Course Name: Bachelor of Science
Discipline : Botany
CHOICE BASED CREDIT SYSTEM
(For those who joined in 2023 and after)

Course Scheme:

II year B.Sc. BOTANY

Semester	Part	Subject Name	Hours	Credit	Int + Ext =Total	Local	Regional	National	Global	Professional Ethics	Gender	Human Values	Environment & Sustainability	Employability	Entrepreneurship	Skill Development	Subject Code	Revised / New / No Change / Interchanged & Percentage of Revision
III	Part 1	**Tamil**	6	3	25+75=100												**U24PT31**	**Interchange from II semester**
	Part 2	**English**	6	3	25+75=100												**U24PE31**	**New**
	Core V	**Fungi, Lichens and Plant Pathology**	4	4	25+75=100				✔					✔	✔	✔	**U24BYC31**	**10 % Revision**
	Core VI-LAB III	**LAB: Fungi, Lichens and Plant Pathology**	2	1	40+60=100				✔					✔	✔	✔	**U24BYCP31**	**10 % Revision**
	Allied	**General Chemistry-I**	4	3	25+75=100												**U24CHAY31**	**New (Sem Change)**
	Allied Lab	**LAB:** Volumetric Analysis	2	-	-												----	--
	Allied	**Cellbiology, Developmental Biology, Physiology, Immunology and Evolution & Commercial Zoology**	4	4	25+75=100												**U24ZYAX31**	**New (Sem Change)**
	Allied Lab	**LAB**: Cellbiology, Developmental Biology, Physiology, Immunology and Evolution & Commercial Zoology	2	-	-												---	--
	SL	**Value Education**	-	3	25+75=100							✔					**V24VE31**	**New**
	Total		**30**	**21**														

IV	Part I	**Tamil**	6	3	25+75=100												**U24PT41**	**Interchange from III semester**
	Part II	**English**	6	3	25+75=100												**U24PE41**	**New**
	Core - VII	**Bryophytes, Pteridophytes and Gymnosperms**	4	4	25+75=100				✔					✔	✔	✔	**U24BYC41**	**New**
	Core-VIII - Lab -IV	**LAB: Bryophytes, Pteridophytes and Gymnosperms**	2	1	40+60=100				✔					✔	✔	✔	**U24BYCP41**	**New**
	Allied	**General Chemistry-II**	4	3	25+75=100												**U24CHAY41**	**New (Sem Change)**
	Allied Lab	**LAB:** Volumetric Analysis	2	2	40+60=100												**U24CHAYP41**	**New (Sem Change)**
	Allied	**Commercial Zoology (Vermiculture, Apiculture, Aquaculture And Poultry Science And Dairy Farming)**	4	4	25+75=100												**U24ZYAX41**	**New (Sem Change)**
	Allied Lab	**LAB: Cellbiology, Developmental Biology, Physiology, Immunology and Evolution & Commercial Zoology**	2	2	40+60=100												**U24ZYAXP41**	**New (Sem Change)**
	SL	**Environmental Studies**	-	2	25+75=100												**U24ES41**	**New**
	Total		**30**	**24**														

Year	Part	Subject	Credit	Int = Total	Code
I & II	Part V	NSS / NCC / Physical Education/ YRC / RRC	3	100 = 100	U22NS4 / U22NC4 / U22PS4 / U22YR4 / U22RR4

SEMESTER – III

Course Title : Core - III -Fungi, Lichens and Plant Pathology	**Total Hours :60**
Course Code : U24BYC31	**Total Credits : 4**

Course Outcomes:

COs	CO Statement
CO1	Acquire knowledge on the contributions of mycologists and understand the roll of fungi in various fields
CO2	Gain knowledge on the morphology and reproduction of fungi
CO3	Familiarize with the distribution, morphology and reproduction of lichens.
CO4	Able to differentiate the symptoms of plant diseases and gain knowledge to protect the plants from diseases.
CO5	Able to explain the etiology of plant diseases

UNIT - I **(12-hours)**

General characters of fungi. Classification of fungi based on Alexopoulos (1962); Contributions of Edwin John Butler & C.V.Subramaniyan; Role of fungi as food, medicine, growth regulator sand in industries; Occurrence, structure, reproduction and life cycle of *Albugo* (Oomycetes).

