PERIYARUNIVERSITY

PERIYARPALKALAINAGAR

SALEM–636011

DEGREEOFBACHELOROFSCIENCE

CHOICEBASEDCREDITSYSTEM

Syllabusfor

B.SC.ZOOLOGY

(SEMESTER PATTERN)

(For Candidates admitted in the Colleges affiliated toPeriyarUniversityfrom2021-2022onwards)

DEFINITION

PROGRAMME:

"Programme"meanscoredegreesofferedinvariousdisciplines.

COURSE:

"Course"referstothecoursesofferedunderthedegreeprogrammespreadoverthecompleteProgrammeofstudy as under.

PartI - means"Tamil/otherlanguages"offeredundertheprogramme.

PartII - means"English"languageofferedundertheprogramme.

PartIII - means"thecoresubjects"relatedtotheprogramme ConcernedincludingPracticals.

PartIIIAllied - means"Alliedsubjects"offeredasallied,whichis Interdisciplinaryinnaturebutrelatedtotheprogramme.

PartIIIElectives - means"Electivesubjects"relatedtothecoresubjectsofthe programmeconcerned.

PartIV **(i)** - "Tamil"meansbasicorientationinTamillanguageforthosestudentswhoha venotstudiedTamilupto12th standard.

(ii) - "Advanced Tamil" means, the subject is meant for students whohave studied Tamil language upto 12th standard and chosen otherlanguagesincollegebutwouldliketoadvancetheirTamillangua geskills.

(iii) - "Non-Major Electives" means option is being given tostudents whodonot comeundertheabovetwo categories (i&ii).

(iv) - Skillbasedsubjectmeansthecoursesofferedundertheprogramme related to Advanced Skill acquisition for industrialapplication for which a separate Diploma will be awarded alongwiththeDegree.

"FoundationCourse"meanscoursesofferedas

(iv) -

1) EnvironmentalStudies(1st year)

2) ValueEducation-HumanRights/Women'sRights(2ndyear)

PartV - "Extension Activities" means all those activities whichform partofNSS/NCC/Sports/YRCandothercoandextracurricularactivit ies.

Adetailedexplanationoftheabovewithrelevantcreditsaregivenunder“SchemeofExaminational ongwithDistribution ofMarks andCredits”

Duration:

Means the stipulated years of study to complete a programme as prescribed by the University timeto time.Currently for the undergraduate programme the duration of studyis THREE years.Theseregulations applyto theregular courseofstudyinapprovedinstitutions oftheUniversity.

Credits:

Means the weightage given to each course of study (subjects) attributed by the experts ofthe BoardofStudies concerned.

CreditSystem:

Means, the course of study under this pattern, where weightage of credits are spread over todifferent semesters during the period of study and the Cumulative Grade Point Average will beawarded basedon the credits earned bythestudents. The followingarethetotal credit points:

ForUndergraduateProgramme(Threeyears) : 148

AIMANDSCOPEOFTHECOURSE:

1. Toacquireknowledgeindifferentareasofanimalscience.
2. The topics included indifferent units of different papers wouldenable the students to developtechnicalskillsinZoologicalandappliedbranches.
3. Skill based subjects like Poultry Science, Diary Science, Human health and hygiene, Sericulture,Apiculture,Aquaculture, BiotechnologyandClinical Nutritionhavebeenincludedinordertoprovideopportunitiesinemploymentandresearchin Governmentand PrivateOrganizations.
4. Thereisalsoscopeforselfemploymentforthestudents.
5. Practicalsincludedinthesyllabuswillimprovetheskillsofthestudentsin Microscopy,Observations,Drawin gandLaboratorytechniques.

ELIGIBILITYFORADMISSION:

Candidate for admission to the first year of the degree of Bachelor of Science Course shall berequiredto have passed the Higher secondary examination (Academic or Vocational Stream) conducted by theGovernment of Tamil Nadu or an Examination accepted by the Syndicate, Subject to such conditionsmay be prescribed therefore shall be permitted to appear and qualify for B.Sc degree examination inZoology.

DURATIONOFTHECOURSE:

Thecourseforthedegree ofBachelorofScienceshallconsistofthreeacademicyearsdividedintosixsemesters.Each semesterconsistsof90workingdays.

PASSINGMINIMUM:

Thecandidateshallbedeclaredtohavepassedtheexaminationsifhe/shesecurenotlessthan40marks .

DISTRIBUTIONOFMARKS:

THEORY

Universityexamination = 75 marksInternalassessment =25marks

INTERNALASSESSMENTSTRUCTURE:

Test =15marks

Assignments =05marks

Attendance =05marks

PassingminimumforInternalAssessment

=10marks

PassingminimumofUniversityexaminations=30marks

PRACTICALS

UniversityExaminations=60marksInternalAssessment=40marks

INTERNALASSESSMENTSTRUCTURE:

Test =15marks

Observationrecord =10marks

RegularityinPractical =15marks

Passingminimumforinternalassessment

=10marks

PassingminimumforUniversityexaminations =30marks

CLASSIFICATIONOFSUCCESSFULCANDIDATES:

- Candidateswhosecurenotlessthan60%oftheaggregatemarksinthewholeexaminationsshallbedeclaredtohavepassedtheexaminationsinfirstclass.
- Candidateswhosecureabove50%andbelow60%shallbedeclaredto havepassedtheexaminationsinsecondclass.
- Othersuccessfulcandidateswhosecurebelow50%shallbedeclaredtohavepassedtheexaminationin thirdclass.

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CourseStructure(CBCS)

FromAcademicyear2021-2022onwards

Part	CourseCode	TitleoftheCourse	Hrs. /Week	Credits	Exam. Hrs.	Marks		
						CIA	ESE	Total
SEMESTERI								
I	Language I	Tamil	6	3	3	25	75	100
II	Language II	English	6	3	3	25	75	100
		ProfessionalEnglish	2	4	3	25	75	100
III	Core I	Invertebrates	5	5	3	25	75	100
III	Practical-I	Invertebrates&Chordata	3	-	-	-	-	-
III	Allied-I	Chemistry/Botany	4	4	3	25	75	100
III	AlliedPractical	Chemistry/Botany	3	-	-	-	-	-
IV	ValueEducation	Yoga	1	2	3	25	75	100
Total			30	21		150	450	600
SEMESTERII								
I	Language II	TamilII	6	3	3	25	75	100
II	Language II	English II	4	3	3	25	75	100
II	Naan MuthalvanCourse	LanguageProficiencyforEmployability(EffectiveEnglish)	2	2	3	25	75	100
IV		ProfessionalEnglish	2	4	3	25	75	100
III	Core- II	Chordata	5	5	3	25	75	100
III	Practical-I	Invertebrates&Chordata	3	4	3	40	60	100
III	AlliedII	Chemistry/Botany	4	3	3	25	75	100
III	AlliedIPractical	Chemistry/Botany	3	3	3	40	60	100
IV	EVS	EnvironmentalStudies	1	2	3	25	75	100
Total			30	29		255	645	900
SEMESTERIII								
I	LanguageIII	TamilIII	6	3	3	25	75	100
II	LanguageIII	EnglishIII	6	3	3	25	75	100
III	CoreIII	Cellbiology	5	6	3	25	75	100
III	Practical-II	Cell Biology,Genetics,Vermiculture&Vermicomposting&Aquaculture	3	-	-	-	-	-
III	Allied III	Chemistry/Botany	4	4	3	25	75	100
III	AlliedPractical	Chemistry/Botany	3	-	-	-	-	-
IV	NMSDC	Digital Skills for Employability – Microsoft Office Essentials	2	2	3	25	75	100
IV	NMECI	Human health & Hygiene(offeredtootherDept.Students)	1	3	3	25	75	100
Total			30	21		150	450	600

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SEMESTERIV								
I	LanguageIV	TamilIV	6	3	3	25	75	100
II	LanguageIV	EnglishIV	6	3	3	25	75	100
III	CoreIV	Genetics	4	5	3	25	75	100
III	Practical-II	CellBiology,Genetics,Vermiculture &Vermicomposting&Aquaculture	3	4	3	40	60	100
III	AlliedIV	Botany/Chemistry	4	4	3	25	75	100
III	AlliedIVPractical	Botany/Chemistry	3	3	3	40	60	100
IV	NaanMuthalvan Course	Employability Skills-Microsoft	2	2	3	25	75	100
IV	NMECII	Wildlife Management (offered to OtherDept.Students)	2	2	3	25	75	100
IV	InternshipProgramme	Dairyfarm,Fishfarm/Breedingcentre,Poultryfarm,MedicalLab,NaturalEcosystem,NaturalHistoryMuseum, Sericulturefarmhouse,Apiculturefarms,Vermifarm.						
	CoreIV	Genetics	4	5	3	25	75	100
Total			30	26		255	645	800
SEMESTERV								
III	CoreV	AnimalPhysiology	5	5	3	25	75	100
III	CoreVI	Developmental Biology	5	5	3	25	75	100
III	CoreVII	Immunology&Microbiology	5	5	3	25	75	100
III	Elective I	MedicalLaboratoryTechniques(MLT)	5	5	3	25	75	100
IV	SBEC III	PoultryScience	2	2	3	25	75	100
IV	NMSDC	Advanced Technology for Employability in Life Science – Medical Coding	2	2	3	25	75	100
IV	Practical	Practical–III& IV	6	-	-	-	-	-
Total			30	24		150	450	600
SEMESTERVI								
III	CoreVIII	Environmental Biology	5	4	3	25	75	100
III	CoreIX	EvolutionaryBiology	4	4	3	25	75	100
III	CoreX	Bioinformatics, Biostatistics andComputerApplications	5	5	3	25	75	100
III	Elective II	Sericulture	4	4	3	25	75	100
IV	**NMSDC**	**Advanced Medical Coding**	**2**	**2**	**-**	**25**	**75**	**100**
IV	SBECIV	DairyScience	2	2	3	25	75	100
IV	Practical-III	AnimalPhysiology,Developmental Biology, Immunology & Microbiology,PoultryScience,&MLT.	3	3	3	40	60	100

III	Practical-IV	Environmental Biology, EvolutionaryBiology, Bioinformatics, BiostatisticsandComputerApplications, Sericulture&Apiculture.	3	3	3	40	60	100
III		ExtensionActivities		1				
V	CoreVIII	Environmental Biology	5	5	3	25	75	100
Total			33	33		230	570	800
TotalCredits:148						Total Marks:4200		

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SEMESTER-I

PERIYARUNIVERSITY,SALEM–636011

B.Sc.,ZOOLOGY

SEMESTER -
ICORE COURSE -
IINVERTEBRATE

Objectives:

Onthesuccessful completionofthecourse,students will beableto

- Describethedistinguishingcharacteristics ofthemajortaxonomy
- Explainthebasicaspects ofclassificationdetailsofinvertebrates
- Understandbiodiversity,habitat,adaptationorganizationandtaxonomicstatusofinvertebrates
- Recallcertainmorphologicalattributesandphysiologicalprocessesthataredistinctandsignific anttoeachPhyla
- Understandthesystemicand functionalmorphologyofvariousgroupsofinvertebrates
- Explainthebasicaspects ofstructuralandfunctionaldetailsofInvertebrates

UnitI

Animalkingdom–Systems ofclassificationandnomenclature-levelsof organization.
Invertebrate: Introduction,Generalcharactersandclassificationsuptoclasseswithexamples.

Phylum: Protozoa - General characters. **Type Study:** *Paramecium caudatum* – External features, Nutrition,Locomotion - effective stroke, recovery stroke, Metachronal rhythm, Reproduction – Asexual - Binary fission,Sexualreproduction–
Conjugation,Autogamy,Endomixis,HemimixisandCytogamy.**GeneralTopic:**Protozoanhumandiseases.

UnitII

Phylum: Porifera - General characters. **Type Study**: *Leucosolenia botryoides* - External features,Body wall, Spicules, Canal System, Nutrition, and Reproduction.**General Topic**: Canal System insponges.

