B. Sc. Zoology

Syllabus

AFFILIATED COLLEGES

Program Code: 22F

2020 – 2021 onwards

BHARATHIAR UNIVERSITY

(A State University, Accredited with “A” Grade by NAAC, Ranked 13th among Indian Universities by MHRD-NIRF, World Ranking: Times -801-1000, Shanghai -901-1000, URAP - 982)

Coimbatore - 641 046, Tamil Nadu, India
The B. Sc. Zoology program describe accomplishments that graduates are expected to attain within five to seven years after graduation.

<table>
<thead>
<tr>
<th>PEO</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEO1</td>
<td>Enhanced the professional skills by means of continuous education and development.</td>
</tr>
<tr>
<td>PEO2</td>
<td>Express a mastery of discipline, precise information and exhibit analytical and practical skills.</td>
</tr>
<tr>
<td>PEO3</td>
<td>Exhibit professional integrity and the capability for ethical decision making.</td>
</tr>
<tr>
<td>PEO4</td>
<td>Graduate will recognize the need and apply their knowledge in general and various discipline areas.</td>
</tr>
<tr>
<td>PEO5</td>
<td>Pursue lifelong learning and continuous improvement of their knowledge and skills in the diverse field with the highest professional and ethical standards.</td>
</tr>
<tr>
<td>PEO6</td>
<td>Skill to function on multidiscipline environment to meet desired needs within realistic constraints such as environmental, social, ethical, health, safety, and sustainability.</td>
</tr>
<tr>
<td>PEO7</td>
<td>Understand the local, National and global issues related to the development and to be considerate of the impact of the issues.</td>
</tr>
<tr>
<td>PEO8</td>
<td>Exhibit the ability to communicate effectively and to function successfully as a team member and leader.</td>
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<tr>
<td>PEO9</td>
<td>Ability to explore and assess research work on the field of emergencies and adversity particularly in the field of the Public Health aspects.</td>
</tr>
<tr>
<td>PEO10</td>
<td>Capacity to obtain, analyses, and communicate in order to formulate strategies for mitigation in future scenarios with the ability to clearly present and discuss their conclusions and the knowledge behind them.</td>
</tr>
</tbody>
</table>
PROGRAM SPECIFIC OUTCOMES (PSOs)

<table>
<thead>
<tr>
<th>PSO</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSO1</td>
<td>To provide Knowledge of various animals from primitive to highly evolved forms.</td>
</tr>
<tr>
<td>PSO2</td>
<td>To understand prospective of various branches of Zoology and analyze the interaction between animals with their ecosystems.</td>
</tr>
<tr>
<td>PSO3</td>
<td>Understanding the morphology and functional characteristic at cellular and sub-cellular (molecular) level.</td>
</tr>
<tr>
<td>PSO4</td>
<td>To equip students with laboratory skills as well as field based studies to make a successful career in Zoology.</td>
</tr>
<tr>
<td>PSO5</td>
<td>To highlight biodiversity and its need, make aware about methods of conservation and sustainability.</td>
</tr>
<tr>
<td>PSO6</td>
<td>Understand the applications of Zoology in daily life, Medicine, Apiculture, Aquaculture, Industrial Microbiology and Agriculture.</td>
</tr>
<tr>
<td>PSO7</td>
<td>Gain knowledge about research methodologies, problem solving methods and effective communication skills.</td>
</tr>
<tr>
<td>PSO8</td>
<td>To ensure quality performance, achieve excellence in education and scientific research in the field of Zoology.</td>
</tr>
</tbody>
</table>
## PROGRAM OUTCOMES (POs)

