to study the common parasitic diseases and life threatening conditions caused by helminths as regards etiology and life cycle of parasites of medical importance.
	CO4	Analyze the common diseases caused by arthropods of medical interest as regards etiology, pathogenesis.
	CO5	Illustrate the immunological and molecular methods used for diagnosis of parasitic infections.

Programme Code: 06	M.Sc., Zoology			
Major Elective 3. WildLife Ecology and Management				
Batch 2024 - 2025	Hours/Week 5	Total Hours 75	Credits 5	Employability

Course objectives

1. To understand and appreciate biodiversity and the Act to protect the wild species.
2. To learn different techniques to study wildlife and develop knowledge ofthe benefits of the ecosystem.
3. To get knowledge about various methods to conserve biodiversity.

Course Outcome

On successful completion of course the students will be able to

K1 - K5	**COI**	Discuss the various components of an ecosystem.
	CO2	Understand the wildlife management in India and National Parks and Sanctuaries.
	CO3	Describe the Biodiversity hotspots, Endangered species and their Protection
	CO4	Analyse the importance of ecosystem services in the environment.
	CO5	Evaluate the Wild life management Techniques and animal plant interaction.

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Programme Code: 06	M.Sc., Zoology			
Major Elective 4. Poultry Science and Management				
Batch 2024 - 2025	Hours/Week 5	Total Hours 75	Credits 5	Employability

Course objectives

1. Make the students to develop knowledge on the history and the role of poultry in rural development and its structure.
2. Students can learn the methods of rearing, breeding and production of poultry.
3. Get the knowledge about the preparation of feed antibiotics, vaccines and marketing.

Course Outcomes

On successful completion of course the students will be able to

K1 -K5	**COI**	Get the knowledge about the importance of poultry farming
	CO2	Understand the types of poultry breeding
	CO3	Apply the knowledge in types of incubators for poultry breeding
	CO4	Analyze the importance of poultry marketing
	CO5	Evaluate the advanced methodology in the poultry management

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NON-MAJOR ELECTIVE

1. Information Security
2. Clinical Laboratory Techniques
3. Nano-biotechnology
4. Human Genetics and Counselling

SUB CODE:24PGI4N2

Programme Code: 06	M.Sc., Zoology			
Non Major Elective 1 - INFORMATION SECURITY				
Batch 2024 - 2025	Hours/Week 4	Total Hours 60	Credits 4	Employability

Course Objectives

1. Students will identify the core concepts of Information security.
2. To examine the concepts of Information Security.
3. To design and implement the security features for IT and Industrial sectors.

Course Outcomes (CO)

On successful completion of course the students will be able to

K1 - K5	**CO1**	To Learn the principles and fundamentals of information security.
	CO2	To Demonstrate the knowledge of Information security concepts
	CO3	To Understand about Information Security Architecture.
	CO4	To Analyze the various streams of security in IT and Industrial sector.
	CO5	To know about Cyber Laws and Regulations.

Programme Code: 06	M.Sc., Zoology			
Non Major Elective 2. Clinical Laboratory Techniques				
Batch 2024 - 2025	Hours/Week 4	Total Hours 60	Credits 4	Employability

Course Objectives

1. Understand about clinical laboratory techniques.
2. To familiarize technical knowledge on various laboratory instruments.
3. To analyze physiochemical parameters of samples by using laboratory instruments.

Course outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**CO1**	Describe the clinical laboratory techniques
	CO2	Demonstrate about the various laboratory instruments
	CO3	Understanding sample preservation methods
	CO4	Estimation of samples in the laboratory
	CO5	Prepare report based on the sample analysis

Programme Code: 06	M.Sc., Zoology			
Non Major Elective 3 - Nano- Biotechnology				
Batch 2024 - 2025	Hours/Week 4	Total Hours 60	Credits 4	Employability

Course Objectives

1. To enhance the basic knowledge on nanoparticle synthesis and its application in agriculture..
2. To enrich nano-technological knowledge on DNA, Proteins, Nucleic acids, drug delivery and biomedicine.
3. To apply knowledge on risk assessment of nano products in environmental and health issues.

