SEMESTER – I			
Core I Plant Diversity I (Algae, Bryophytes, Fungi and Lichens)			
Course Code: 21UBOC11	**Hrs / Week: 6**	**Hrs / Sem: 90**	**Credits: 6**

Objectives:

- To have comprehensive idea on primitive plants
- To understand the major groups of lower plants and their characteristics.
- To study the effective utilization of algae, fungi, lichen and bryophytes for the environment and human well being

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	know the general characteristics of algae, fungi, lichen and bryophytes	1	An
CO-2	ennumerate the importance of algae and bryophytes and their role in everyday life and environment.	7	Ev
CO-3	observe adaptive feature of the specified plant groups	3	An
CO-4	compare and contrast algae, fungi and bryophytes	2	Un
CO-5	identify algal, fungal and bryophytes samples	8	Re
CO-6	distinguish life cycle pattern in algae, fungi and bryophytes	7	Ap
CO-7	understand the criteria behind the classification of algae, fungi and bryophytes	1	Un
CO-8	apply the knowledge acquired for self employability	6	Ap

SEMESTER – I			
Core I	**Plant Diversity I (Algae, Bryophytes, Fungi and Lichens)**		
Course Code: 21UBOC11	**Hrs / Week: 6**	**Hrs / Sem: 90**	**Credits: 6**

UNIT I: **Algae**: Introduction - Brief history of Algae, Classification of algae based on Fritsch (1945), Habitat. General characteristics of algae - Range of thallus organization, Methods of reproduction-vegetative, asexual and sexual, Life cycle patterns, Alternation of generation in algae. Algal cytology – cell wall, cytoplasm (algal pigments, reserve food materials), flagella and nucleus. Economic importance of algae: algae as food, SCP, fodder, green manure, role in N_2 fixation, medicine and biofuels. Ecological benefits of algae.

UNIT II: Habitat, thallus structure, reproduction and life cycle of *Oscillatoria, Volvox, Caulerpa, Vaucheria, Sargassum* and *Gracilaria*.

UNIT III: **Bryophytes:** General characteristics of Bryophytes. Classification of Bryophytes by Rothmaler (1951). Habitat, thallus structure, reproduction and life cycle of *Marchantia* and *Polytrichum.* Economic importance of Bryophytes - biological, ecological, medicinal and as potting material. Affinities between algae and bryophytes.

UNIT IV: **Fungi :** Classification of fungi based on Alexopoulus and Mims (1979), General characters. Habitat, somatic structure, asexual reproduction, sexual reproduction and life cycle of *Albugo, Aspergillus, Peziza,* and *Polyporous*. Role of fungi in medicine, industry, food and food products.

UNIT V: **Lichens:** Classification of lichen based on habit, habitat, anatomy, nature of partners, different views on lichen association, organization, process of lichenization. Vegetative propagules - isidia, soredia, cyphellae, cephalodia.Thallus structure and reproduction of *Collema, Parmelia* and *Usnea*. Economic and ecological significance of lichens.

Text Books:

1. Pandey S.N. and Trivedi. P.S. *A Text Book of Botany* Vol. I and II. New Delhi: Vikas Publishing House Pvt. Ltd., 2006.
2. Sharma O.P. *Text Book of Algae.* New Delhi: Tata Mc. Graw-Hall Publications, 2006.
3. Johri, R.M., Smeh Lata and Kavitha Tyagi. 2011. *A Text Book of Fungi*, Dominant Publishers and Distributors Pvt. Ltd., New Delhi
4. Singh V. Pandey P.C. and Jain D.K.. A *Text Book of Botany*. Meerut: Rastogi Publication, 2002

Books for Reference:

1. Fritsch F.E. *The Structure and Reproduction of Algae*. London: Vol.I all II. Cambridge Univeristy Press, 1972.
2. Kamat N.D. *Topics in Algae*. Aurangabad: Sai Kraipa Prakasham, 1982.
3. Parihar N.S. *Bryophyta*. Allahabad: Central Book Depot Publications in Botany, 1967.
4. Robert Edward Lee. *Phycology*: Cambridge University Press, 2009.
5. Vashishta B.R, Sinha A.K. and Singh V.P. *Algae*. New Delhi: S. Chand and Co. Ltd. 2007.
6. Vashishta B.R Sinha A.K. and Singh V.P. *Bryophyta*: New Delhi: S. Chand and Co. Ltd., 2006.
7. Ahmadjian V and Hale M.E. *The lichens.* London: Academic Press, 1973.
8. Alexpoulous C.J. Mims C.W. and Blackwell M. *Introductory Mycology.* New Delhi: Wiley Eastern Limited, 1988.
9. Dubey H.C. *An introduction of fungi.* New Delhi: Vikas Publishing House, 2005.
10. Pandey B.P. *Plant Pathology.* New Delhi: S.Chand and Co.Ltd, 2007.
11. Rangasamy G. *Diseases of Crop Plants in India Prenties*. New Delhi. Hall of India, 1992.
12. Singh R.S. *Plant Diseases.* New Delhi: Oxford IBH, 1991.

Practicals

Hr/ week: 2

- Micropreparation and evaluation of *Oscillatoria, Volvox*, Diatoms, *Vaucheria, Caulerpa, Sargassum, Dictyota, Acanthophora, Gracilaria*
- Micropreparation evaluation of *Riccia, Marchantia* and *Polytrichum*
- Micropreparation evaluation of *Albugo, Aspergillus, Peziza* and *Polyporous*.
- Micropreparation evaluation of *Usnea*and*Parmelia*
- Identification of microscopic and macroscopic algae
- Identification of Bryophytes
- Identification of microscopic and macroscopic fungi
- Field visit: No of days: 2 (Collection of seaweeds and bryophytes)
- Submission of specimen (algae/ bryophytes/ fungi/ lichen)

Submission: Record note book

SEMESTER – II			
Core II	**Anatomy, Embryology and Microtechniques**		
Course Code: 21UBOC21	**Hrs / Week: 6**	**Hrs / Sem: 90**	**Credits: 6**

Objectives:

- To understand the fundamental organization of tissues, developmental events of plants and related techniques
- To understand the developmental process from flower to fruit
- To gain knowledge on the histological architecture of plants
- Application of techniques in anatomical and embryological studies

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	C L
CO-1	classify meristems and explain the organization of root apex	2	Ev ,An
CO-2	distinguish meristematic and permanent tissues	8	An
CO-3	compare the secondary growth in dicot stem and root	3 , 7	An
CO-4	describe the cytological events associated with the flower development	1 ,3	Un , E
CO-5	explain the physiological changes during pollen pistil interaction.	1	Un
CO-6	understand fertilization and double fertilization.	2	Ev
CO-7	explain the development of seed and dispersal mechanism	2, 3	Un
CO-8	apply microtechniques to prepare anatomical sections and make permanent mounts	3	Un

SEMESTER – II			
Core II	**Anatomy, Embryology and Microtechniques**		
Course Code: 21UBOC21	**Hrs / Week: 6**	**Hrs / Sem: 90**	**Credits: 6**

UNIT I: Meristematic tissues: Classification based on position. Shoot apex (Tunica corpus theory) and root apex (Histogen theory). Permanent Tissues: Simple tissue -parenchyma (chlorenchyma, aerenchyma), collenchymas and sclerenchyma.Complex tissues – xylem and phloem.Organs: Primary structure of dicot and monocot root, stem and leaf.Nodal anatomy – Unilacunar (*Nerium*), Trilacunar (*Azadirachta*), Multilacunar (*Aralium*).

UNIT II: Secondary growth: Secondary growth in root and stem. Vascular cambium – structure (fusiform initial, ray initial) and function, seasonal activity – annual ring.Structure of wood, secondary medullary rays, heart wood and sap wood.Cork cambium – structure and function. Bark. Lenticels. Adaptive and Protective system: Epidermis, cuticle, stomata. General account of adaptations in xerophytes and hydrophytes.