Phylum: Coelenterata- General characters. **Type Study:** *Obeliageniculata*- Externalfeatures,Histology of the colony, Cnidoblast and its functions, Life History of Obelia, Metagenesis. **GeneralTopic:**Polymorphism inCoelentrates

UnitIII

Phylum: Helminthes - General characters. **Type Study:** *Taenia solium*- External features, Body wall,Feeding, Respiratory system,Excretory system-flame cells, Nervous system, Reproductive system,Lifecycle.**GeneralTopic:**Parasitic adaptationin Helminthes**.**

Phylum: Annelida - General characters. **Type Study:** *Megascolex mauritii* - External features, Bodywall,Coelom,Locomotion,Digestivesystem,Nervoussystem,Excretorysystem,Reproductivesystem. **GeneralTopic:**Metamerismin annelids.

UnitIV

Phylum: Arthropoda - General characters. **Type Study:** Peripatus - External features, Body wall,Digestive system, Respiratorysystem, Nervous System, Sense organs, Excretory system, Reproductivesystem.**GeneralTopic:**Affinitiesoflivingfossil.

Type study: *Periplaneta americana* - External features, Body wall, Mouthparts, Digestive system,Respiratorysystem, Nervous system,Senseorgans,Excretorysystem, Reproductivesystem.
GeneralTopic: BeneficialInsects.

UnitV

Phylum:Mollusca-Generalcharacters.**TypeStudy**:*Pilaglobosa*-Externalfeatures,Shell,Digestivesystem,Respiratorysystem,Circulatorysystem,Nervoussystem,Senseorgans-Eyes,Osphradium,Statocyst, Tentacles, Excretorysystem**. GeneralTopic**: Torsionin Mollusca**.**

Phylum:Echinodermata-Generalcharacters.**TypeStudy:***Asteriasrubens*-Externalfeatures,Pedicellaria-Structure and Function, Digestive system, Water vascular system, Circulatory system-PerihaemalandHaemalsystem,Nervoussystem,Senseorgans,Excretorysystem,Reproductivesystem.**GeneralTopic**:Larvalforms ofEchinoderms**.**

CourseOutcomes:

- Tocompareandunderstandthegeneralandspecificcharacteristics withineachPhyla
- Interprettheaffinities,evolutionaryrelationshipsandadaptationofthemajortaxaandtoexplaintheireconomicimportancewith respect to Non-Chordates

ReferenceBooks

- Jordan.E.L and Verma.P.S, Invertebrate Zoology Revised Edn., S.Chand and Co. Ltd. Ram Nagar,NewDelhi, 2014.
- N. C. Nair, N. Soundara Pandian, S. Leelavathy, T. Murugan, A Text Book of Invertebrates, SarasPublications,2013.
- Dhami P.S. and Dhami J.K, Invertebrate Zoology 5 th edition S. Chand & Co., New Delhi, 2012.EkambaranathaAyyar,M.&Ananthakrishnan,T.NManual of Zoology Vol-I (Invertebrata) PartI &IIVishwanathan(p)Ltd.Chennai,2010
- Kotpal R.L., Agarwal S.K and Ketarpal R.P.R, Modern Text Book of Zoology – Invertebrates,RastogiPublications,2011.

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SEMESTER–II

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B.Sc.,ZOOLOGY

SESTER - II
CORECOURSE-II

Objectives:

CHORDATA

- Tounderstandwhatthechordatesare.
- Tounderstandthetaxonomicpositionofchordates.
- Tounderstanddifferentcategoriesofchordates.
- Tounderstandthe generalcharactersofchordates.
- Tounderstandsthelevelsoforganizationinchordatesubphylum.
- Tounderstandtheoriginandevolutionaryrelationshipindifferent subphylum ofchordates.

UnitI

Chordata: Introduction,General characters and Classification of Chordata.**Prochordata**:Generalcharactersandclassificationuptoorderswiththenameoftheexamples.**Typestudy**:Amphioxus-Externalfeatures-DigestiveandExcretorysystemAgnatha: Petromyzon - External morphology; Ammocoetes Larva. **General Topic**: Affinities ofAmphioxus.

UnitII

Pisces: GeneralcharactersPisces**.Typestudy:**Scoliodon(Shark)-Externalcharacters-Placoid scales- Digestive system Respiratory system - Receptor Organs - Urinogenital system.**GeneralTopic**: Migration offishes

UnitIII

Amphibia: Generalcharacters.**Typestudy**:Frog-Structureandorganization(Excludingskeletal system) **General Topic**: Parental care inamphibia.**Reptilia:**Generalcharacters.**Typestudy**-Calotes-Structureand Organization (Excluding skeletal system).**General Topics**:Identification ofpoisonous andnon-poisonous snakesofSouthIndia

UnitIV

Aves: General characters. **Type study:** Pigeon - External characters-Flight muscles-Digestivesystem,Respiratorysystem,Urinogenitalsystem.**GeneralTopics**:1.MigrationofBirds 2.FlightadaptationsinBirds.

UnitV

Mammalia: Generalcharacters.**Typestudy**:Rabbit–Externalmorphology–Digestivesystem–Respiratorysystem-StructureofHeartandBrain-Reproductivesystem.**GeneralTopics**: 1. Adaptations ofaquaticmammals.2.Dentition in mammals

Courseoutcomes:

- Thiscoursewillbehelpful tostudenttohaveoverallunderstandingofvarious chordates.
- Describeuniquecharactersofurochordates,cephalochordatesandfishes.
- Recognizelifefunctionsofurochordatestofishes.
- Understandtheecologicalroleofdifferentgroupsofchordates.
- Theknowledgegainedfromthissubjectwillbehelpfulforstudentstorealizethesignificance ofAnimalSciences.

References:

- EkambaranathaAyyar,M.andT.N.Ananthakrishnan.AManualofZoologyVol.II(chordate). S.Viswanathan (Printers and Publishers) Pvt.Ltd.,Chennai. Alexander, R.M. TheChordatesCambridgeUniversityPress.
- JordanE.L.andP.S.Verma.ChordataZoology(11thEdition).S.ChandandCompanyLimited,7361 RamNager, Qutab Road,New Delhi-110 055.
- Kotpal.R.L.ModemTextBookofZoology-vertebrates.RastogiPublications,Gangotri,ShivajiRoad,Meerut-250002.
- Nigam,H.C.,1983.ZoologyofChordates,VishalPublications,jalandhar - 144008,942.
- NewmanH.H.1981ThePhylum Chordata,SatishBookEnterprise,Agra-282003,477pp.
- Parker and Haswell, 1964. Text Book of Zoology, Vol II (Chordata), A.Z.T,B.S. PublishersandDistributors,New Delhi-110 051, 952 pp
- Waterman, Allyn J. et al., 1971. Chordate Structure and Function, Mac Millan & Co., NewYork,587 pp.

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B.Sc.,ZOOLOGY

PRACTICAL-IINVERTEBRATE&CHORDATA

Courseobjectives

- Thestudentwilldemonstratean understandingof,andbeable
- To identifyindetail,theanatomicalcharacteristicsofmembersofInvertebratesandphylumChordata.
- Toclassifyoftheontogenic andphylogenic relationshipsofInvertebratesandphylumChordata.

DISSECTION

1. Cockroach-Digestivesystem
2. Prawn-Nervoussystem
3. Fish–DigestiveSystem

MOUNTING

1. Mouth parts ofHousefly, Honeybee,Mosquito
2. Bodysetaeof Earth worm
3. Fish-Ctenoidscales.

SPOTTERS

A. Classifygivingreasonsuptoorder:

Paramecium,Aurelia,Fasciola,Ascaris,Lamellidens,Asterias,*Balanoglossus,Branchiostoma(Amphioxus) ,Petromyzon,Ranahexadactyla,Calotes versicolor,Columbalivia.*

B. Drawlabelledsketches:

Obeliamedusa,Ephyralarva,Redialarva,Cercarialarva,Mysis larva,Bipinnarialarva

C. CommentonBiologicalsignificance:

Plasmodium,Obeliacolony,Physalia,Fasciola–Miracidium,Taenia–Matureproglottid,Chaetopterus,Peripatus,Hirudinaria,Limulus,Chiton,Sepia,Octopus,*Anabasscandens, Clariasbatrachus,Hippocampus,Echeneis,Ichthyophis,Axolotlelarva,Chamaeleon,Viperarusselli(Russe l'sviper),Dracovolans,Bat.*

D. CommentonStructure/Skeleton/ Palate/ Dentition:

Sponge–Spicules,Sponge–Gemmule,Taenia–Scolex,Neris–Parapodium,Penaeus–Petasma,Starfish–Pedicellaria,*Rana*–Pectoralgirdle,*Rana*-Pelvicgirdle, Rabbit–Dentition.

CourseOutcomes.

- Trainingexperiencein anatomythrough simpledissectionand mounting.
- Familiarizationwithconventionalorgansystemindifferentanimals.
- Identifyand studypreservedspecimens of variouseconomicallyimportantanimals.

Suggestedmanuals:

1. PracticalZoology-InvertebratesS.S.Lal
2. PracticalZoology-InvertebratesP.S.Verma
3. Practical Zoology-InvertebratesK.P.Kur

SuggestedReferences:

- Barnes,R.D.(1982).InvertebrateZoology,VEdition.HoltSaundersInternationalEdition.
- Barnes,R.S.K.,Calow,P.,Olive,P.J.W.,Golding,D.W.andSpicer,J.I.(2002).TheInvertebr ates:ANewSynthesis,IIIEdition, Blackwell Science
- Barrington,E.J.W.(1979).InvertebrateStructureandFunctions. IIEdition,E.L.B.S.andNelson
- Boradale,L.A.andPotts,E.A.(1961).Invertebrates:AManualfortheuseofStudents.AsiaPublishingHom e
- Kardong,K.V.(2005)Vertebrates"ComparativeAnatomy,FunctionandEvolution.IVEdition.McGraw-HillHigher Education.
- Kent,G.C. andCarrR.K.(2000).ComparativeAnatomyoftheVertebrates.IXEdition.TheMcGraw-HillCompanies.
- Hilderbrand,MandGaslowG.E.AnalysisofVertebrateStructure,JohnWileyandSons.4Walter, H.E.andSayles,L.P;BiologyofVertebrates,Khosla PublishingHouse.
- ClevelandP.Hickmanet.al.(2008).AnimalDiversity,McGraw-Hill HigherEducation
- Kotpal(2015).ModernTextbookofZoologyVertebrates,Rastogi publishers,NewDelhi
- Saxena,R.K.andSaxena,S.(2015).Comparative AnatomyofVertebrates,VivaBooks,Delhi
- JordanE.L.andVermaP.S.(2010).ChordateZoology,S.Chand&Co,NewDelhi.

B.Sc.ZOOLOGY

SEMESTER–III

PERIYARUNIVERSITY,SALEM–636011

B.Sc.,ZOOLOGY

SEMESTER
IIICORE COURSE
IIICELLBIOLOGY

CourseObjectives:

- Tounderstand thestructures andpurposesofbasiccomponentsofprokaryoticandeukaryoticcells,especiallymacromolecules,membranes,andorganelles
- Tounderstandhowthesecellularcomponentsareusedtogenerateandutilizeenergyincells
- Tounderstandthecellularcomponentsunderlyingmitoticcelldivision.
- Tounderstandresponsestoenvironmentalor physiologicalchanges,oralterationsofcellfunctionbroughtabout bymutation.
- Tounderstandtheprocessofcelldivision inbothsomaticandgermcell.

UnitI

The Cell: Ultra structure of Animal cell - Cytoplasm - Structure and Composition, Function - ExtraCytoplasmic Structure – Cilia, Flagella - Cytoplasmic Inclusions. Human Blood Cells – RBC andWBC.

UnitII

Cell components: Plasma Membrane Ultra Structure - Different Models - Functions - Structure andFunctions-
Endoplasmicreticulum,Ribosomes,GolgiComplex,Lysosomes,Centrioles,andMitochondria.

UnitIII

Nucleus: Ultrastructure,CompositionandFunctions-NuclearMembrane-Nucleoplasm-Chromosomes-HeterochromatinandEuchromatin-Nucleolus-DNAandRNAs-ProteinSynthesis.

UnitIV

Cell Divisions: Types - Amitosis, Mitosis and Meiosis and their Significance - Cancer, Ageing ofCellsandStem cell studies.

UnitV

Tools and Techniques: Cell Fractionation, Homogenization Centrifugation and Isolation of sub-cellular Components.Biochemical Techniques - Cell Culture Techniques. Histological Techniques - Staining - Vital Stains - Cytoplasmic and Nuclear Stains.Microscopes - Types – Light and Electronmicroscope.