UNIT - II **(12-hours)**

Occurrence, structure, reproduction and life cycle of the following:

a) Zygomycetes -*Rhizopus*
b) Ascomycetes - *Aspergillus*
c) Basidiomycetes -*Agaricus*

UNIT - III **(12-hours)**

General characters of Lichens; Types – crustose, foliose and fruticose, Homoiomerous and heteromerous thalli; Somatic structures – Soredia, Isidia and Cephalodia; Structure and reproduction of *Usnea.* Economic importance of Lichens.

UNIT - IV **(12-hours)**

Classification of plant diseases; Symptoms of plant diseases - bacterial, fungal and viral; Plant protection - Principles, Physical, Chemical and Biological methods.

UNIT - V **(12-hours)**

Study of the Etiology, symptoms and control measures of the following diseases:

a) Citrus canker
b) Tikka disease of Groundnut
c) Red rot of Sugarcane
d) Wilt of Cotton.

e) Bunchy top of Banana.

Text Books:

1. Text book of Fungi O P Sharma, 1998. Tata McGrew Hill Publishing Co. New Delhi.
2. Plant Pathology - B P Pandey, 2001. S. Chand & Company.

Reference Books:

1. Dubey, R.C. and Maheswari, D.K. 2000. A Text Book of Microbiology. S.Chand & Co Ltd. New Delhi.
2. Kumar, H.D. and Swati Kumar, 1999. Modern Concepts of Microbiology. Vikas Publishing House Pvt, Ltd. New Delhi.
3. Mehrotra, R.S. 2000. Plant Pathology. Tata McGrew Hill Publishing Co. New Delhi.
4. Rangaswamy, G. 1992. Disease of crop plants in India. Prentice Hall of India, New Delhi.
5. Vashishta, P C and Gill, P C. 1998. Plant Pathology. Pradeep Publications, Jalandhar.
6. Introductory Mycology - C.J Alexopoulos, Charles W. Mims, M.Blackwell, 2002. 4th Edition. Wiley India Pvt. Ltd. New Delhi.
7. Plant Pathology - R.S Mehrotra, 2nd Edition, 2003. Tata McGrew Hill Publishing Co. New Delhi

e- RESOURCES

1. https://byjus.com/biology/kingdom-fungi/
2. https://plants.jstor.org/stable/10.5555/al.ap.person.bm000038361
3. https://microbiologynote.com/economic-importance-of-fungi-in-medicine-industry-agriculture-and-food/
4. https://byjus.com/neet/rhizopus/
5. https://my.clevelandclinic.org/health/diseases/14770-aspergillosis
6. https://www.vedantu.com/biology/lichens
7. https://byjus.com/biology/classification-of-lichens/
8. http://www.nou.ac.in/Online%20Resourses/30-8/botany4.pdf
9. https://www.agric.wa.gov.au/citruscanker/citrus-canker
10. https://www.biologydiscussion.com/plants/plant-diseases/red-rot-of-sugarcane-symptoms-and-control-plant-diseases/58688
11. https://www.apsnet.org/edcenter/disandpath/fungalasco/pdlessons/Pages/RiceBlast.aspx
12. https://agritech.tnau.ac.in/crop_protection/banana_diseases/crop_prot_crop%20diseases_fruits_banana_3.html

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Course Title : LAB : Fungi, Lichens and Plant Pathology	**Total Hours :30**
Course Code : U24BYCP31	**Total Credits : 1**

Course Outcomes:

COs	**CO Statement**
CO1	Acquire knowledge on the contributions of mycologists and understand the role of fungi in various fields
CO2	Gain knowledge on the morphology and reproduction of fungi
CO3	Familiarize with the distribution, morphology and reproduction of lichens.
CO4	Able to differentiate the symptoms of plant diseases and gain knowledge to protect the plants from diseases.
CO5	Able to explain the etiology of plant diseases

Practical Syllabus

1. Observation of slides – *Albugo*, *Rhizopus*, *Aspergillus* and *Agaricus.*
2. Study of external and internal structure of basidiocarp of *Agaricus.*
3. Study of the infected region of the *Amaranthus* and *Arachis hypogea* leaves
4. Study of the external and internal morphology of *Usnea* thallus and apothecium.
5. Study of the etiology of bacterial, fungal and viral disease prescribed in the syllabus.
6. Observation of Soredia, Isdia and Cephalodia.