UNIT III: Structural organization of flower: Structure of anther and pollen, structure andtype of ovules, types of embryo sacs, organization and ultra structure of mature embryo sac. Pollination and fertilization: Pollination mechanisms and adaptations.Pollen pistil interaction.Phenomenon of double fertilization.

UNIT IV: Embryo and endosperm: Dicot and monocot embryo. Endosperm - type, structure and functions. Embryo endosperm relationship.Seed-structure appendages anddispersal mechanisms.Apomixis and polyembryony: Definition, types and applications

UNIT V: Microtechnique: Preparation of permanent free hand sections.Microtomy: Fixation, dehydration, embedding, sectioning, staining (general staining and double staining) and mounting. Micrometry – definition, types and uses.

Books for Reference:

1. Bhojwani S.S. and Bhatnagar S.P. *The embryology of Angiosperms*. Uttar Pradesh: VikasPublishing house PVT. Ltd., 2007.
2. Dwivedi J.N and Singh R.B. *Essential of plant techniques*. Jodhpur: Chant printers, 1985.
3. Eames, A.J and L.H Mac Danniels. *An Introduction to Plant Anatomy*. New Delhi: TataMcGraw- Hill Publishing Company Ltd, 1972.
4. Fahn A. *Plant Anatomy*. United Kingdom, Pergamon Press.1990
5. Maheswari, P. *Introduction to embryology of angiosperm*. India: Tata Mc Graw Hillpublications and Co. 1971.
6. Pandey B.P. *Plant Anatomy*. India: S. Chand Co. 1978.
7. Ruth L.W. *Microtechniques*, New York: Mc millaian Company, 1971.
8. Singh V Pandey P.C and Jain D.K. 1987. Meerut: *Anatomy of Seed Plants*. Rastogi,Publication,

Practicals Hr/week: 2

- Observation of tissues - parenchyma, collenchyma and sclerenchyma.
- To measure the dimensions of the given tissue types using stage

micrometer and ocularmicrometer

- Sectioning of stem - monocot (*Dracaena*), dicot (*Polyalthea* and *Boerhaavia*)
- Sectioning of root – Dicot (*Azadirachta*), Monocot (*Crinum*)
- Nodal anatomy: Taking series of transverse sections in the nodal region and identify thetypes of nodal anatomy
- Study of the types of stomata from the epidermal peeling of *Hybiscus/ Cucurbita/* grass
- Adaptive antomy: Xerophytic – (*Nerium* leaf), hydrophytes (*Hydrilla* stem)
- Structure of young and mature anther (permanent slide)
- Types of ovule: Anatropus (permament slide), orthotropus, circinotropus, amphitropus,campylotropus (models)
- Dissection of embryo from developing seeds

SEMESTER – I			
Skill Enhancement Course - I Professional English for Botany – I			
Course Code: 21UBOPE1	**Hrs / Week: 2**	**Hrs / Sem: 30**	**Credits: 2**

Objectives:

- To enhance the lexical, grammatical, sociolinguistic and communicative competence in an increasingly complex, interdependent world.
- To develop intellectual flexibility, creativity and critical thinking skills of students by offering adequate practice in professional context.