CourseOutcomes:

- Ableto describethefunction and thecompositionoftheplasmamembrane.
- Ableto explaintheprinciplesofthecelltheory.
- Abletodifferentiatebetweenprokaryotesandeukaryotes.
- Abletounderstand theimportanceofthenucleus and itscomponents.
- AbletounderstandhowtheendoplasmicreticulumandGolgiapparatus interactwithoneanotherandknow with whichotherorganelles theyareassociated.
- Abletoidentifythethreeprimarycomponentsofthecell‟scytoskeletonandhowtheyaffectcellshape,function andmovement.

REFERENCEBOOKS

- AjayPaul.,2011. CellandMolecularBiology.BooksandAlliedPvt, Kolkata.
- Powar,C.B.,2002.Cell Biology.HimalayaPublishingHouse.
- Cohn,N.S.,1979,ElementsofCytology,FreemanBookCo.,NewDelhi.
- VeerBalaRastogi, Introductorycytology.KedarNathRamNath.Meerut250001.
- Bhaskaran,K.K.&Biju Kumar,A.:CellBiology, Genetics&MolecularBiology.
- VijayakumaranNair,K.&Jayaprakash,M.:CellBiology,Genetics,MolecularBiology.Academica,TVM.
- Verma&Agarwal(2006)CellBiology,Genetics,MolecularBiology,Evolution&Ecology,S.Chandpublishers

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SBEC-I
VERMICULTUREANDVERMICOMPOSTING

CourseObjectives:

- Torecallandrecognizeearthwormdiversity.
- Togetknowledgeonorganicfarmingandwastemanagementusingvermitechnology.
- Tounderstandthevermiculturetechniques.
- Toapplyknowledgeonvermicompost preparation.
- Toawarethesignificanceofsustainableagricultureandorganicfarming.
- Toinoculatebasic knowledgeonrecyclingofbiodegradablewasteofdifferent kinds.
- TounderstandthevalueofVermitechnologyanditssignificance.

UnitI

Vermiculture: Vermiculture process – Site selection - Selection and collection of species mono andpolyculture-Essentialparametersforvermi–bedding.Methodsofharvesting-generalmanualmethods,self-harvestingmethod, mechanical method.

UnitII

Vermi-technology: Scope of vermiculture and vermicomposting – difference between vermicultureandvermicomposting.Vermi-tech practices inIndia.

UnitIII

Earthwormdiversity: Ecologicalgroupsofearthworms,biologyofcompostingearthworms–*Eoisenafoeitida,Eudriluslugeniae.*

UnitIV

Soil and Organic waste sources: Soil – Physical, chemical and biological features, Organic wastesources–problemsintraditionalcomposting, Types,small andlargescale pitmethod,heapmethod.

UnitV

Vermicompost: Nutritive value of vermicompost, storing and packing of compost - Applications ofvermicompostinagriculturalandhorticulturalpractices-Economicimportanceofvermiculture,Nationalizedbank support (NABARD)forvermiculture.

CourseOutcomes:

- Getknowledgeaboutthe characteristicsandroleofearthworminsustainableagriculture.
- Getknowledgeonthesignificanceofearthworms.
- Understand the importanceof wastedegradationbyeco-friendlymethod.
- Applythe significanceofVermicompostingmethods.
- Applyknowledgeon commercializationofVermiproducts.
- ExpertiseinVermicultureTechniques
- CreatingOpportunitiesforselfemployment

ReferenceBooks:

- EarthwormecologybyLEE
- BiologyofearthwormbySteven son
- Vermicompostingtech–soilhealth tohumanhealthbyRanganathanL.S.
- TripathiG,Vermisource Technology,DiscoveryPublishingHouse,2003
- Ranganathan,L.S.,VermicompostingTechnology–FromSoilHealthtoHumanHealth,2006.

- Bhatnagar,R.K.andPalta,R.K.,(1996).VermicultureandVermicomposting.KalyaniPublishers,NewDelhi.
- ArunK.Sharma.(2002).AhandbookofOrganic Farming,Agrobios,Jodhpur,India
- TheEarthwormbook,S.A. Ismail. OtherIndiapress,Goa-403507,India(2005).
- GuptaP.K.(2008).VermicompostingforSustainableAgriculture.Agrobios.India.
- Edwards,C.A.andJ.R.Lofty(1977)"BiologyofEarthworms"Chapmanand HallLtd.,London.
- Lee, K.E. (1985) "Earthworms: Their ecology and Relationship with Soils and LandUse",AcademicPress,Sydney.
- Satchel,J.E.(1983)."EarthwormEcology",ChapmanHall,London

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NMEC–I
HUMANHEALTH ANDHYGIENE

CourseObjectives:

Onthecompletion of thecoursethelearnerwill beableto,

- understandtheclassification ofnutrients
- gainknowledgeon theintakeofbalanceddiet andthesignificanceoffood
- listthecommondeficiencydisorders,theircauses,symptoms andrecommendedfoodsources
- evaluatetheimportanceofabalanced diet
- understandthetypes ofabusesandassociatedbehaviouralchanges.
- knowthecausesfordrug,tobacco andalcoholaddiction anditseffects onhealth.
- analysethepossiblewaysofde-addiction.
- knowaboutthediseasesanddisordersassociatedwith lifestylemodification.
- explaintheunderlyingcauseandsymptomsfordiabetes,obesity,cancerandAIDS.

UnitI:PhysicalHealth

Health & Hygiene: Meaning, Definitions, Significance. **Nutrition:** Classification and functions offood,sourcesandrequirementofCarbohydrates,Proteins,Fats,VitaminsandMinerals,Malnutrition,Balanced diet.

UnitII:Water,Air,LightandNoise.

Water: Criteria for water quality standards, householdpurification.**Air**:Healtheffectsof airpollution, prevention and control. **Ventilation** – Standards of ventilation, **Light** – The requirementsofgoodlighting,**Noise**:Effects of noiseexposure.

UnitIII:Pathogens

Dimensions and Determinants of health, Indicators of health– Characteristics of indicators, Typesofindicators, Diseaseagents– Classificationofdiseaseagents- water,air,vectorborne.

UnitIV:MentalHealth

ConflictsandFrustration,Depression,Mentalillness–Majorandminorillnesses-Socialpathologicalcauses.Defense Mechanisms,Guidanceand Counselling.

UnitV:PersonalHygiene

DentalCare,Eyecare,Earcare andSkincare.Diabetes,Obesity andCancer.AwarenessonAlcoholism,Smoking, Tobaccochewing,DrugAbuseandAddiction,STD-AIDS.

CourseOutcomes:

Afterthecompletion of thecoursethestudentwillbeto,

- Getanopportunitytowork inthefieldofhealthdepartment,NGOs.
- DohigherlearninginteareaofParamedicalcourses.
- Confirm thequalityand standards ofwater,air,light,sound.
- Suggestremedial measuresforpreventionandcontrolofthesediseasesanddisorders.
- Create awarenessamongtheindividuals inthe societytolead healthylife.

TextBooks:

1. Park,J.E.andPark.2000.Textbookofpreventiveandsocialmedicine,17th Edition,Banarasidas Publishers,Jabalpur.
2. Murugesh,N.2002.Healtheducationandcommunitypharmacy,3rdEdition,SathyaPublishers,Madurai.
3. EdwardPSarafinoandTimothyW.Smith.2012,HealthPsychology,InternationalStudentVersio7thEdition, WileyIndia(P)Ltd, New Delhi.
4. Srilakshmi,B.Dietetics,2014,7thMulti-colorEdition,NewAgeInternationalPublishers,NewDelhi.
5. SathyanarayanaU. Biochemistry–RevisedEdition,Booksand(P)Ltd,Kolkata.

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1. SwaminathanM(1995):"Food&Nutrition",TheBangalorePrinting&publishingcoltd.,VolI,Second Edition, Bangalore.
2. Srilakshmi(1997):"FoodScience",NewAgeInternational(P)Ltd,Publishers,Pune.
3. Mudambi.R.Sumathi&RajagpalM.V(1983),"Foods&Nutrition",WilleyEasternLtd,Second Edition,New Delhi.
4. Thangam.E.Philip(1965):ModernCookery,OrientLongman,IIedition.VolII,Bombay.
5. ShubhanginiA.Joshi,(1992)""NutritionandDietetics"TataMcGrow-HillpublishingCompanyLtd,NewDelhi.
6. Srilakshmi.B–"NutritionScience",VEdn,New AgeInternational(P) Ltd,Publishers,Chennai.
7. Tortora.JandFunk.R.,(2008),MicrobiologyanIntroduction,9thedition,PearsonEducationinSouth Asia.
8. WinwoodR.S.and SmithJ.L.,Sear"sAnatomyand PhysiologyforNurses,6thEdition,EdwardArnoldandJaypeeBrothers.

B.Sc.ZOOLOGY

SEMESTER–IV

SEMESTER –
IVCORE COURSE –
IVGENETICS

CourseObjectives:

- ➢ Toknowhowthebehaviorofchromosomesduringmeiosiscanexplainby Mendel‟slaw.
- ➢ Tounderstand howinheritance patterns areaffectedbypositiononchromosomes.
- ➢ Tomakeoutthesimilaritiesanddifferencesbetweenhowgeneticinformationispassedoninprokar yotesandeukaryotes.
- ➢ Tounderstandgeneinteractions.
- ➢ Tounderstandthechemicalnatureofheredity.

UNITI:

Introduction to Genetics, Mendel's experiment, Alleles, Backcross, Test cross, Laws of heredity.Monohybrid and Dihybrid. Interaction of genes – complementary, epistasis, lethal genes in man,Multiplealleles –HumanBloodgroupingsystem - Rh factor, Erythroblastosisfoetalis.

UNITII

Linkage – complete, incomplete.Crossing over - Chromosomes map - Sex determination in man andDrosophila. Sex linked Inheritance in man – Haemophilia, Colour Blindness, Animal breeding: – Inbreedingand out breeding, heterosis.

UNITIII

Mutation - Types of mutation- gene mutation - mutagens – Chromosomal abnormalities – autosomeandsexchromosomes–klinefelterssyndrome,Turner‟ssyndromeandDown‟ssyndrome.

UNITIV

Karyotyping, idiogram,Simple Mendelian traits in man– twins.Inbornerrors ofmetabolism– phenylketonuria,Alkaptonuria, Albinism,Sickle–Cell anaemia.PedigreeAnalysis.

UNITV

Vectors: Plasmids and Viral vectors - Recombinant DNA technology - Human Genome project – Gene structure and functions – Genetic engineering – Genetic application of bacteria, structure andlifehistoryof*T*4 phage.

Courseoutcomes:

➢ Comprehensiveanddetailedunderstandingofthechemicalbasisofheredity.

➢ Understandingabouttheroleof geneticsinevolution.

➢ Theabilitytoevaluateconclusionsthat arebasedon genetic data.

➢ Theabilityto understandresults ofgeneticexperimentationinanimals.

ReferenceBooks:

1. Strickberger:Genetics(MacMillan).
2. Farnsworth:Genetics(harperandRow).
3. P.K.Gupta:Genetics(RastogiPublications)
4. P.S.VermaandAgarwal:Genetics(S.Chand&Co.Ltd.)
5. Altonburg,E:Genetics(Oxford&IBHpublishingcompany)
6. BurnsG.W.:TheScienceofGenetics(MacMillan)
7. A.C.Pai:Foundations ofGenetics(McGaw–Hill)
8. J.A.Serra:ModernGenetics(3volumes)
9. Sinnot,DunnandDobzhansky:PrinciplesofGenetics(McGrawHill)10.

Gardener:Principles of Genetics.

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B.Sc.,ZOOLOGY

SBEC

IIAQUACULTU

RE

Courseobjectives:

- Toknowthebasicprinciplesofaquaculturefarming.
- Toacquiretheknowledgeabout thewaterqualityparameters.
- Tounderstand thefunction ofindividualnutritivecomponents.
- Toknowthecultivablefishproductionforsustainableaquaculturefarming.
- Tostudythemicrobial infective defencemechanism andtheirdisease management.