****A field study / trip to research institute / Universities / Industrial visit should be carried out for atleast two days***.

SEMESTER III
Part III — **Allied** Subject — **GENERAL CHEMISTRY-I for Biological Science**
Hours per week: 4 Subject Code: **U24CHAY31**
Credits: 3

(For those who joined from June 2024 onwards)

Course Outcomes

CO1: To study fundamental ideas on organic chemistry.
CO2: To know the basic properties of hydrogen, hydrides & oxides
CO3: To search out an idea on colloids.

CO4: To learn some important petroleum processes and fertilizers

CO5: To acquire a knowledge on polymers.

Unit I: Basic concepts of organic chemistry **12 Hours**

Organic compounds — general properties and classification of organic compounds — functional groups — homologous series. Isomerism — structural isomerism and stereoisomerism — examples — Types of organic reactions: substitution, addition and elimination with examples.

Unit II: Hydrogen, Hydrides and Oxides **12 Hours**

Hydrogen:

Isotopes of hydrogen — preparation, properties and uses of heavy hydrogen — ortho and para hydrogen.

Hydrides:

Definition — classification of hydrides (Saline hydrides, Metallic hydrides, Molecular hydrides and Polymeric hydrides.) — Nature of hydrides and position of hydrogen in the periodic table.

Oxides:

Definition — classification — examples.

Unit III: Colloids **12 Hours**

Colloidal state of matter — various types — classification. Sols — dialysis — electroosmosis- electrophorosis — stability of colloids — protective action — Hardy Schulze law — gold number.

Emulsion: types of emulsion — emulsifier.

Gels: Classification, preparation — application of colloids.

Unit IV: Petroleum and fertilizers **12 Hours**

Refining of petroleum — composition and uses of petroleum fractions — thermal and catalytic cracking — octane number, cetane number — antiknocking agents - unleaded petroleum — petrochemicals — synthetic petrol.

Fertilizers — classification — important manures — manufacture and uses of urea — super phosphate — calcium ammonium nitrate (CAN) fertilizer.

Unit V: Polymers **12 Hours**

Polymers — general characteristics — plastics — elastomers and fibres — thermoplastics and thermosetting plastics - methods of polymerization — bulk — suspension and solution polymerization. Uses of polycarbonates — polyurethanes — epoxy resins and teflons (PTFE).

Text Books:

Unit I

1. B.S.Bah1 and Arun Bah1, Advanced Organic Chemistry, S.Chand & Co., Ltd., 2008.

Unit II & III

1. B.R.Puri, L.R.Sharma and K.C.Kalia, Principles of Inorganic Chemistry, Villabh Publishing , 2003.

Unit-IV & V

1. M.K. Jain and S.C.Sharma, Modern Organic Chemistry, Vishal Publishing Co., 2011.

Reference Books:

Unit I

1. M.K. Jain and S.C.Sharma, Modern Organic Chemistry, Vishal Publishing Co., 2011.

Unit II

1. R.D.Madan, Satya Prakash's Modern Inorganic Chemistry, S.Chand & Co., Ltd., 2008.
2. P.L.Soni and Mohan Katiyal, Textbook of Inorganic Chemistry, Sultan Chand & Sons, 2008.

Unit III

1. P.L.Soni, Textbook of Physical Chemistry, Sultan Chand & Sons, 2008.

Unit IV

1. K.S.Tewari, N.K.Vishnoi and S.N.Mehrota, A Text book of Organic Chemistry, 2nd revised edition, Vikas publishing house PVT LTD, New Delhi, 2005.