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	recognise the words used in life science and improve their competence in using the language	1	An
CO-2	Comprehend unfamiliar texts and describe biological processes	7	Ev
CO-3	Apply critical and theoretical approaches to the reading and analysis of various texts in life science	3	An
CO-4	Analyse critically, negotiate and present without committing errors and develop entrepreneurshipskills	2	Un
CO-5	Recognize the technical words used life science laboratory settings	8	Re
CO-6	learn language use in formal/professional world	7	Ap
CO-7	Write simple sentences without spelling or grammatical error	7	Ap
CO-8	Improve English proficiency with good vocabulary	7	Ap

SEMESTER – I			
Skill Enhancement Course - I Professional English for Botany – I			
Course Code: 21UBOPE1	**Hrs / Week: 2**	**Hrs / Sem: 30**	**Credits: 2**

UNIT I: Communication

1. Listening :Listening to instructions and following – Instructions to use microscope
2. Speaking: Pair Walk – Dialogue between a teacher and student about the usage of microscope (formal conversation)
3. Reading: Comprehension passage – GregorJohann Mendel
4. Writing: Developing a story with pictures – Life cycle of *Aspergillus/ Sargassum*
5. Vocabulary - Unit specific - Incorporated into the LSRW tasks

UNIT II: Description

1. Listening: Listening to process description-drawing a flow chart- How to dissect *Datura* plant/ *Musa paradisiaca*
2. Speaking- Role play- - Conversation between a Botany teacher and a student regarding the colonization of lichen
3. Reading - Skimming/Scanning – Basic equipment used in Biology experiments
4. Process Description -Compare & Contrast – Nutrition in fungi
5. Vocabulary - Unit specific - Incorporated into the LSRW tasks

UNIT III: Negotiation Strategies

1. Listening: Listening to interviews of specialist – Dr. M.S. Swaminathan (Green Revolutionist) https://www.youtube.com/watch?v=-M7QqZcY_Z4
2. Speaking: Brainstorming (Mind mapping) – Symbiotic relationship of Fungi
3. Reading: Longer reading passages for comprehension – Cell organelles
4. Writing: – Essay writing – Economic importance of Algae
5. Vocabulary - Unit specific - Incorporated into the LSRW tasks

UNIT IV: Presentation Skill

1. Listening: Listening to Lecture – General characters of Bryophyte https://www.youtube.com/watch?v=VA2LNWkZNWo
2. Speaking: Short Talks – Bryophytes are Amphibians of plant kingdom
3. Reading: Comprehension – passage - I.O.P. Iyengar
4. Writing: Recommendations - (Using laptop or PC)
5. Vocabulary - Register specific (Incorporated into the LSRW tasks)

UNIT V: Critical Thinking Skills

1. Listening: Listening Comprehension – Introduction to Horticulture
2. Speaking - Making Presentation- Etiquettes in laboratory
3. Reading-Comprehension Passages, Note making - Photosynthesis
4. Writing - Problem & Solution Essays, Creative writing–Marine Ecosystem
5. Vocabulary - Register specific (Incorporated into the LSRW tasks)

Text Books:

1. Tamil Nadu State Council for Higher Education (TANSCHE).*Professional English forLife Sciences - I.*

Books for Reference:

1. Pandey S.N. and Trivedi P.S. *A Text Book of Botany,* Vol. I and II. New Delhi: VIKASPublishing House Pvt. Ltd., 2006.
2. Sharma O.P. *Text Book of Algae*. New Delhi: Tata Mc. Graw-Hall Publications, 2006.
3. Pandey, S.N. and P.S Trivedi. *A Text Book of Botany,* Vol. I. New Delhi: VikasPublishing House Pvt. Ltd., 2006.
4. Singh V. Pandey P.C. and Jain D.K. *A Text Book of Botany*.Meerut: Rastogi Publication,2002.

SEMESTER – II			
Skill Enhancement Course - II Professional English for Botany – II			
Course Code: 21UBOPE2	**Hrs / Week: 2**	**Hrs / Sem: 30**	**Credits: 2**

Objectives:

- To enhance the lexical, grammatical, sociolinguistic and communicative competence in an increasingly complex, interdependent world.
- To develop intellectual flexibility, creativity and critical thinking skills of students by offering adequate practice in professional context.