<table>
<thead>
<tr>
<th>PROGRAM OUTCOMES (POs)</th>
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</thead>
<tbody>
<tr>
<td>On successful completion of the B. Sc. Zoology program</td>
<td></td>
</tr>
<tr>
<td><strong>PO1</strong></td>
<td>Students are able to study animals of diverse phyla, their distribution and their association with the surroundings.</td>
</tr>
<tr>
<td><strong>PO2</strong></td>
<td>Students gain information and skill in the fundamentals of animal sciences, understands the multifarious connections along with different living organisms.</td>
</tr>
<tr>
<td><strong>PO3</strong></td>
<td>Students achieve knowledge of internal structure of cell, its functions in control of various metabolic functions of organisms. Correlates the physiological, Biochemical processes of animals and relationship of organ systems.</td>
</tr>
<tr>
<td><strong>PO4</strong></td>
<td>Students will be able to compare and distinguish the characteristics of animals that discriminate them from other forms of life.</td>
</tr>
<tr>
<td><strong>PO5</strong></td>
<td>Understands the complex evolutionary processes and behavior pattern of different animals.</td>
</tr>
<tr>
<td><strong>PO6</strong></td>
<td>Understanding of environmental conservation processes, pollution control methods and its importance. Students also gain knowledge and awareness about biodiversity as well as the importance of protection of endangered species.</td>
</tr>
<tr>
<td><strong>PO7</strong></td>
<td>Achieve knowledge in applied fields like Sericulture, Poultry forming and Apiculture alongside Statistical and Laboratory techniques.</td>
</tr>
<tr>
<td><strong>PO8</strong></td>
<td>Understands about various concepts and importance of Biotechnology, Bioinformatics, Genetics, Genetic engineering in industry and day today human life.</td>
</tr>
<tr>
<td><strong>PO9</strong></td>
<td>Apply ethical principles and assign to professional ethics and responsibilities in delivering his duties.</td>
</tr>
<tr>
<td><strong>PO10</strong></td>
<td>Understanding of Zoology to one’s own life and apply the knowledge judicially and remain constantly employable.</td>
</tr>
</tbody>
</table>
BHARATHIAR UNIVERSITY: COIMBATORE 641 046
B. Sc., ZOOLOGY CURRICULUM
(For the students admitted during the academic year 2020 – 21 onwards)

<table>
<thead>
<tr>
<th>Part</th>
<th>Course Code</th>
<th>TITLE OF THE COURSE</th>
<th>Credits</th>
<th>HOURS</th>
<th>MAXIMUM MARKS</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Theory</td>
<td>Practical</td>
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<tr>
<td>FIRST SEMESTER</td>
<td></td>
<td></td>
<td></td>
<td>MAXIMUM</td>
<td></td>
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<tr>
<td>I</td>
<td>11T</td>
<td>Language I</td>
<td>4</td>
<td>6</td>
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<tr>
<td>II</td>
<td>12E</td>
<td>English I</td>
<td>4</td>
<td>6</td>
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<tr>
<td>III</td>
<td>13A</td>
<td>Core Course I: Animal Diversity – Non Chordate</td>
<td>4</td>
<td>6</td>
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<td>III</td>
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<td>-</td>
<td>-</td>
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<tr>
<td>III</td>
<td>1AH</td>
<td>Allied A Course I Chemistry/Botany/ Biochemistry</td>
<td>3</td>
<td>4</td>
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<tr>
<td>IV</td>
<td>1FA</td>
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SECOND SEMESTER

| I    | 2IT         | Language II         | 4       | 6      | -        | 25  | 75  | 100   |
| II   | 22E         | English II          | 4       | 6      | -        | 25  | 75  | 100   |
| III  | 23A         | Core Course II: Animal Diversity – Chordate | 4 | 6 | - | 25 | 75 | 100 |
| III  | 23P         | Core Practical I    | 4       | -      | 4        | 40  | 60  | 100   |
| III  | 2AH         | Allied A Course II Chemistry/Botany/Biochemistry | 3 | 4 | - | 20 | 55 | 75 |
| III  | 2PH         | Allied Practical    | 2       | 2      | -        | 20  | 30  | 50    |
| IV   | 2FB         | Value Education – Human Rights | 2 | 2 | - | - | 50 | 50 |
| Total|             |                     | 23      | -      | -       | -   | -   | 575   |