UnitI:Introduction toAquaculture

Aquaculture - Scope and Definition, History of aquaculture, origin and growth. Types of aquaculture – Intensive, Semi-intensive, Extensive, Monoculture, Polyculture, Integrated fish farming (Compositefishculture,Paddy-fishculture, Duck-fish culture, Pig–fishculture), PenandCageCulture.

UnitII:FarmManagement

Selectionofsites-waterqualitymanagement(temperature,dissolvedoxygen,pH,alkalinity,hardness,ammonia,andnitrites)-watersupplyanddrainage-Constructionofdifferentponds(Nursery,Rearingand Stockingponds) -pond structure(size,shape,depthetc.).

UnitIII:Feed Technology

Live feeds - Rotifer and brine shrimp Artemia. Artificial feeds – formulation, types, and nutritiveimportance.Nutritionalrequirementsof cultivableFish.Feedadditives andpreservatives.

UnitIV:EconomicImportanceofFish

Cultivable species-criteria for selection, Brooders, Spawning and fry production and grow out, Cultureof fresh water fishes – Catla, Rohu and Mrigal. Mariculture – culture of shrimp (*Penaeus monodon*),edible oyster and pearl oyster. Induced breeding - Hypophysation.Preservation of fish – Smoking,Canning,andDrying.

UnitV:DiseasesManagementoffishandGovernmentAgencies

Infectiousdiseases:Bacterial,viralandFungi.HemorrhagicSepticemia(VHS).Preventionandtreatment of diseases.Role of Government Agencies – CMFRI, MPEDA, CIBA, CIFA and NFDB.Fundingagency–NABARD.

Courseoutcomes:

- Familiarizetheimportanceofaquaculturepractices.
- Acquiredthetechnologyenabledsustainableaquaculturefarmmanagement.
- Gainedknowledgeofnutritiveimportanceinfeedformulation
- Obtainedknowledgein theeconomicalaspectsoftheaquaculture.
- RelatethestrategieslearnedforthedevelopmentofAquafarmmanagement andsustainableproduction

References:

1. Jhingram,V.G.,(1982),FishandFisheriesin India,HindustanPublishingCooperation,NewDelhi.
2. James E. Lannen, R. Onealsmitherman, George tchobanologous, (1983), principles and practices ofPondAquaculture:Astateoftheartreview,PondDynamics/AquacultureCRSP,programManagementOffice,Oregonstate University,MarineScienceCenter,Newport,Oregon,USA.
3. Lucas, J.S., Southgate, P.C. and Tucker, C.S. eds. (2019) Aquaculture: farming aquatic animals andplants,JohnWiley&Sons.
4. Austin, B., Austin, D. A, (2012), Bacterial fish pathogens, 2012.,Vol. 481, p. 482. Dordrecht, TheNetherlands:Springer.
5. Lim C.E., Sessa D.J, (1995), Nutrition and Utilization Technology in Aquaculture. AOCS Press,Illinois,USA.
6. RoberstR.J,(2012),FishPathology.Wiley–Blackwell.
7. Pillay,T.V.R.&M.A.Dill,(1979),AdvancesinAquaculture.FishingNews(Books)Ltd.,England.

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NMEC –

IIWILDLIFEMANAGEMENT

CourseObjectives:

Onthecompletion ofthecourse thestudentwillbeableto

- Knowthebasic conceptandprinciplesofWildlifeManagement
- UnderstandtheEvaluationofWildlifehabitat
- Knowpopulation estimation
- AnalyseHuman–animalconflicts
- RealiseZoo‟sZoological Parks,Wildlifesanctuaries,NationalParksandTigerreserves

UnitI:WildlifeManagement:

Basic concepts and principles - Wildlife management before and after implementation of Wild Life(Protection) Act, 1972 – IUCN – CITES – NBA – IBA – Project Tiger – Project Elephant – ProjectCrocodile

UnitII:EvaluationofWildlifehabitat:

Habitat – Definition, Types ofForest habitat- basic survey techniques of habitats– Vegetativeanalyses– Point centeredquadrat, Quadrat, striptransect–Habitatmanipulation.

UnitIII:PopulationEstimation:

Basic concepts and applications - Direct count (block count, transect methods, Point counts, visualencounter survey).Indirect count (Call count, track and signs, pellet count, pugmark, camera trap,DNAfingerprintingandaerial photography).

UnitIV:Human-AnimalConflicts:

Basic concepts, reason for conflicts, Identification of damages caused by wild animals and controlmeasures.Casestudies –Elephant, gaur,wild boar, monkey, tigerand leopard.

UnitV:WildlifeSanctuaries,NationalParks&TigerReserves:

Definition – in-situ and ex-situ conservation. Sanctuaries and national parks in India - Mudumalai andPeriyarTigerReserves-NilgiriBiosphereReserve.

Courseoutcomes:

- UnderstandthevariousconceptsofWildlifeManagement
- WriteCompetitiveExaminations

References:

1. Saharia,V.B.1982WildlifeinIndia,NatarajPublishers,DehraDun
2. Seshadri,B.1986India‟sWildlifereserves,SterlingPub‟rsPvt.Ltd.,NewDelhi
3. Giles,R.H.Jr.(Ed)1984.WildlifeManagementTechniques3rdedition. ThewildlifeSociety,Washington.D.C. NatarajPublishers,Dehradun.India
4. Dasmann,Rf.1964,WildlifeBiology.John and Wileyandsons Newyork.Pp231.
5. Robinson,Wl.and Eric,G. Bolen,1984. WildlifeEcologyandManagementMacMillan

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B.Sc.,ZOOLOGY

PRACTICAL-II

CELLBIOLOGY,GENETICS,VERMICULTURE&V

ERMICOMPOSTINGN&AQUACULTURE

CourseObjectives:

Studentswillbeable,

- Countblood cellsbyusinghemocytometer.
- Identificationofdrosophilamutants.
- StudyaboutNormalKaryotyping
- Tocompostinalimitedspace anddescribethedecomposingprocess.
- Theywill alsoturntowardsorganicfarming,
- Togivethestudents thenecessarybasicinformationaboutfisheryandaquaculture.
- Todiscuss aquaticfoodprimaryproductionsystems, fisheryandaquaculture.
- Todiscussimportantfactorsforperformingasustainablefisheryandasustainableaquaculture.

MajorPractical:

1. CountingofRBCusingHemocytometer
2. CountingofWBCusingHemocytometer.
3. Mitosisin Onionroot tipsquash

MinorPractical:

Humanbloodgrouping
CommonDrosophilamutant–
EyeColourandWing.MountingofBuccal epithelial
cells.

Spotters:

1. Microscope
2. Columnarepithelium,Ciliatedepithelium,Glandularepithelium
3. Cardiacmuscle
4. Catla,Rohu,Mrigal,andTilapia
5. Vermiwash,EarthwormCocoon
6. HumanKaryotyping, Downsyndrome

ExtensionActivity:

Fieldtrip&Reportsubmission:
1.Visit Vermiculture
Unit2.VisitAquacultureF
arm

CourseOutcomes:

- Basicknowledgeonapplicationstodifferentcellstudies.
- Understandsthefundamentalgeneticstudies.
- Understandsconceptsoffisheries,fishingtoolsandsiteselection

- KnowledgeonAquaculturesystems,inducedbreedingtechniques,postharvestingtechniques
- Providesknowledgeofornamentalfishbreeding whichishighlyprofessionalandattractiveavenue

foryouth

References:

1. CelisJE(ed)(1998)CellBiology:ALaboratoryHandbook,2ndedn.SanDiego:AcademicPress.
2. PaddockSW (ed)(1999) Methods inMolecularBiology,vol122: ConfocalMicroscopyMethodsandProtocols.Totowa, NJ: HumanaPress.
3. Human Genetics and Genomics: A Practical Guide - Bahar Taneri, Esra Asilmaz, Türem Delikurt,PembeSavas,SeniyeTargen,YagmurEsemen
4. BhattJ.V.&S.R.Khambata(1959)"RoleofEarthwormsinAgriculture"IndianCouncilofAgricultural Research,New Delhi
5. Dash, M.C., B.K.Senapati, P.C. Mishra (1980) " Verms and Vermicomposting" Proceedings of theNationalSeminar on Organic Waste Utilization and Vermicomposting Dec. 5-8, 1984, (Part B), Schoolof LifeSciences, Sambalpur University,Jyoti Vihar, Orissa.
6. Kevin, A and K.E.Lee (1989) " Earthworm for Gardeners and Fisherman" (CSIRO, Australia, DivisionofSoils)
7. Wallwork,J.A.(1983)"EarthwormBiology"EdwardArnold(Publishers) Ltd.London.
8. ICAR,2013.HandbookofAnimalHusbandry,4thEd.ICARPublication, Pusa,NewDelhi.
9. Banerjee,G.C.,2006.TextbookofAnimalHusbandry8thEd.OxfordandIBHPublishingCompanyLtd.,New Delhi.
10. JagadishPrasad,2002.PrinciplesandpracticesofDairyFarmManagement,3rdEd.KalyaniPublishers ,Ludhiana.
11. Sastry,N.S.R.,C.K.ThomasandR.A.Singh,2015.LivestockProductionManagement,4thEd.Kalyan iPublishers, New Delhi.
12. Hafez, E.S. E.(1962).ReproductioninFarmAnimals.Lea& FabigerPublisher13.DunhamR.A.(2004).AquacultureandFisheriesBiotechnologyGeneticApproaches.CABI publications,U.K.

B.Sc.ZOOLOGY

SEMESTER – V

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B.Sc.,ZOOLOGY

SEMESTER -
VCORECOURSE-
V

CourseObjectives: **ANIMALPHYSIOLOGY**

- Tounderstandthestructureofthedifferent organ systemsinman/mammals.
- Tounderstandthemechanismsinvolvedinthefunctioningofthedifferent systems.
- Tostudycertain disordersthatariseasaconsequenceof physiologicalmalfunction.
- Tounderstandthemetabolicactivitiesinmammalianbody.
- Tounderstandthegaseoustransportandthestructureinvolvedingaseoustransportinmammalianbody.
- Tounderstandthevariousbiomoleculesinbody.
- Tounderstandthetypesmechanism ofworkingofnervecells.
- Tounderstandthenatureofendocrine glandsandtheirsecretion.

UNIT–I

Nutrition:Proteins,Carbohydrates,lipids,Vitamins,mineralsandwater.–Foodrequirements–BalancedDiet. DigestivesystemofMan,Digestiveenzymesand Absorption.

UNIT–II

Respiratory system of Man, Mechanism of respiration in Man, Respiratory pigments.Circulatorysystem-CirculationofBlood– Composition,PropertiesandFunctions.HumanCardiacCycle,CardiacRhythm–Originand RegulationofHeart Beat.

UNIT–III

NervousSystem–Neuron–Structure,typesofneurons,Nerveimpulse.Synapse–Synaptictransmission, Neurotransmitters. Receptors – Photoreceptor – Mammalian Eye – Physiology of vision.Phonoreceptors– Mammalian Ear

UNIT–IV

MuscularSystem:Structureandtypesofmuscle,Physiologyofmusclecontraction.
Excretion – Kidney – Structure and Function, Mechanism of Urine formation, Osmoregulation inmammals.

UNIT–V

Endocrineglands–Structure,secretionsandfunctionsofallEndocrineglandsofVertebrates.Antagonismand Synergism.

CourseOutcomes

- Studentsareabletounderstandthephysiologyatcellularand system levels.
- Studentsareabletodescribetheroleand functionsofdifferentsystems.
- Abletodescribethephysiologyofrespiratory,renal,endocrinesystemstodefinenormalandabnormalfunctions.