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	recognise the words used in life science and improve their competence in using the language	1	An
CO-2	Comprehend unfamiliar texts and describe biological processes	7	Ev
CO-3	Apply critical and theoretical approaches to the reading and analysis of various texts in life science	3	An
CO-4	Analyse critically, negotiate and present without committing errors and develop entrepreneurship skills	2	Un
CO-5	Recognize the technical words used life science laboratory settings	8	Re
CO-6	learn language use in formal/professional world	7	Ap
CO-7	Write simple sentences without spelling or grammatical error	7	Ap
CO-8	Improve English proficiency with good vocabulary	7	Ap

SEMESTER – II			
Skill Enhancement Course - II Professional English for Botany – II			
Course Code:21UBOPE2	**Hrs / Week: 2**	**Hrs / Sem: 30**	**Credits: 2**

UNIT I: Communication

Listening: Listening to audio text and answering questions: Primary Tissues in plants
Pair Work: Pairwise reading of a conversation script (e.g. difference between plant cell and animal cell) prepared by each pair of their choice. (The script can be based on any topic in plant science)
Reading: Comprehension passage- JanakiAmmal, the Indian Botanist
Writing: Developing a story with pictures: Story of seed
Vocabulary: Unit oriented

UNIT II: Description

Listening: Listening to Process Description - Mitosis
Role play: Deforestation
Reading Passages on Environment conservation
Process Description - Compare & Contrast Algae and Fungi
Vocabulary: Unit oriented

UNIT III: Negotiation Strategies

Listening to the interviews of James Watson, Stephen Hawking, SasiTharoor Small group discussion - Green Revolution, impacts, limits, and the path ahead
Reading: Passage reading - Pseudoscience, the paranormal, and science education
Writing: Developing essay from the passage -Healthy diet.
Vocabulary: Unit oriented

UNIT IV: Presentation Skills

Listening : Listening to lectures and notes taking-
(https://www.youtube.com/watch?v=Dh9ptiJj7TE)
Speaking: Organized speech – Frustrations of people in Pandemic situation. (informative)
Reading: Comprehensive passage - Embryogenesis and answering questions.
Writing: Descriptive writing- Interpretation-Animals for ever (Gerald Durrell's)
Vocabulary: Unit oriented

UNIT V: Critical Thinking Skills

Listening: Listening for information - Introduction to enzymes
Speaking: Preparation of Power Point presentation –Small group discussion on errors in Power Point presentation: History of Botany
Reading: Note making –Professional Competence and Professional Ethics
Writing: Summary writing – Drug designing.

Text Book:

1. Tamil Nadu State Council for Higher Education (TANSCHE).*Professional English forLife Sciences - I.*

Books for Reference:

1. Verma P.S. and Agarwal. V.K. *Cell biology, Genetics, Molecular Biology, Evolution andEcology*. New Delhi, S. Chand and Co., 2007.
2. Bhojwani S.S and Bhatnagar S.P. *The embryology of Angiosperms*. New Delhi: VikasPublishing house PVT. Ltd., 2007.
3. Dubey, R.C. 2006. *Text Book of Biotechnlogy*, fourth edition. New Delhi. S. Chand and CoLtd., 2006.

SEMESTER I			
Allied I	**Invertebrate & Chordate Zoology**		
Course Code: 21UZOA11	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 3**

Objectives:

- To enlighten the students about the diverse forms of invertebrates and vertebrates.
- Students will develop broad foundational knowledge of the extreme diversity in animal form, function, adaptation and natural history.

Course Outcomes:

Co. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	acquire basic knowledge of invertebrates and chordate animal	1	Un
CO-2	compare common and distinctive features of invertebrate phyla	1	Un
CO-3	understand the parasitic adaptation through their mode of life	1	Un
CO-4	develop the ability to control the parasites	1	Ap
CO-5	characterize the major classes of subphylum Vertebrata of the phylum Chordata	1	Re
CO-6	assess the interaction of organisms with environment and their adaptive mechanism	1, 3	Ev
CO-7	distinguish the unique features and evolutionary relationship between each chordate group	1	An
CO-8	apply the knowledge of biological diversity to our daily life and conservation of bioresources	1,3	Ap