THIRD SEMESTER

| I    | 3IT         | Part I-Language III | 4       | 6      | -        | 25  | 75  | 100   |
| II   | 32E         | Part II-English III | 4       | 6      | -        | 25  | 75  | 100   |
| III  | 33A         | Core Course III: Comparative Anatomy of Vertebrates. | 4 | 5 | - | 25 | 75 | 100 |
| III  | Core Practical II |                    | - | - | 2 | - | - | - |
| III  | 3AJ         | Allied B Course I Botany Chemistry/Biochemistry | 3 | 4 | - | 20 | 55 | 75 |
| III  | Allied Practical |                    | - | - | 2 | - | - | - |
| IV   | 3ZA         | Skill Based I: Sericulture | 3 | 3 | - | 20 | 55 | 75 |
| IV   | 3FC         | Non Major Elective I * | 2 | 2 | - | - | 50 | 50 |
| Total|             |                     | 20      | -      | -       | -   | -   | 500   |
### FOURTH SEMESTER

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<td>Core Course IV: Ecology, Evolution and Zoogeography</td>
<td>4</td>
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<td>4PJ</td>
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<td>-</td>
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<td>Skill Based II: Biostatistics and Computer Applications</td>
<td>3</td>
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### FIFTH SEMESTER

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<td>Core Course V: Cell Biology and Biochemistry.</td>
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<td>Core Practical IV</td>
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<tr>
<td>IV</td>
<td>5ZC</td>
<td>Biophysics and Instrumentation.</td>
<td>3</td>
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### SIXTH SEMESTER

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<td>III</td>
<td>63A</td>
<td>Core Course VIII: Animal Physiology.</td>
<td>4</td>
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<td>Core Course IX: Developmental Biology.</td>
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<td>5</td>
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<td>Core Course X: Biotechnology.</td>
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**Skill Based Course IV:**
Practical

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<th>Skill Based Course IV: Practical</th>
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<td>V</td>
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<td>Extension activities**</td>
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<td><strong>TOTAL</strong></td>
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<td><strong>GRAND TOTAL</strong></td>
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<td>-</td>
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</table>

**ONLINE COURSES**

1. SWAYAM
2. MOOC’S

* Non Major Elective I: Basic Tamil I / Advanced Tamil I / Yoga / Women studies and Non major Elective II: Basic Tamil II / Advanced Tamil II / General Awareness.

* It is compulsory that those who opt for any languages other than Tamil, they should choose Basic Tamil (Who don’t studied Tamil) or Advanced Tamil (For those who studied Tamil up to HSC).

**Only internal marks.

# Elective Courses

**List of Elective courses**

(Conracts can choose one course from Elective I & II, Elective III will be the practical of Elective II)

<table>
<thead>
<tr>
<th>Elective Course I</th>
<th>A</th>
<th>Human Genetic and Counseling – Course I &amp; II.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Pest and their control – Course I &amp; II.</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>Wild life management and Conservation – Course I &amp; II.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elective Course II</th>
<th>A</th>
<th>Pathology and clinical laboratory technology – Course I &amp; II.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Poultry science &amp; Management – Course I &amp; II.</td>
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<tr>
<td></td>
<td>C</td>
<td>Apiculture – Course I &amp; II.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elective Course III</th>
<th>A</th>
<th>Pathology and clinical laboratory technique – Practical.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Poultry science and Management – Practical.</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>Apiculture – Practical.</td>
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#VALUE ADDED COURSE (OPTIONAL)

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<tr>
<th>S. No</th>
<th>PAPAERS</th>
<th>TOTAL MARKS</th>
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<tbody>
<tr>
<td>1.</td>
<td>Medical Emergence Management.</td>
<td>100</td>
</tr>
<tr>
<td>2.</td>
<td>Vermitechology</td>
<td>100</td>
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<tr>
<td>3.</td>
<td>Economics of Conservation</td>
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<tr>
<td>4.</td>
<td>Intellectual Property Rights</td>
<td>100</td>
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</table>
First Semester
Course Code: 13A