Unit V

1. P.L.Soni, Textbook of Physical Chemistry, Sultan Chand & Sons, 2008.

e-Resources:

1. https://www.priyamstudycentre.com/chemistry/organic-compound
2. https://youtu.be/XklMKuEAWdU
3. https://www.adichemistry.com/inorganic/hydrogen/H2/hydrogen.html
4. https://en.m.wikipedia.org/wiki/Isotopes_of_hydrogen
5. https://byjus.com/jee/colloids/
6. https://youtu.be/QAH-cCK1bS8
7. https://en.m.wikipedia.org/wiki/Petroleum_refining_processes
8. https://youtu.be/Dmn1X_z985A
9. https://www.britannica.com/science/polymer/Synthetic-polymers
10. https://youtu.be/t9UtS70GR44

SEMESTER: III

ALLIED: 3	**CELL BIOLOGY, DEVELOPMENTAL BIOLOGY, PHYSIOLOGY, IMMUNOLOGY AND EVOLUTION**
Contact hours per Week – 4 hours	***Credits: 4***
Contact hours per Semester – 60 hours	***Subject Code:* U24ZYAX31**
Course Outcomes: At the end of this course, the students will be able to	
CO 1: Understand various structure and functions cell and organelles.	
CO 2: Study about the development and function of various organs in animal body.	
CO3: Find out ancestral development in earth.	
CO 4: Differentiate the structure and functions of various immune organs.	
CO 5: Comprehend the types and causes of cancer.	

Unit I (**12 hours)**

Cell Biology

Structure and functions of animal Cell- cell membrane- cell organelles- mitochondria, endoplasmic reticulum, Golgi complex, ribosomes. Cancer- site of infection- types- causes – treatment.

Unit II (**12 hours)**

Developmental Biology

Structure of sperm and ovum in frog- Gametogenesis-cleavage, blastulation and gastrulation. Human reproductive system, birth control –Test tube baby.

Unit III **(12 hours)**

Physiology

Digestion and absorption of Carbohydrates, proteins and lipids- Structure of Nephron. Neuron and conduction of Nerve impulse.

Unit IV (**12 hours)**

Immunology

Types of immunity (Innate and Acquired immunity) - Lymphoid organs (Primary and Secondary)– Immunoglobulin-IgG- Antigen antibody reactions.

Unit V (**12 hours)**

Evolution

Paleontological evidences for evolution- Lamarckism- Darwinism- Modern synthetic theory, Allopatric and sympatric speciation- cultural evolution of man.

Textbooks:

1. Cell Biology, Molecular biology, Genetics, Immunology, And Biotechnology, Arumugam. N. (2007), Saras publication, Nagercoil.
2. Physiology, Developmental biology, Biochemistry, Microbiology and Evolution, Arumugam. N., (2007), Saras publication, Nagercoil.

Reference Books:

1. Chordate embryology, PS Verma & VK .Agarwal, (2012), Chand Publication
2. Fundamentals of biochemistry for medical students, Ambika Shanmugam (2007),
3. Evolution, Veera bala Rastogi-.
4. Animal Physiology, Rastogi-
5. Immunology –Ivan Roitt

IV - SEMESTER

Course Title : Core-IV – Bryophytes, Pteridophytes, Gymnosperms and Paleobotany	**Total Hours :60**
Course Code : U24BYC41	**Total Credits : 4**

Course Outcomes:

COs	**CO Statement**
CO1	Gain knowledge on structure and reproduction of Bryophytes
CO2	Familiarize with the structure and reproduction of Pteridophytes
CO3	Know about the structure and reproduction of Pteridophytes
CO4	Acquire knowledge on structure and reproduction of Gymnosperms
CO5	Know about the evolution of various groups of plants and fossils of Pteridophytes and Gymnosperms during various geological eras

Unit I **(12-hours)**

General characters of Bryophytes; Classification of Bryophytes by Rothmaler (1951); Morphology, reproduction and structure of Gametophyte and Sporophyte of the following: (Except developmental stages)

a) Marchantiales - *Marchantia*
b) Polytrichales - *Polytrichum.*

Unit II **(12-hours)**

General characters of Pteridophytes; Classification of Pteridophytes (G.M Smith, 1955). Structure and reproduction of the following: (Except developmental stages)

a) Psilotales - *Psilotum*
b) Lycopodiales - *Lycopodium*

Unit III **(12-hours)**

Structure and reproduction of the following: (Except developmental stages)

a) Equisetales - *Equisetum*
b) Marsiliales - *Marsilea*

Unit IV **(12-hours)**

General characteristic features of Gymnosperms; Morphological and anatomical structure of needle and stem of *Pinus*; Reproduction of *Pinus* (Except developmental stages).