SEMESTER I			
Allied I:	**Invertebrate & Chordate Zoology**		
Course Code: 21UZOA11	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 3**

UNIT I: General characters of invertebrates

Protozoa: General characters –*Parameciumcaudatum* – external morphology-reproduction – binary fission and conjugation

Porifera: General characters – *Leucos olenia* - external morphology

Coelenterata: General characters - Obelia - structure

General Topics: Protozoan parasites – *Entamoeba histolytica*

UNIT II: Platyhelminthes: General characters - *Fasciola hepatica*- external morphology and life cycle

Annelida: General characters –*Hirudinaria* (Leech) - external morphology

General Topic: Human Helminth parasites – *Ascaris lumbricoides*, – life cycle, pathogenecity and control measures

UNIT III: Arthropoda: General characters –*Periplaneta americana*- external morphology and digestive system - mouthparts of honey bee.

Mollusca: General characters – *Lamellidens marginalis* - external characters

Echinodermata: General characters –*Asterias rubens* – external characters.

UNIT IV: General characters and outline classification of Chordata up to classes

Pisces: General characters - *Scoliodon* - external characters

Amphibia: General characters - *Ranahexadactyla* - external characters and respiratory system.

Reptilia: General characters –*Calotes versicolor* - external characters

General topic: Identification of poisonous andnon poisonous snakes

UNIT V: Aves: General characters - *Columbalivia*- external characters

Mammalia: General characters - *Oryctolagus cuniculus* – external characters and urinogenital system.

General topic: Adaptations of aquatic mammals.

Text Books

1. Nair N.C., Leelavathi S, and Soundara Pandian. N.A. *Text book of Invertebrates*. Nagercoil: Saras Publication, 2006.
2. Thangamani A, PrasannaKumar S, Narayanan L.M Arumugam N. *Chordata* Nagercoil: Saras Publication, 2006.

Books for Reference

1. Ekambaranatha Ayyer M. A and Viswanathan S. *Manual of Zoology*. Vol I Chennai: Viswanathan Printers and Publishers, 1993.
2. Ekambaranatha Ayyer M. A and Viswanathan S. *Manual of Zoology*. Vol II Chennai: Viswanathan Printers and Publishers, 1993.
3. Arumugam N. *Text Book of Chordates*. Revised edition Nagercoil: Saras Publication, 2010.
4. Jordon E. C and Verma P.S. *Invertebrate Zoology*. New Delhi: Revised edition. S. Chand and Company Ltd., 2009.
5. Shukla G.S and Upadhyay V.B. *Economic Zoology*. First edition. Meerut: Rastogi Publication, 1985.

Practicals

Hrs / Week – 2

Cockroach : Digestive system

Mounting **:**

Honey bee - Mouthparts

Earth worm - Body setae

Shark - Placoid scale

Virtual dissection – Frog (Respiratory System)

Slides/Models/Charts:

Invertebrata: *Paramecium caudatum*, *Leucos olenia*, *Obelia*, *Entamoeba histolytica, Fasciola hepatica, Ascaris lumbricoides* (male and female), sea anemone, hermit crab, *Asterias*, redia and cercaria

Chordata: *Amphioxus*, *Scoliodon*, *Najanaja,Rana hexadactyla*, *Columba livia*, aquatic mammals - *Orcinus* (killer whale) and *Delphinus* (dolphin)

Lab Manual for Reference

1. Leelavathy S, Soundara Pandian N. and Murugan T. *Practical Zoology* Vol. I Nagercoil: Saras Publication, 2013.
2. Verma P.S. and Chand S. *A Manual of Practical Zoology*, *Chordates*. Ramnagar, New Delhi: S. Chand and Company Ltd, 2008.

SEMESTER II			
Allied II	**Genetics, Physiology and Developmental Zoology**		
Course Code: 21UZOA21	**Hrs/ Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

Objectives:

- To highlight the importance of genetics, physiology and developmental biology to the students
- Students will learn the developmental stages, structure and functions of various organ systems of human.