ReferenceBooks

1. Verma,Tyagi andAgarwal.1986.AnimalPhysiology.Chand&Co.,NewDelhi.
2. William.S.Hoar.1976.GeneralandComparativePhysiology,PrenticeHallofIndiaPvt.Ltd.,NewDelhi-110001.
3. Wood.D.W.1983.PrinciplesofAnimalPhysiology.3rd edition.
4. ProsserandBrown.1985.ComparativeAnimalPhysiology.SatishBookEnterprise,Agra-282003.
5. Tortora,G.J.andDerrickson,B.H.(2009).PrinciplesofAnatomyandPhysiology,XIIEdition,JohnWiley &Sons,Inc.
6. Widmaier,E.P.,Raff,H. andStrang,K.T. (2008)Vander‟sHumanPhysiology,XIEdition.,McGrawHill
7. Guyton,A.C.andHall,J.E.(2011).TextbookofMedicalPhysiology,XIIEdition,HarcourtAsiaPvt.Ltd/ W.B. SaundersCompany
8. Berg,J.M.,Tymoczko,J.L.andStryer,L.(2006).Biochemistry.VIEdition.W.HFreemanandCo.
9. Nelson,D.L.,Cox,M.M.andLehninger,A.L.(2009).PrinciplesofBiochemistry.IVEdition.W.H.Freemanand Co.
10. Murray,R.K.,Granner,D.K.,Mayes,P.A.andRodwell,V.W.(2009).Harper‟sIllustratedBiochemistry.XXVIIIEdition.LangeMedicalBooks/McGraw3Hill.
11. Singh.H.R,&Neeraj Kumar(2017)AnimalPhysiologyandBiochemistry,VishalPublishingCo12.Nagabhushanam,(2008), Textbook ofAnimalPhysiology,Oxford&IBH
13. Rastogi,S.C.(2007).EssentialsofAnimalPhysiology,NewAgeInternationalPublishers

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B.Sc.,ZOOLOGY

CORE COURSE
VIDEVELOPMENTALBIOLOGY

CourseObjectives

Oncompletion of thecourse,studentsshouldbeableto

- Rememberthebasic concepts anddefinitions ofmodern developmental biology
- Understandstepsand advancementsinthedevelopmentalbiology
- Comprehendembryonic formationanddevelopmentalstageswithsuitable examples
- Applyfunctionalknowledgeondevelopmentalbiologyintofrontiersciences
- Analyzeanimalembryonicdevelopmentandpossibilitiesofbirth control

UnitI:Gametogenesis

Spermatogenesis–Definition–Processandsignificance-Structureofmammaliansperm.Oogenesis–Definition–ProcessandSignificance–Typesof EggsandEggmembranes.

UnitII:FertilizationandParthenogenesis

Fertilization – Definition – Process and Significance. Entry of sperm– egg activation, Postfertilization changes – Theories of fertilization - Parthenogenesis: Definition and Significance –typesofParthenogenesis.

UnitIII:CleavageandGastrulation

Planes and patterns of cleavage – Factors affecting cleavage – Cleavage in frog and Chick.Morula and Blastulation - Morphogenetic movements - Fate maps –Gastrulation in frog andchick.

UnitIV:OrganogenesisandEmbryogenesis

Origin and development of organs – Development of brain, eye and heart.Development of foetalmembranesinchick.PlacentainMammal–Definition–Significance andtypes.

UnitV:MetamorphosisandExperimentalEmbryology

Metamorphosis–definitionandsignificance.RegressiveandProgressiveMetamorphosis–hormonalcontrolofmetamorphosisinAmphibians–Regeneration–nucleartransplantation–inducedovulation
–Artificialinsemination–IVF–Embryotransfer.

CourseOutcomes:

Afterthecompletionofthecourse,students should beableto

- Develop critical understanding how a single-celled fertilized egg becomes an embryo and then afully formed adult by going through three important processes of cell division, cell differentiationandmorphogenesis.
- Understand how developmental processes and gene functions within a particular tissue or organismcanprovideinsightinto functions of other tissues andorganisms.
- Realize that very similar mechanisms are used in very diverse organisms; and development iscontrolled through molecular changes resulting in variation in the expression and function of genenetworks.
- Understand the relevance of developmental biology in medicine or its role in development ofdiseases.

REFERENCEBOOKS

1. Balinsky, B.T. (1981) An introduction to Embryology, 5th Edition. W.B.SaundersCo.London.
2. Pattern(1971.)Fundamentals ofEmbryology—McGrawHillBookCo.NewYork.
3. Carlson,BruceM(1996).Patten"sFoundationsofEmbryology,McGrawHill,Inc.
4. Verma.P.S.&.AgarwalV.K.ChordateEmbryology.S.Chand&CompanyLtd.RamNagar,NewDelhi110 055

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B.Sc.,ZOOLOGY

CORE COURSE VIIIIMMUNOLOGYANDMICROBIOLOGY

CourseObjectives:

- Tounderstandtheconceptofimmunityanditsconstituenttypes.
- Tostudythelymphoidorgans,thecellsoftheimmunesystem andtheeffectormoleculesnamely,antigensandantibodies.
- Tostudytheclinicalmanifestationsofimmunologicaldisorders.
- Toappreciatethediversityofmicrobesandsignificanceofcertainmicrobesthatareassociatedwith man.

UNIT-I:**Immunity**

Innateimmunity–Physical,MechanicalandBiochemicalfactors–Cellularfactors– Geneticfactor.Acquiredimmunity– Natural– Artificial–Active–PassiveimmunityCellmediatedimmunity

UNIT–IILymphoid organs

PrimaryLymphoidorgans–Thymus–BursaofFabricius–Bonemarrow,SecondaryLymphoidorgans – Lymphnode–spleen–MALT–Payer‟spatchesTonsils. Celloftheimmunesystem–Lymphoidlineage– Myeloidlineage.

UNIT-III:**Antigens -Antibody**

Antigen and Antibody – Definition and structure of Immunoglobulin – Types of Immunoglobulin – Biological propertiesof Immunoglobulin.Antigen antibody reaction – Vaccines – Types of Vaccines - CommonVaccines-Autoimmunedisorders – Rheumatoidarthritis.

UNIT–IV:Classification&Diseasesof Microorganisms.

StructureandReproductionofBacteria,BacterialdiseaseinMan–Typhoid,Cholera,Tuberculosis,Structureand Reproductionof T4 Phage,Viral disease inMan– AIDS, Polio, Rabies.

UNIT–V:AppliedMicrobiology

Structureandeconomicimportanceofyeast,Sterilization,Culturemediaandculturetechniques, FoodBeverages,Microbiologyof foodpoisoning.

CourseOutcomes

- Impartsindepthknowledgeoftissues,cellsandmoleculesinvolvedinhostdefensemechanisms
- Understandingoftypesofimmunity
- Interactionsofantigens,antibodies, complementsandotherimmunecomponents
- Understandingofimmunemechanismsindiseasecontrol,vaccination, processofimmuneinteractions
- Classificationofmicroorganisms.
- Understandingof pathologyof diseasescausedbyvarious microorganismssuchas bacteria,virus,parasitesandfungus

REFERENCEBOOKS

1. Ananthanarayanan,K. &JayaramPanicker,C.K.1988.TextbookofMicrobiology,3rdEdition.
2. Dasgupta.A.1982.MordenImmunology,2ndEdition,JaypeeBrothers,MedicalPublications,NewDelhi.
3. Pelczar,M.J.etal.1993.Microbiology,McGrawHill,NewYork.
4. Stewart,F.S.1968.BacteriologyandImmunologyforstudentsofMedicine.9thedition.ELBS.
5. FreemanBurrows.TextBookofMicrobiology.22ndEdition,Igaku-Shoin-SaundersInternationalEdition.
6. Khan,F.H.(2009).TheelementsofImmunology. PearsonEducationIndia
7. Abbas,A.K.,AndrewH.H.Lichtman,andShivPillai(2017).CellularandMolecularimmunology.Elsevier
8. PeterJ.Delves,SeamusJ.Marti,DennisR.Burton, IvanM.Roitt.(2017).Roitt′sEssentialImmunology.Wiley-Blackwell
9. ThomasJ.Kindt,BarbaraA.Osborne, andRichard Goldsby(2006).KubyImmunology. W. H.Freeman
10. Ramesh(2016).Immunology.McGrawHillEducationIndiaPrivateLimited

PERIYARUNIVERSITY,SALEM–636011

B.Sc.,ZOOLOGY

ELECTIVEPAPER–I
MEDICALLABORATORYTECHNIQUES (MLT)

CourseObjectives:

- Tomaketheknowledgeaboutmedicallaboratoryinstruments anditsuses.
- Toteachthemethodandcollectionofsamplesanditsimportance.
- Tomakeawarethestudents duringtheemergencysituation.
- Tolearnthebloodsamplecollectionanditscellscounting.
- TolearnthetechniquesusedintheClinicallaboratoryforsampleanalysis.
- Tocreateknowledgeon Self-EmploymentOpportunity.

UnitI:LaboratoryInstruments:

General and personal care in the laboratory.Maintenance of Laboratory records. General principle, useandmaintenanceofLaboratoryinstruments:Autoclave,Hotairoven,Incubator,Waterbath,Centrifuge,Refrigerator,Colorimeter,pHmeter,Hemocytometer,HemoglobinometerandSphygmomanometer.

UnitII:PreparationofLaboratoryEquipmentsandChemicals:

Cleaning,maintenanceofGlassware-DefinitionandmethodsofSterilization.Heat,Radiation,Chemical methods. Preparation and uses of Reagents – Normal Saline - Turkey's fluid, Hayem's fluid,Leishamn'sstain, Wrightstain, Carnoy'sfluid andBovin's fluid.

UnitIII:ClinicalHematology:

Blood and its Constituents, Collection of blood (Venous and Capillary) Anticoagulants, RBC, WBC,Total count and Erythrocyte Sedimentation rate (ESR), Platelet count, Clotting time, Bleeding time.Bloodgroupingand Cross matching,Blood transfusion.

UnitIV:ClinicalMicroscopicExamination:

ExaminationofSputum–ExaminationofUrineandFaeces-ExaminationofthroatSwab-Examination ofCerebrospinalfluid-Semen analysis-Sperm motility-Sperm count.

UnitV:PathologicalExamination:

Malarialparasites,Plasmodiumsp.,Endamebahistolytica,Ascarislumbricoids,Taeniasolium.Pathologyof Vibriocholera,diphtheriae,Mycobacteriumtuberculosis,Salmonellatyphiandclostridium tetani.

Courseoutcome

- Understandfundamentalanalyticalprinciplesandprocessesusedinclinicallaboratorytestingforvarious specimens.
- Understand the conceptsand safetymeasuresofclinical laboratoryinstruments.
- Acquiredtechnicalskillswillhelpthestudentsforcollectingandprocessingbiologicalspecime nsforanalysis.
- Applicationofmedicallaboratoryprocedureswillenablethestudentstodistinguishnormalandabnorma lmicroscopic pathogens.
- Studentsenabletheircriticalandanalyticalthinkinginthedetection ofdiseases.
- Interpretation willempower studentsto compareand contrastclinical laboratory procedures,interpretdataand predictdiagnosis.

References:

1. KanaiL. Mukherjee,MedicalLaboratoryTechnologyvolI,II,III–,TataMcGrawHill PublishingLtd.,NewDelhi.
2. RamanikSood,MedicalLaboratoryTechnology– JaypeeBrother'sMedicalPublishers(P)Ltd.,NewDelhi.
3. MadhavanKutty,KTextBookofMedicalLaboratoryTechnology,MedcenPoonthanam.
4. MaryEllenWedding,SallyAToenjasMedicalLaboratoryProcedures JaypeeBrothers MedicalPublishers.
5. Samuel,K.MNotes onClinicalLab TechniquesPublishedbyM.K.Gopalan,Chrompet.
6. SathishGupteShortTextbookofMedicalLaboratoryforTechniciansJaypeeBrothers,MedicalPubli shers.
7. BakerF.J.AndSilvertonR.EIntroductiontoMedicalLaboratoryTechnologyHodderEducationPublis hers.

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B.Sc.,ZOOLOGY

SBECIII-POULTRYSCIENCE

CourseObjectives:

- Toexplorethe cultivation of poultry
- Tounderstand the methodologyofconstruction ofpoultryhouse
- Tocreate theawarethe studentsforabout thepoultrydiseaseand its treatment
- Tomakethelearner wellawareofvarious methods inPoultryScienceand its management.
- Totrainthestudents toundertakePoultryfarming as incomesource.

UNIT:I

Introductiontopoultrykeeping–PoultryindustryinIndia–Poultrybreedsandclassesoffowls–Poultryhousing–general principles of buildingpoultryhouse.

UNIT:II

Rearingoffowls–growers.Layersandbroilers–growthmanagement–summerandwintermanagement.

UNIT:III

Poultrynutrition–Compositionofpoultryfeed–nutrientrequirementsforfowls–nutritionaldeficiencysymptoms.