Unit V

Paleobotany **(12-hours)**

General classification of geological time scale - Contributions of Birbal Sahni - Fossilization and types of fossils. Morphology and reproduction of *Rhynia*

***A field study / trip to research institute / Universities / Industrial visit should be carried out for atleast two days.**

Text Books:

- Pandey, B.P. College Botany - Algae, Fungi and Bryophyta Vol.1 S.Chand& Co. Ltd, Ram Nagar, New Delhi.
- Vasishta B.R. et al, Bryophyta - S Chand & Co., Ltd, New Delhi, 2010.
- Pandey B.P (2006). A text book of Botany (Bryophyta, Pteridophyta & Gymnosperms)
- Parihar, N.S(1965) - An Introduction to Embryophyta Vol II (Pteridophytes)
- Vashishta.P.C,1999,Gymnosperms. S.Chand & Company Ltd,New Delhi.
- Vashishta.P.C,1999,Pteridophytes. S.Chand & Company Ltd,New Delhi.

Reference Books:

- Vashishta (2010) - Bryophyta
- Sporne. K.R (1975) - Morphology of Pteridophytes.
- OP. Sharma (2012) - Pteridophyta
- Chopra, G.L(1992) - Gymnosperms.
- Sporne K.R(1965) - The Morphology of Gymnosperms.
- Shukla and Misra (1986) - Essentials of Paleobotany.
- Karl Ulrich Kramer &; P. S. Green. General References for Pteridophytes

e-Resources:

1. https://www.biologydiscussion.com/pteridophytes/pteridophytes-and-gymnosperms-comparison-plants/73478
2. https://onlinelibrary.wiley.com/doi/full/10.1111/eva.12839
3. https://www.easybiologyclass.com/economic-importance-of-gymnosperms-short-notes/
4. https://books.google.co.in/books?id=uPxGAQAAIAAJ&pg=PA165&lpg=PA165&dq=PTERIDOPHYTES+ANDG+YMNOSPERMS+e+resources&source=bl&ots=-w-ZvtLLxz&sig=ACfU3U1z7Mg9er6Cwfdy_ioiNiJSYfSkqQ&hl=ta&sa=X&ved=2ahUKEwid4Ozy9o76AhX4rJUCHZbLAvEQ6AF6BAgKEAE#v=onepage&q=PTERIDOPHYTES%20ANDG%20YMNOSPERMS%20e%20resources&f=false

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Course Title : LAB IV - Bryophytes, Pteridophytes, Gymnosperms and Paleobotany	**Total Hours: 30**
Course Code : U24BYCP41	**Total Credits : 1**

Course Outcomes:

COs	**CO Statement**
CO1	Develop skill in the microscopic observation of the anatomy of vegetative and reproductive structures of Bryophytes and Pteridophytes
CO2	Develop skill in observing the anatomy of Gymnosperm woods.
CO3	Know about the internal morphology of Fossils

CO4	Become expertise in making sketches of the sections observed under dissection microscope and compound microscope.
CO5	Get trained in the preparation of double stained permanent slides of wood and stem sections

Practical Syllabus

1. Study the external and internal morphology of *Marchantia* and *Polytrichum.*
2. Study the external and internal morphology of Stem, Leaves and Cones- *Psilotum, Lycopodium , Equisetum* and *Marsilea*
3. Study the external and internal morphology of Stem, Leaves and cones - *Pinus*
4. Prepare two permanent slides
5. Observe the fossil slide prescribed in the syllabus.

SEMESTER IV

Part III — Allied subject II — GENERAL CHEMISTRY —II for Biological science

Hours per week: 4 **Credits: 3** **Subject Code: U24CHAY41**

Course Outcome:

CO1: To study the separation of chemicals by chromatography techniques.
CO2: To know the classification of proteins, structure and function of nucleic acids and
Hormones, and the basics of vitamins
CO3: To learn the basics of chemical calculation
CO4: To acquire a knowledge on detection and estimation of elements
CO5: To gain adequate knowledge on dyes

Unit I: Chromatography **12 Hours**

Basic principles of common types of chromatography — Paper chromatography — thin layer chromatography — column chromatography — Ion exchange chromatography. Applications of each technique.