Course Outcomes:

CO. No	Upon completion of this course, students will be able to	PSO Addressed	CL
CO-1	compare and contrast the Mendelian inheritance and its modifications	4	An
CO-2	explain the importance of genetics and welfare of human society	4	Ev
CO-3	characterize the types of food and the process of digestion, absorption and assimilation	2	Cr
CO-4	attain knowledge of respiration, excretion and understand the mechanism of transport of gases and urine formation	4	Ap
CO-5	comprehend the structure and functions of human reproductive system	2	Un
CO-6	list the various stages in human developmental biology	2	An
CO-7	understand the menstrual cycle and the role of contraceptive in population control	2	Un, An
CO-8	outline the different aspects of infertility and its treatment	2	Un

SEMESTER II			
Allied II	**Genetics, Physiology and Developmental Zoology**		
Course Code: 21UZOA21	**Hrs/ Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

UNIT I: **Genetics** Simple Mendelian traits in man – multiple alleles - ABO blood group - Rh factor in man – erythroblastosis foetalis – sex determination in man - sex linked inheritance in man - haemophilia and colour blindness –non disjunction - Down's and Klinefelter's syndrome.

UNIT II: **Physiology - Digestion**

Nutrition : Food constituents – carbohydrates, proteins and fats.

Digestion : Role of enzymes in the digestion of carbohydrates, proteins and fats

Absorption : Absorption of digested food

UNIT III: **Respiration and Nervous co - ordination**

Respiration : Haemoglobin – transport and exchange of oxygen and carbondioxide. Nervous co – ordination : Structure and types of neurons – conduction of nerve impulse through neuron and synapse.

UNIT IV: **Excretion and Reproduction**

Excretion : Structure of kidney and nephron - urine formation

Reproduction : Structure of human testis and ovary, Graafian follicle, menstrual cycle and its hormonal control, menopause.

UNIT V: **Developmental Zoology**

Man- structure of sperm and ovum – fertilization – cleavage, gastrulation – fate map. Placenta in mammals – types (diffuse, cotyledonary and discoidal) and functions - Birth control measures – contraceptive devices, infertility - ART, IVF, IUI, Twins.

Text Books:

1. Verma P.S., Tyagi B.S. and Agarwal V.K. *Animal Physiology*, sixth Edition. New Delhi: S. Chand &Company Ltd., 2000.
2. Verma P.S. and Agarwal V.K. *Chordate Embryology*. Tenth Edition. New Delhi: S.Chand & Company Ltd, 2010.
3. Meyyan R.P. *Genetics*. Nagercoil: Saras Publication, 2007.

Books for Reference :

1. Verma P.S. and Agarwal V.K. *Cell Biology, Genetics, Molecular Biology, Evolution & Ecology.* New Delhi:. S. Chand & Company Ltd, 2013.
2. Arumugam N. *Developmental Zoology*. Nagercoil: Saras Publication. 2009..
3. Verma P.S., Tyagi B.S. and Agarwal V.K. New Delhi: *Animal Physiology*, sixth Edition. S. Chand & Company Ltd, 2000.

Practicals
Hrs/ Week : 2

1. Simple Mendelian traits in man
2. ABO blood grouping
3. Qualitative tests for glucose, protein and lipid
4. Examination of excretory products (ammonia, urea and uric acid crystals)
5. Museum specimens : Slides / Charts / Models

   Sex linked inheritance of colour blindness, haemophilia, Down syndrome. Frog - sperm and egg, diffuse placenta (pig), cotyledonary placenta (sheep). Villus, nephron, neuron, human sperm and human egg

Laboratory Manual for Reference:

1. Jeyasurya, Dulsy Fatima, Kumaresan and Selvaraj. *Practical Zoology* Volume – 3 Nagercoil: Saras Publication, 2013.