UNIT:IV

Poultrydiseases:Ranikhetdisease, Newcastledisease,Fowl pox, Birdsflu.Vaccinationschedules.

UNIT:V

Poultryeggproduction–compositionandnutritivevalueofegg-useoffeathersandpoultrymanure.Economicsofpoultry.Field visit.

CourseOutcomes:

- StudentsinPoultrySciencestudythenutrition,marketing,managementandbusinessskillsneededin poultryproduction.
- PoultrySciencestudentsreceiveafoundationinbasicsciencesandmathematics,aswellasununderstanding ofthe poultryindustry.

References:

a. PrakashMalhotra(2008) EconomicZoology,AdhyaynaPublishers &Distributors,NewDelhi.
b. GnanamaniA.R.Modern aspectsofcommercial Poultrykeeping.GiriPublication,Madurai.
c. BanerjeeG.C.AtextbookofAnimalHusbandry–Oxford&IBHpublishingCoPvt.Ltd.,NewDelhi.
d. Jawaid,A.andSinha,S.P.(2008)AHandbookofEconomicZoology.S.Chand&Company,NewDelhi.
e. Upadhya,V.B.(2006)EconomicZoology.Rastogi Publications,Meerut,India.
f. Biester,H.E.andSchwarte,L.H.(1969)DiseasesofPoultry,5thEdn.OxfordandIBHPublishingCo,NewDelhi.

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B.Sc.,ZOOLOGY

SBEC-IV

CLINICALNUTRITION

CourseObjectives:

- TounderstandNutritionforourhealth.
- Tounderstand thedisordersofnutrition.
- Tounderstandthediseasesduetoinsufficientnutrition

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UNITI

Introduction, Definition of nutrition, Principles of Healthy Nutrition, Therapeutic diet – types andqualities.Food as source of nutrients, functions of food, nutrients & energy, Adequate, optimum & goodnutrition,malnutrition.

UNITII

Interrelationship between Nutrition and Health - Visible symptoms of goods health.Weight ManagementandEatingDisorders-Obesityand Underweight, causes and dietary management.Nutritionand Anaemia.

UNITIII

Routine hospital diets - Regular diet, light diet, full liquid and tube feeding. Diabetes - Types, Symptoms,Causesanddietarymanagement.HypertensionandCardiovascularDiseases,SymptomsandDietarymanagement.

UNITIV

Diseases of gastro Intestinal tract- Gastric and duodenal Ulcer, Diarrhea, Constipation and dietarymanagement.Typhoid,Jaundice,Malaria,dengue,*Chikungunya*– symptomsanddietarymanagement

UNITV

Feeding infants and children - problems in feeding children in hospitals.Nutritionanddietclinics -Patientscheckupanddietarycounseling,educatingthepatient andfollowup.

Courseoutcomes:

- Developingdietplanningskillsforhealthyanddiseasedindividualsinsocietyforbetterhealthmanagement andprevention of diseases.
- Sensitizationandawareness aboutthehazards ofpoorhygieneandsanitationanditsmanagement.

REFERENCES:

1. Paul.S.Text bookofBionutritioncuringdiseasesthroughdiet.CBSPublications.
2. TextbookofNutrition-RavinderChadha&PulkitMathur,OrientBlackswanPvt.Ltd.Telangana.
3. SrilakshmiB.NutritionScience.NewDelhi:NewAgeInternational.
4. ClinicalNutrition&Dietetics-F.P.AntiaandPhilipAbraham,OxfordUniversityPress.
5. SwaminathanS.:AdvancedtextbookonFoodsNutritionVol.I.

B.Sc.ZOOLOGY

SEMESTER–VI

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B.Sc.,ZOOLOGY

SEMESTER –
VICORECOURSE–
VIII

CourseObjectives: **ENVIRONMENTALBIOLOGY**

- Tounderstandthebasicecologicalconcepts.
- Tolearntheimportance ofenvironmentanditsrelatedcomponents.
- Toattaintheknowledgeabouttheecosystemanditscharacteristics.
- Todevelopanawarenessofpollutionandimportanceofenvironmentalresources.
- Toobtaintheknowledge about theconservation ofbiodiversity

UnitI–Introduction ofecology

Concepts and definition – ecology, habitat, biosphere and biome; Biotic factors – animals, plants,bacteria andfungi; Abiotic factors– water,air, soil and sunlight.

UnitII–Populationandcommunity

Populationcharacteristics–natality,mortality,density,growthcurveandagedistribution;Community - species richness, dominance, diversity, abundance; Species interaction - Mutualism,commensalism,parasitism.

UnitIII–Ecosystem

Structure and function of ecosystem - Food chains, food web, ecological pyramids and energy flow;Ecological niche; Ecosystem types – forest and grassland; Aquatic ecosystem – Lakes, rivers andestuaries;Biogeochemical cycle–carbon,nitrogenand phosphorous.

UnitIV–Pollution

EnvironmentalPollutions-air,water,soilandnoisepollution-Sourcesandprevention;Solid waste –types,sourcesand controlmeasures;Hazardouswaste–typesandtreatmentmethods.

UnitV–Biodiversity andConservation

Biodiversity and hotspots of India; Wildlife conservation - National parks and Sanctuaries of India.Conservation of biodiversity - In-situ and Ex-situ conservation.Natural resources- renewable andnon-renewable.

CourseOutcomes:

- ✓ Acquiretheecologicalknowledgeanditsbiologicalsignificance.
- ✓ Understandthedifferences inthestructureandfunctionofecosystems.
- ✓ Learnthewaysofinteractionsoflivingandnon-livingorganismswiththeenvironment.
- ✓ Identifytheproblemsofenvironmentand analyzingitsimpactonbiodiversity.
- ✓ Theimportanceofhotspots, sanctuariesandtheir roleinprotectingbiodiversity.

REFERENCES:

1. Odum,E.P.(1971).Fundamentals ofEcology.W.B.SaundersCompany,Phil.London.
2. Kotpal,R.L.andBali,N.P.(1986),ConceptsofEcology,VishalPublication,NewDelhi.
3. Sharma,B.K.andKaur,(1997).AnIntroductiontoEnvironmentalPollution.GoelPublishingHouse,Meerut.
4. Agarwal,K.C.(2001).EnvironmentalBiology,NidiPublicationLtd.Bikaner.
5. https://pib.gov.in/newsite/mbErel.aspx?relid=105134
6. N.Arumugam,ConceptsofEcology,SarasPublicationPvt.Ltd,Nagercoil,TamilNadu, India.

PERIYARUNIVERSITY,SALEM–636011

B.Sc.,ZOOLOGY

CORE COURSE - IXEVOLUTIONARYBIOLOGY

CourseObjectives:

Onthecompletion ofthecoursethestudentwillbeableto

- Identifythe Originoflife.
- Relatetheexistingevidencesofevolutionwiththeprocessofevolution.
- AnalyzecriticallytheEvolutionarytheories withexamples.
- UnderstandthePatternsofEvolution.
- Summarizetheconceptofspecies,mechanisms ofspeciation.
- Appreciatetheevolutionofman.
- Defend Animaldistribution.

Unit1:Originoflife

HistoryofLife:Abiogenesis,Biogenesis.BiochemicalEvolution:ConceptsandExperiments.Geologicaltimescale.

Unit2:EvidencesofEvolution

Homologous organs, Analogous organs and vestigial organs.Mass extinction- Causes, Majorextinctions. Fossils, Types of fossils, and Fossilization, Indian fossils, Dating of fossils.Origin andevolutionofhorseand man -Cultureevolution–FutureEvolution.

Unit3:Evolutionary theories

ContributionsofLamarck,DarwinandDeVries. Presentstatusof LamarkismandDarwinism.ModernSyntheticTheory,HardyWeinberg Law.

Unit4:Mechanismof Evolution&Speciation

Organic variations; Isolating Mechanisms; Natural selection, Types of naturalselection, Artificialselection.Polymorphismandmimicryinevolution.Evolutionary&Biologicalspeciesconcept, Modesofspeciation(Allopatric,Sympatric)

Unit5:PatternsofEvolution&Animaldistribution

MicroandMacroevolutionaryPrinciples.Zoogeographicaldistribution-Continentalandislandfauna-Continental drift-Discontinuousdistribution,adaptiveradiation.

CourseOutcomes:

Afterthecompletion ofthecoursethestudentwillbeto

- Studentsareabletodescribevariousbiologicalinteractions.
- Abletodescribeevolutionaryhistoryofman.
- Abletodescribeoriginof speciesonearth.
- WritecompetitiveexaminationslikeGATE/UPSC/TNPSC.

- Getanopportunityto work in thefieldofforensic science, Museum,Archeology.
- Dohigherlearningin theareaofanthropology.

Textbooks:

1. MohanP.Arora,OrganicEvolution,HimalayaPublishingHouse,Mumbai.
2. Rostogi,V.B.OrganicEvolution,Kedernath,Ramnathpublishers,Meerut.
3. VermaP.S.&Agarval,V.L.ConceptsofEvolutionS.Chand&Company.

References:

1. EliC.Minkoff,1984,Addison–WesleyPublishingCompany,Canada.
2. PeterE.Rosenbaum,2010.Volpe"sunderstandingevolution,McGraw-Hill,NewYork.
3. TheodosiusDobzhansky,FranciscoJ.Ayala,G.LedyardStebbins,JamesW.Valentine,1977Evolution,W. H. Freeman &company, SanFrancisco.
4. G.LedyardStebbins,1966.Theprocessoforganicevolution,Prentice–Hall,NewJersey.
5. EdwardO.Dodson,1960.Evolution:ProcessandProduct,ReinholdPublishingCorporation,New york.

Weblinks:

1. http://www.nhs.ukhttp://www.eniscuola.net/en/2012/11/29/exobiology/2
2. .https://en.wikipedia.org/wiki/Astrobiology

PERIYARUNIVERSITY,SALEM–636011

B.Sc.,ZOOLOGY

CORECOURSE-X

BIO-INFORMATICS,BIOSTATISTICSANDCOMPUTERAPPLICATIONS

CourseObjectives

- Tointroducethebasicsofbioinformatics-biologicaldatabases,retrieval toolsandapplications.
- Tounderstanddatacollection,datahandlinganddataanalysis.
- Tounderstandcomputercomponents,certainMSOfficeapplications, internetsearchengines andcomputerviruses.

Bio-Informatics:

UNIT-I

Definition,history,biologicaldatabases,proteinsequence,Proteomics,Proteinstructure,entryofaSWISSPROTac count, Genomics– Divisions,entryofGenBankaccount.

UNIT-II

Data retrieval tools- Entrez, BLAST, Bioinformatics in drug design, Phylogeny analysis inbioinformatics,Humangenomeproject.

Bostatistics:

UNIT-III

Data - types of data, collection of data, methods of collecting primary data, sources of secondary data.Classificationandtabulationofdata.Measuresofcentraltendency-Arithmeticmean.Measuresofdispersion– Standard deviation andStandarderror.Student‟s„t‟test andChi-squaretest

UNIT-IV

Diagrammatic representation of data- line diagram, bar diagram (simple, component and percentage), piediagram and pictogram.Graphic representation of data – histogram, frequency polygon, frequency curve andOgive.

ComputerApplications:

UNIT-V

Fundamentals of Computer: Classification, Computer organization, Input devices, output devices, Storagedevices, Software, Computer and its application to biology-, MS Word, Excel, Power point, Internet, WWW,E-Mail–Searchengines(Google,Yahoo),Applications, Computer virus.

CourseOutcomes:

- Basicsofbioinformatics-biologicaldatabases,retrievaltoolsandapplications.
- Collection,Handling,Analysisofbiologicaldata.
- Studentsgainsknowledgeaboutstatisticalmethodslikemeasuresofcentraltendencies.
- Computerapplicationsinbiologicaldata/statisticalmethods.

ReferenceBooks

1. Gupta,S.P.1976.Statisticalmethods.SultanChandandSons.NewDelhi.
2. Palanichamy,S.Manohar,StatisticsforBiologists,ParamountPublications,Palani.
3. IgnachimuthuS.BasicBioinformatics–.NarosaPublisingHouse,NewDelhi,2005.
4. Mani,S.BioinformaticsVol I,II,III. CentreforCulturalStudiesPub,Coimbatore.
5. RastogiS.C.,Mendiratta,N.Bioinformatics–MethodsandApplications.,RastogiPrenticeNewDelhi,2005.
6. Rajaraman.V.Fundamentalsofcomputers.