Unit II: Protein, Nucleic acids, Hormones and vitamins **12 Hours**

Definition — classification of proteins — colour reaction of proteins — Nucleic acids — nucleoside — nucleotides and general structure of DNA. Hormones — classification — structure of some sex hormones — oestrone and testosterone. Vitamins — classification of vitamins — sources and deficiencies of Vitamins A, B1, C, D, E and K (structural elucidation not required).

Unit III: Basic chemical calculation **12 Hours**

Significant numbers — SI Units— calculation of formula weight–understanding Avogadro number — mole concept — mole fraction of the solvent and solute — conversion of grams into moles and moles into grams — stoichiometric equations.

Methods of expressing concentration of the solution: normality, molarity and molality — calculations based on principle of volumetric analysis.

Unit IV: Detection and estimation of elements **12 hours**

Detection of nitrogen, halogens and sulphur (Lassaigne's test) — estimation of

carbon and hydrogen (Liebig's method), sulphur and halogens (Carius method) — Determination of empirical and molecular formula — structural formula.

Unit V: Dyes **12 Hours**

Dyes - colour and constitutions — chromophore - auxochrome theory - classification of dyes by structure and methods of applications - preparation of methyl red, Bismarck brown, Malachite green, Indigo and Congo red.

Text Books:

Unit – I

1. B.R.Puri, L.R.Sharma and S.Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 2004.

Unit – II

1. M.K. Jain and S.C.Sharma, Modern Organic Chemistry, Vishal Publishing Co.,2011.

Unit – III

1. P.L.Soni and Mohan Katiyal, Textbook of Inorganic Chemistry, Sultan Chand &Sons, 2008.

Unit – IV

1. P.L.Soni, Textbook of Organic Chemistry, Sultan Chand & Sons, 2008.

Unit – V

1. M.K. Jain and S.C.Sharma, Modern Organic Chemistry, Vishal Publishing Co., 2011
2. B.S.Bahl and Arun Bahl, Advanced Organic Chemistry, S.Chand & Co., Ltd., 2008.

Reference Books:

Unit - I

1. B.R.Puri, L.R.Sharma and S.Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 2004.

Unit - II

1. P.L.Soni, Textbook of Organic Chemistry, Sultan Chand & Sons, 2008.

Unit - III

1. K.S.Tewari, N.K.Vishnoi and S.N.Mehrotra, textbook of organic Chemistry, Vikas house PVT Ltd, New Delhi, 1998.

Unit - IV

1. B.S.Bah1 and Arun Bah1, Advanced Organic Chemistry, S.Chand & Co., Ltd., 2008.

Unit - V

1. R.D.Madan, Satya Prakash's Modern Inorganic Chemistry, S.Chand & Co., Ltd., 2008.

e-Resourses:

1. https://microbenotes.com/chromatography-principle-types-and-applications/
2. https://youtu.be/8m7CeObsTIk
3. https://youtu.be/AUMJwjLXh1M
4. https://simple.m.wikipedia.org/wiki/Vitamin
5. https://en.m.wikipedia.org/wiki/Significant_figures
6. https://chemistryonline.guru/normality-molarity-molality-3/
7. https://youtu.be/aH-Cjyn8V_Y
8. https://www.adichemistry.com/organic/basics/analysis/lassaig

nes/lassaignes- test.html
9. https://youtu.be/MhBEj32wZqE
10. https://www.britannica.com/technology/dye

Part III — Allied Chemistry Lab I — LAB: VOLUMETRIC ANALYSIS
Hours per week: 2 Subject Code: U24CHAYP41 **Credits: 2**

Course Outcome:
CO1: To acquire the basic principles of volumetric titration,
CO2: To understand the basic knowledge on standard solution, molar and the indicator
CO3: To get the knowledge on the titration between acidimetry and alkalimetry
CO4: To develop the basic knowledge on permanganometry
CO5: To know the fundamental knowledge on iodometry.

(Exam to be conducted at the end of even Semester)
A double titration involving making up of the solution to be estimated or single titration involving making up of the solution to be estimated and the preparation of standard solution.

(a) Acidimetry and alkalimetry
1. Titration between a strong acid and strong base.
2. Titration between a strong acid and weak base.
3. Titration between a weak acid and strong base.

(b) Permanganometry
1. Titrations between potassium permanganate and oxalic acid, ferrous sulphate and ferrous ammonium sulphate.