Course Outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**CO1**	Outline the fundamentals of nanotechnology and nanoparticles
	CO2	Understand the knowledge about bio-nano-materials, synthesis and its characterizations.
	CO3	Apply the various applications of bio-nano materials in different field applications like agriculture and medicine.
	CO4	Analyze the significance of bio-nano-materials to enhance the treatment of various diseases and enhancement of agriculture through nanomaterial's.
	CO5	Evaluate nano-technological knowledge on environmental and health issues.

Programme Code: 06	M.Sc., Zoology			
Non Major Elective Paper 4 - Human Genetics and Counselling				
Batch 2024 - 2025	Hours/Week 4	Total Hours 60	Credits 4	Employability

Course objectives

1. To Understand knowledge on the blood types, transfusion and diseases. 2.To know about the role of amniocentesis in Prenatal Diagnosis, dermatoglyphics and Population genetics.
3.To learn the applications of Genetic engineering and Genetic counseling

Course outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**CO1**	Describe the types, physiology and genetics of blood groups.
	CO2	Understand the importance of prenatal genetic diagnosis and roleof dermatoglyphics in criminology.
	CO3	Apply the Hardy Weinberg principle in human genetics.
	CO4	Analyze the applications of genetic engineering in medicine.
	CO5	Discuss the values of genetic counselling and pedigree chartanalysis in human life.

Programme Code: 06	M.Sc., Zoology			
EDC- Entrepreneurial Opportunity in Sericulture				
Batch 2024 - 2025	Hours/Week 2	Total Hours 30	Credits 2	Entrepreneurship

Course Objectives

1. To inculcate the Entrepreneurship and capacity building among the students
2. To train the people from low economic back ground so as to take sericulture as a prosperous avocation
3. To give knowledge about the mulberry cultivation and silk worm rearing techniques. The students will know about the laws and by laws governing keepingsilk moth.

Course Outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**CO1**	Explore the expert manpower to handle the sericulture units/corporate sector
	CO2	Understand the trained students in silkworm production techniques
	CO3	Apply sustainable rural economy by adapting sericulture for different climate condition
	CO4	Analyze the economics and marketing value of cocoons and silk
	CO5	Evaluate the entrepreneurial opportunities for rural development in Sericulture

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Programme Code: 06	M.Sc., Zoology			
JOC – ANIMALHUSBANDRY				
Batch 2024 - 2025	Hours/Week 3	Total Hours 45	Credits 2	Employability

Course objectives

1. To give an overview on the common breeds of livestock and their breeding habits.
2. To develop ideas about the various management practices and veterinary medicine.
3. To have a basic understanding of veterinary and dairy Science.

Course outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**CO1**	Remember the concept about the basic principles and production of livestock.
	CO2	Understand the basic principles of animal genetics and role of reproductive physiology in livestock production.
	CO3	Apply the knowledge to understand the feeding system and role of nutrition in animal production.
	CO4	Analyze the impact of diseases and control measures on animal husbandry practices.
	CO5	Evaluate the technical knowledge for consultancy, marketing and entrepreneurship development in the field of animal husbandry.

Programme Code: 06	M.Sc., Zoology			
ALC-Eco tourism				
Batch 2024 - 2025	Hours/Week 3	Total Hours 45	Credits 2	Employability

Course Objectives

1. Learn the importance of tourism.
2. Understand the Laws and policies related to tourism.
2. Understand the benefits of tourism.

Course outcomes (CO)

On successful completion of course the students will be able to

K1 to K5	**COI**	Get knowledge about the tourism industry
	CO2	Explain the National and International relationships with tourism
	CO3	Apply the knowledge of information technology in the tourism industry
	CO4	Familiarize about the passport and visa formalities
	CO5	Evaluate the natural disasters and their management