ELECTIVE COURSE – IISERICULTURE

CourseObjectives:

- Toknowthehistoryandsocio-economicaspectsofsericulture.
- Tounderstandtheclassificationand morphologyofsilkworm+.
- Toobtaintheknowledge about thedescription ofMulberrycultivation andpestmanagement.
- Toattaintheknowledgeabout thediseasemanagementinsericulture.
- To understandthemethodologyfollowed forthereelingand rearingofsericulture

UNITI:SericultureHistory&economics

Origin and History of sericulture-environmental impacts - Advantages and characteristics - currentstatus of sericulture in India - income and employment generation – National Sericulture Project(NSP)-Futurescopeofsericulture.

UNITII:BiologyofMulberryandPlanting

Biology of Mulberry- Description and Eco-Mulberry cultivation in India - Selection of land andcultivation of mulberry –Mulberry varieties- Different methods of planting –Organic and in organicmanure application-Mulberry pest Management- (Mealy bug – Maconellicoccushirsutus), (hairycaterpillar-Spilosomaobliqua)–(Stemgriddler-Stheniasgrisator):PreventiveandcontrolMeasures.

UNITIII:SilkwormTaxonomyand Classification

Silkworm taxonomy, Classification of silk worms based on number of larval Moults, Moultinismand Voltinism – Tasar, Muga, and Eri. Morphology and life cycle of silk worm (Bombyx mori) andorganizationoflarvae, Pupaeand Moth-Structureofthesilkglandand importance.

UNITIV:FarmingandDiseaseManagement:

Silkworm rearing house models-Disinfection of rearing houses and appliances- Egg transportationand incubation –Egg handling – Hatching –Brushing.Silk worm Pests- Uzi fly, Ants and DemistedBeetles- diseases- Bacterial (Flecherie)-fungal (Muscardine) and viral (Grasserie) diseases of silkwormand its preventivemeasures.

UNITV:ReelingandRearingTechnologies:

Reeling methods – Reeling and Re-reeling –Silk examination, cleaning, lacing, book making andgrading of silk.Rearing of silkworm-Chawki rearing or young age worm rearing- Harvesting ofcocoon(stifling,storageand sorting) andqualityassessment.

CourseOutcome:

- Describetheeconomicimpactsandincomegenerationbysericulture.
- Educatethestudents about thebasic biologyofMulberryculture.
- Expertiseinthetaxonomy,morphologyandlifecycleofthesilkworm.
- Relatethestrategies involvedinthesericulturemanagementsystem.
- Acquiredtheknowledge aboutthetechnologiesinsericulture.

REFERENCES:

1. G.Ganga and Sulochanachetty (2018-19,Reprint)An Introduction to sericulture (IIndedition),Oxford&IBH PublishingCo.Pvt.Ltd, NewDelhi,India.
2. Charsley,S.R.(1982).CultureAndSericulture.AcademicPressInc.,NewYork,U.S.A
3. Rangaswamy.G.(1987).ManualonsericultureFAO,Vol–IV,Agricultureservicebulletin ,CSB,Bangalore,India.
4. Dandan.S.B.(2004),Handbookofnewsericulturetechnologies,CentralSilkBoardBangalore,pp287.
5. Mahadeveppa,D., Halliyal,V.G.,Shankar,A.G.andBhandiwad,R.(2000),MulberrySilkReelingTechnology, OxfordandIBHPublishingCo.PVT.Ltd.New Delhi.
6. http://www.csrtimys.res.in/sites/default/files/ebooks/2019-1.pdf

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B.Sc.,ZOOLOGY

SBEC–V–APICULTURE

CourseObjectives:

Thelearnerwill…

- Understandthebasiclifecycleofthehoneybee.
- Learnabout beekeepingtools andequipment.
- Learn to managebeehives forhoneyproduction and pollination.
- Learnaboutbeediseasesandpests.

UNIT-I:**Introduction**

ScopeofApiculture.TypesofHoneyBees-LifeCycle.
Honeybee's*species:ApisdorsataF.,ApisindicaF.,ApisfloraeF.,ApismelliferaF.*

UNIT–II:**Social Organization**

SocialOrganizationofHoneyBee-
drones,queens,andworkers.BeeLanguageandCommunication.DancingandSwarming.

UNIT-III:**BeeKeeping andBeeKeepingEquipment**

Beehive, Tools for Bees Keeping: Comb foundation, Bee gloves, Bee veil, Smoker, Hive tool,Honeyextractor.

UNIT-IV:ProductsofApiculture

Honey-Chemicalcomposition-
Nutritionalvalueandmedicinalvalue.TestingMethodstofindadulterationin honeyProduction ofBeewaxandUses.BeevenomandUses.

UNIT-V:BeeenemiesandDiseases

Beeenemies:Insects,Reptiles,birds,Mammals.

BeeDiseases:Nosima,Acarine,Septecamiea, BroodFoul,IsleofWight, Amoebadisease.

CourseOutcomes:

- EncourageStudents"participationinscientificbeekeeping.
- Maintain ecological balancein nature bywayof domesticationofhoneybee species.
- Maintain small apiaries for demonstration, pollination, extraction and popularization of honeyandotherby-product of beekeeping.
- Motivationofstudentstoadoptbeekeepingassourceoftheirlivelihood.

References:

1. Kumar,A.andNigam, P.M.,EconomicandAppliedEntomology.
2. BackyardBeekeeping-KimFlottum,ed.ofBeeCulturemagazine
3. FirstLessonsinBeekeeping-KeithDelaplane
4. HoorayforBeekeeping!– BobbieKalman
5. HowtoKeepBeesand Sell Honey–Kelleys
6. TheHive&the Honeybee-Dadant

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B.Sc.,ZOOLOGY

SBEC–VI–DIARYSCIENCE

CourseObjectives:

- Toexplorethe Farmingof DairyBreeds
- Tounderstand the methodologyofconstruction ofDairyFarming
- TogetemploymentintheCooperativeMilkProducersUnionLimitedandinprivatedairyproductfactories
- Toprovideknowledgetogivethemanopportunityanditssocio-economic aspects
- Totrainandimpartpracticalknowledge incleanmilkproduction,processingof milkandpreparationofmilk products
- ToStudyof various diseasesanddisorders in DairybreedsandFirstAidMeasures
- TocreatetheawarethestudentsabouttheCattlediseaseanditstreatment

UnitI:DairyFarming:

DairyFarming-DefinitionandScope.DairybreedsofIndiaanditsclassification.Exoticcowbreed-JerseyandRedSindhi,Indianbreed–OngoleandKangayam,Buffalo-Murrah andSurti.

UnitII:Cattlefeedandit'sNutrition:

Commoncattlefeedandnutritivevalues.Rations-itscomputationalandqualities-Balancedrationforcattle.Importanceofgrassland and fodderin dairyfarming.

UnitIII:MilkandMilkproducts:

Milk and its Composition – Nutritive value; milk collection; factors affecting the quality of milk;Dairyprocessing:Pasteurization;gradingandpackaging;transportationanddistribution.Milkproducts–Butter,Ghee,Cheese.

UnitIV–Diseasesof Cattle:

Viral diseases - Cow pox-Foot and mouth disease - Rinder pest. Bacterial diseases–Anthrax-Mastitis – Tuberculosis - Haemorrhagic septicemia. Non-contagious diseases-Milk fever, Parasitesofdairybreeds

UnitV:MarketingofMilk:

Milkmarketing-DairyCooperatives:RoleofCooperativesocietiesinmilkproductionandmarketing.

Dairy development in India, NDDB, NDRI; Merits and demerits of Dairy Business.Progressiveplans to promoteDairytechnologyas aSelf-employment Venture.

CourseOutcomes

- On the successful completion of the course, students will be able to impart technical knowledgeand skills required concerning the selection and breeding of dairy cattle, management of animalsanddifferentphysiological status, nutrition,health, housingandfeeding.
- Principlesandpracticesessentialintheproductionofcleanmilk.Abletoclassifyfeedsaccording to their nutritive values. Students will know the different types of microbes, anddiseases.
- Completion of the programme may seek employment in private dairy farm, milk processingplantsand dairyproductfactories.

ReferenceBooks:

1. PrinciplesofDairyScience-G.H.Schmidt,L.D.VivekandN.N.Pathak.
2. Milkandmilkproducts -HarbonsingandMoore
3. HandbookofDairyscience-K.C. Mahanta
4. MilkProductionandprocessing–C.IbraheemKuttyandSheebaKhamer.
5. Farmanimalsandtheirmanagement–J.A.S.WatsonandW.J.Mills.
6. Atext book of AnimalHusbandry– G.C.Banerjee.
7. AnimalHusbandryanddairyscience-Jagdish Prasad

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B.Sc.,ZOOLOGY

SEMESTER -

VIPRACTICAL–

III

ANIMAL PHYSIOLOGY, DEVELOPMENTAL BIOLOGY, IMMUNOLOGY & MICROBIOLOGY,BIOINFORMATICS,BIOSTATISTICS ANDCOMPUTERAPPLICATIONS, POULTRY SCIENCE &MLT

CourseObjectives:

- Toempower ourstudentswithpracticalskillstocomprehendthePhysiologyandotherfunctionsofeachandeveryvitalsystems.
- Identifyexperimentalapproachesindevelopmental biology.
- Recognisesourcesoferrorinexperimentalapproachesindevelopmentalbiology.
- Analyse,compare,assessandevaluateexperimentaldatainthefieldofdevelopmentalbiology.
- Tofamiliarizethestudentwithprinciplesofclinicalmicrobiology,immunology,routinemethodsofidentification ofbacteria &studyof common parasitesof man
- To give the students a sound knowledge of pathogenic microbes, laboratory diagnosis, basicunderstandingof virology, mycology,&advanced serological techniques.
- Applytheknowledgetocollect variousBiological dataandusingstatisticalapplications.
- FamiliarwithvariousApplicationsofBioinformatics
- Understandpracticalknowledgeonpoultryscience.
- Computerapplicationsonbiologicaldata.

MajorPractical:

1. Studyofactivityofsalivaryamylase activitybasedonTemperature.
2. EstimationofOxygenconsumptioninafishwithreferencetobodyweight.
3. Detectionofnitrogenouswasteproductsinfishtankwater,frogtankwater,birdexcreta.

MinorPractical:

1. Separationofserumfromthebloodsample.
2. EstimationofUrinesugar.
3. Representationofdata–Histogram,Frequencypolygon..
4. Studyof YeastcellsinCurd,myceliuminBreadmould.
5. Entrypage of SWISS PROT and BLAST.
6. Studyofvariousbreedsoflayersandbroilers(photographs)

Spotters:

1. Slidesofdifferent stagesofchickembryo:24Hours,48Hours,72hoursand96Hours.
2. Slidesofcleavagestages-BlastulaandGastrulaoffrog.
3. PlacentaofSheepandPig.
4. SlidesofPrimaryandSecondaryLymphoidorgans–Thymus,Bone marrow,SpleenandLymphnode.
5. Computer Hardware -StorageDevice,CPU, Mouse,KeyBoard,Monitor.
6. FeedersandWaterers.

Extension Activity:

1. Visitto poultryfarmandSubmission ofvisitreport.

2. VisittoaMedicalLabandSubmissionofvisitreport

CourseOutcomes:

- Studentsareabletodoexperiment ontheroleandfunctionsofdifferent systems.
- Abletodescribethephysiologyofrespiratory,renal,endocrineandreproductivesystemstodefinenorma landabnormal functions.
- Studentsareabletounderstandhowphysiologicalparametersaremeasuredinmammals.
- Beabletolistthetypesofcharacteristicsthatmakeanorganismidealforthestudyofdevelopment albiology.
- Befamiliarwiththeeventsthat leduptofertilization.
- Beabletoobservethefirstfourroundsofcell divisionindifferentgroups.
- Beabletoidentifythestagesandcellularmechanisms forgastrulation.
- DemonstratevarioustypesofEggs
- LearnaboutvarioustypesofPlacenta
- Developskillin observingspermmotility
- Applythe computer knowledgeto collect variousBiological data
- FamiliarwithvariousApplicationsofBioinformatics
- Getawarenessabout natureoftheemergingdigitalknowledgesociety
- Studentswillgainskilltoexecutetherolesofabiologyteacherormedicallabtechnicianswithtrainingast heyhavebasicfundamentals
- ToimpartawarenessonClinicalLabTechnology
- Tocreate knowledge onSelf-Employment Opportunitybyareaofpoultryscienceand MLT.