(c) Iodometry
1. Titrations between sodium thiosulphate with potassium permanganate and potassium dichromate (demonstration only)

SEMESTER: IV

ALLIED: 4	**COMMERCIAL ZOOLOGY (VERMICULTURE, APICULTURE, AQUACULTURE AND POULTRY SCIENCE AND DAIRY FARMING)**
Contact hours per Week – 4 hours	***Credits: 4***
Contact hours per Semester – 60 hours	***Subject Code:*** **U24ZYAX41**
Course Outcomes: At the end of this course, the students will be able to	
CO1: understand the concepts of maintain animals like earthworms, honey bees, fishes, chicks and cattle.	
CO2: develop the students as entrepreneur of the zoology	
CO3: apply the rearing methods of insects and cattle.	
CO4: construct a fish pond to culture Indian major carps.	
CO5: Comprehend the management of poultry.	

Unit I **12 hours**

Vermiculture

Cultivatable species of earthworms-*Eisenia fetita, Endrilus eugeniae, Perionyx excavates* and *Lampito mauritti* - Vermicomposting methods (Pit, Heap, Tray and Bed methods) -conditions required for vermicomposting- vermicast- vermiwash.

Unit II **12 hours**

Apiculture

Life history of honey bee, kinds of honey bee-types of hives-newton's hive and other appliances, enemines (Bee wax moth and Wasps) and diseases of honey bee (*Nosema* and *Acarine* deseases) –Medicinal values of honey.

Unit III **12 hours**

Aquaculture

scope of aquaculture –aquaculture in India-Culturable organisms (Cata, Rohu and Mrigal) - construction of fish pond-Culture of Indian major carps, induced breeding-prawn culture- pearl culture.

Unit IV **12 hours**

Poultry science

Breeds of fowls-poultry industry in India-Choosing of parents- sexing of day old chick construction of poultry house- deep litter system- Cage system-Rearing of layers and broilers- nutritive value of egg-poultry diseases (common diseases like Raniket diseases, coryza, fowl pox, polyneuritis, coccidiosis, curled toe)

Unit V **12 hours**

Dairy farming

Importance of dairy farming, dairy animals-cattle cow –buffalo-goat (any one example to each)- management of a model dairy farm-live stock diseases- foot and mouth diseases, udder diseases, Rinder pest – nutritive values of milk and milk products.

Textbooks

1. Arumugam .n, Murugan.T,Johnson Rajeswar.J,Ram Prabhu.R, 2009 Applied zoology,saras publication,Nagarkovil

Reference Books

1. Sharma, Bee Keeping in India, ICAR Publications.
2. Ganamani.M.R., 2010 Modern aspects of Commercial poultry keeping, Giri Publications, Madurai
3. Sulthan Ismail,Vermitechnology, Chennai
4. Jamson and Santhanakumar, Concepts of Aquaculture,

LAB: CELLBIOLOGY, DEVELOPMENTAL BIOLOGY, PHYSIOLOGY, IMMUNOLOGYAND EVOLUTION & COMMERCIAL ZOOLOGY

(To be done at the end of the Fourth semester)

Contact hours per week: 2 hours ***Subject Code:*** **U24ZYAXP41**

Credits: 2

List of Practical

1. Preparation of Onion root tip and observe the Mitotic stages.
2. Preparation of Squamous epitheilial cells.
3. Qualitative test for Ammonia, Urea and Uric acid.
4. Qualitative test for Protein, Carbohydrate and lipids.
5. Mounting of mouth parts , sting of Honey bees- Demo only

List of Spotters

1. Mitochondria , Golgi Body , Endoplasmic reticulum, lysosome and Ribosome
2. Mitosis –Stages identification
3. Meiosis -stages identification
4. Following stages of frog embryo i)Egg ii)Sperm iii)Blastula iv) Gastrula
5. Primary lymphoid organ – Thymus.
6. Secondary lymphoid organ – Spleen.
7. Paper cutting of Giraffe neck growth to explain Lamarckism
8. Identification of Catla ,Roghu, Mrigal
9. Model fish pond
10. Vermicompost
11. Newton's hive
12. Poultry feeds, feeder and waterers
13. Milk and their by products.