References:

1. Agarwal,R.A.,A.K.SrivastavaandKaushalKumar.AnimalPhysiologyandBiochemistry(3rdEdition). S.Chand&CompanyLimited, 7361RamNagar, NewDelhi-110055.
2. Arora,M.P.Embryology.HimalayaPublishingHouse,Ramdoot,Dr.BhaleraoMarg,Girgaon,Mumbai.
3. Lakshmanan,M:LaboratorymanualinMicrobiology.
4. Moat&Foster:MicrobialPhysiology.
5. C.S.V.MurthyBioinformatics-HimalayaPublishingHouse.
6. Gurumani. N, An Introduction to Biostatistics (computer Application included) 2nd Edition M.J.P.Publishers,TamilnaduBookHouse,47Nallathambistreet,Triplicane-600005.
7. Beauchamp,T.I.andChildress,J.F.(2008).PrinciplesofBiomedicalEthics.VIEdition,Oxfor dUniversityPress.
8. Samuel,K.M.1992: NotesonClinicalLabTechniques.M.K.G.Iyyer &SonsPubl.Co.,Chennai–India
9. Mukherjee,2006: MedicalLaboratoryTechnologyVol.I,II&III– Tata McGraw HillPubl.Co.Noida,India.
10. TextbookofMicrobiology–R.Anantharayan andCKJ.Paniker
11. Ahand book ofMedicallaboratorytechnology–V.H.Talib
12. MedicalLaboratorytechnology–(vol-I&vol-II)–Kanai.L.Mukherjee
13. MedicalZoology-Sobti 5.MedicalLaboratoryTechnology-RamnikSood

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B.Sc.,ZOOLOGY

SEMESTERVI-PRACTICAL IV

ENVIRONMENTALBIOLOGY,CLINICALNUTRITION,EVOLUTIONARYBIOLOGY,SERICULTURE, APICULTURE AND DAIRYSCIENCE

CourseOutcomes:

- Toinculcatethepracticalknowledgeonmoriculture andsericulture
- Toknowtheimportanceofsilkwormrearing,pestsanddiseasesofsilkwormsandtheircontrolmeasures
- Toanalyzethe qualityofsilkthroughexperiments
- Toidentifythehoneybeespecies, racesandcastes
- Tounderstand the behaviorand physiologyofhoneybees
- Toknow the importanceofhoneybeesand hive products
- Todevelopknowledgeaboutvalueadded products inhoney

MajorPractical:

1. Estimationof DissolvedOxygenindifferentwatersamples.
2. EstimationofSalinityindifferentwatersamples.
3. Plankton study–Freshwaterandmarine planktons

MinorPractical:

1. Preparationandcalculationoffollowingdiets:a)Normaldiet.b)Liquiddietc)Soft diet.
2. Valueadded honeyproduct preparation
3. EstimationofmilkqualitybyMBRT(MethyleneBlueReductionTest)

Spotters:

1. UseofRainGauge, Maximum&Minimum Thermometer,Hygrometer,AnemometerandBarometer.
2. Studyoffossilevidences
3. SilkwormRearingequipments
4. MutantHive
5. HoneyExtractor and Smoker

ExtensionActivity:

1. Visittosericulturefarmhouseandsubmissionofreport
2. VisittoDairyfarmandsubmissionofReport.

CourseOutcomes:

- AbilitytoEstimateofdissolvedoxygen,Salinity,pH,freeCO_2,CarbonatesandBicarbonates,Calcium inwatersamples.
- Familiarwithecologicaladaptations
- MeasurepH ofdifferentwatersamplesusingpHmeter, pHpaper andindicator solution.
- DemonstrateAlarmpheromonesinants.
- Identifythe contributionsof various evolutionists.
- Identifydifferent zoogeographicalrealmswithfauna.
- Applyknowledgeon moriculture and sericulture

- Observethebiology, rearing,pestsanddiseasesofsilkwormandtheircontrolmeasures
- Evaluatethequalityofsilk
- Supplyknowledge inidentifyinghoneybeespecies, racesandcastes
- Field visit to studytheapiarymanagementtechniques and honeyharvesting methods
- Demonstratethestudentsforvalueadded productsinhoney
- Students willget theself-employment with thehelp ofDairyScience
- TheycangenerateemploymentsbyDairyScience.

References:

1. Ananthakrishnan :BioresourcesEcology3rdEdition
2. Goldman–Limnology,2nd Edition
3. OdumandBarrett –Fundamentals ofEcology,5thEdition
4. DavidMcFarland,AnimalBehaviour,PitmanPublishingLimited,London,UK.
5. Manning,A.andDawkins,M.S,AnIntroductiontoAnimalBehaviour,Cambridge,Universit yPress,UK.
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B.Sc.

ALLIEDZOOLOGY

B.Sc. ALLIED ZOOLOGY - ODD SEMESTERPAPER–I:NON–CHORDATAANDCHORDATA

Objectives:

- Toappreciatethediversityoftheanimalkingdom.
- Tounderstandcharacteristicsofthenon-chordatephylaandthechordateclasses.
- Tostudytheorganizationandlifecycleof certaineconomicallysignificantorganisms.

UNIT–I

General characters of the Phylum Protozoa - General organization and life cycle of Plasmodium - Generalcharactersofthe PhylumPorifera-Generalcharacters ofthePhylumCoelenterata.

UNIT–II

GeneralcharactersofthePhylumPlatyhelminthes.,Generalorganizationandlifehistoryof Fasciola hepatica., General characters of the Phylum Nemathelminthes-Nematode parasites ofman.,GeneralcharactersofthePhylumAnnelida.Generalorganizationandreproductionin Earthworm.

UNIT–III

GeneralcharactersofthephylumArthropoda-Generalorganizationandreproductionin Periplanata americana - General characters of the Phylum Mollusca- General characters of thePhylumEchinodermata - Generalorganization and reproduction in Asterias.

UNIT–IV

General characters of the Phylum chordate and outline classification up to class level - Generalcharactersoftheclass: Pisces -General organizationofallsystemsexceptendoskeletalsystemofShark-General characters ofthe class: Amphibia.

UNIT–V

Generalcharactersoftheclass:Reptilia-Generalcharactersoftheclass:Aves-Generalcharacters ofthe class: Mammalia - General organization of all systems of Rabbit exceptendoskeleton.

CourseOutcomes:

- Getawarenessonanimaldiversity
- Understandtheaffinitiesamongtheanimals.
- Applyon zoologyknowledge on further higher learningofother subjects.

REFERENCEBOOKS

1. M.EkambaranathaAyyar&T.N.Ananthakrishnan.OutlinesofZoology.
2. M.EkambaranathaAyyar&T.N.Ananthakrishnan. ManualofZoology,VolI&II.
3. R.L.Kotpal.ModerntextbookofZoology: Invertebrates.
4. R. L.Kotpal.ModerntextbookofZoology:Vertebrates.

PERIYARUNIVERSITY,SALEM–636011

B.Sc.,ZOOLOGY

B.SC. ALLIED ZOOLOGY - EVEN

SEMESTERPAPER–

II:GENERALPRINCIPLESOFZOOLOGY

CourseObjective

Onthecompletion ofthecoursethestudentwillbeableto

- Understandthestructureofthecellanditsfunctions
- Studythe developmentofanimals
- Analysethephysiologyandfunctionsofdifferentorgans
- Knowenvironmental problems
- Deploytheconceptsofevolution

UnitI -CellBiology:

Structure of Animal Cell, Structure and functions of Plasma Membrane, Golgi Body &MitochondriaGenetics**:**Mendelianlaws-Sex linkedinheritance-Turner‟s,Klinefelter‟s andDownsyndrome-Phenylketonuria andSicklecellanemia.

UnitII-DevelopmentalBiology:

TypesofEggs-Fertilization-CleavageandGastrulationinFrog–fetalmembranesinchick-Placentationin mammals.

UnitIII -Physiology:

Osmoticandionicregulationinfishes–DigestionandExcretioninMan-Respiration-TypesofRespiratoryorgans– Respiratorypigment- Hb- Transportofrespiratorygases.

UnitIV-Ecology:

Environmentalfactors–TemperatureandLight-PondEcosystem–WaterPollution–AirPollution–Animal Associations

Unit V-Evolution:

Evidences–Morphological,Anatomical,BiochemicalandPaleontological-Lamarckism–NeoLamarckism,Darwinism– Neo-Darwinism.

CourseOutcomes:

Afterthecompletionofthecourse,studentsshould beableto

- Realisethevariouscellstructure,organelles,
- GainKnowledgeregardinggeneticdisorders,developmentalprocess,physiologicalfunctions,Environmental aspectsandevolutionaryprocess.
- Appliedknowledgeforhigherlearningandoccupationalneeds.

REFERENCEBOOKS

1. Verma.P.S.&.AgarwalV.K(2006)CellBiology,Genetics,MolecularBiology,EvolutionandEcology–S.Chand&CompanyLTD. RamNagar,NewDelhi-110055
2. Verma.P.S.&.AgarwalV.K.ChordateEmbryology.S.Chand&CompanyLtd.RamNagar,NewDelhi-110055
3. VermaP.S.&TyagiB.S.AnimalPhysiology.VIEdition,S.Shand&CompanyLtd,RamNagar,NewDelhi-110055

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B.Sc.,ZOOLOGY

B.SC.ALLIEDZOOLOGYPRACTICALS

ODD&EVEN SEMESTER

NON–CHORDATA,CHORDATAANDGENERALPRINCIPLESOFZOOLOGY

CourseObjectives:

- Togetanatomicalknowledgeandadaptationsinanimalgroup.
- Toidentifymodelanimalsas specimen/slides.
- Toprovideskillofdrawingandlabelling.
- Toappreciateeconomic zoologyforitsimportance.

DISSECTIONS

1. Cockroach/Prawn–Digestivesystem.
2. Prawnappendages.

MOUNTINGS

1. Cockroach–Mouthparts.
2. Honeybee-Mouthparts.

SPOTTERS–IDENTIFICATION

Identify,draw andwritenotes:

1. Paramecium:Entire.
2. Ascon:Entire.
3. Obelia:Colony,Medusa.
4. Fasciolahepatica:Entire.
5. Ascaris:Entire.
6. Penaeus:Entire.
7. Pila:Entire.
8. Starfish:Entire–OralandAboralview.
9. Shark:Entire.
10. Frog:Entire.
11. Calotes:Entire.
12. Pigeon:Entire.
13. Rat:Entire.

EMBRYOLOGY

1. 24hoursofChickembryo
2. BlastulaofFrog.
3. GastrulaofFrog.

ECONOMICZOOLOGY

1. Honeybee–Differentcastes.
2. Silkworm–Adult, Caterpillar,PupaandCocoon.
3. Pisciculture–Ediblefishes.

CourseOutcomes:

- Gettingfundamentalknowledgeon animalgroups.
- Acquiredskillofdissection,drawingandlabelling.
- Awarenessoneconomic valueinanimals.

REFERENCEBOOKS

1. M.EkambaranathaAyyar&T.N.Ananthakrishnan.OutlinesofZoology.
2. M.EkambaranathaAyyar&T.N.Ananthakrishnan.Manualof Zoology, VolI&II.
3. R.L.Kotpal.ModerntextbookofZoology: Invertebrates.
4. R. L.Kotpal.ModerntextbookofZoology:Vertebrates.
5. Verma.P.S.&.AgarwalV.K(2006)CellBiology,Genetics,MolecularBiology,EvolutionandEcology –S.Chand&CompanyLTD.Ram Nagar,New Delhi-110055
6. Verma.P.S.&.AgarwalV.K.ChordateEmbryology.S.Chand&CompanyLtd.RamNagar,NewDelhi-110055
7. VermaP.S.& TyagiB.S.AnimalPhysiology.VIEdition,S.Shand&CompanyLtd,RamNagar,NewDelhi-110055

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