ANIMAL DIVERSITY - NONCHORDATA

Core Course - I

Core/Elective/ SBS: Core Course

Pre-requisite: Basic Knowledge of Non-Chordata

Syllabus Version: 2020 – 2021

Course Objectives:
1. To identify the phyla of invertebrate animals, and recognize their distinguishing features.
2. To understand the taxonomy, relationship and evolution of animals.
3. To understand the role of invertebrates in biological communities, ecological interactions, and conservation problems.
4. To appraise the diversity of animals in a phylogenetic context.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:

1. Understand the diversity and general taxonomic rules on animal distribution
2. The learner will be able to identify the animal at basic level and get an idea of adaptation and importance of non-chordata.
3. Imparts theoretical knowledge about distribution of invertebrate fauna in different zoogeographical realms
4. Understand the importance of its conservation, sustainable economic utilization and its potentials in technological prospects.

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

Unit: 1
CLASSIFICATION AND PROTISTA

17 hours

Concept of five kingdom classification of life.
Introduction to Protista and Animal kingdom – Systems of Classification and Nomenclature - levels of organization - Types of symmetry. General characters of Protista and Classification with examples.
Type study: Paramecium.

Unit: 2
PORIFERA AND COELENTERATA

17 Hours

Characters and classification (up to class) of Porifera and Coelenterate with examples. Salient features of Ctenophora.
Type study: Leucosolenia, Obelia Colony.
General Topics: Canal system in sponge, Polymorphism in Coelenterate, Diversity (Types) of corals and structure of coral polyp, Coral reefs.

Unit: 3
PLATYHELMINTHES, ASCHELMENTHIES AND ANNELIDA

18 Hours

Characters and classification (up to class) of Platyhelminthes, Aschelmenthies and Annelida with...
examples. **Type study:** *Taenia, Ascaris, Megascolecom.*

**General Topics:** Coelom, Coelomoducts and Metamerism, Parasitic adaptations in Helminthes and Annelids, Filter feeding in Polychaetes.

**Unit: 4**

**ARTHROPODA**

<table>
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<tr>
<th>18 Hours</th>
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</table>

Characters and classification (up to class) of Arthropoda with examples. Brief descriptions of *Limulus* (living fossil), Sacculina (Parasitic castration), Copepods, Scorpion, Spider, *Peripatus* (Affinities), Millipeds and Centipeds.

**Type study:** Cockroach and Prawn,

**General Topics:** Crustacean larvae.

**Unit: 5**

**MOLLUSCA, ECHINODERMATA AND HEMICHORDATA.**

<table>
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<tr>
<th>18 Hours</th>
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</thead>
</table>

Characters and classification (up to class) of Mollusca and Echinodermata with examples. Characters of Hemichordata. Brief descriptions of Fresh water Mussel, *Chiton, Sepia,* Starfish, Sea cucumber and Balanoglossus.

**Type study:** Pila, Starfish (External Features and Water Vascular system)

**General Topics:** Larval forms of Mollusca, Torsion and De-torsion in Mollusca, Economically important Mollusca, Echinoderma larva, Evolutionary affinities of Hemichordate.

**Unit: 6**

**CONTEMPORARY ISSUES**

<table>
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<th>2 Hours</th>
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Expert lectures, Online Seminars - Webinars and Field Visits.

**Total Lecture hours**

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<th>90 Hours</th>
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</thead>
</table>

**Text Book(s)**


**Reference Books**


**Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]**
Course Designed By: Dr. A. RAJA RAJESWARI, Asst. Prof, Sri Vasavi College, Erode.

<table>
<thead>
<tr>
<th>COs</th>
<th>PO1</th>
<th>PO2</th>
<th>PO3</th>
<th>PO4</th>
<th>PO5</th>
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*S-Strong; M-Medium; L-Low
Course code | 23A | ANIMAL DIVERSITY - CHORDATA | L | T | P | C
---|---|---|---|---|---|---
Core/Elective/ SBS | Core Course - II | 4 | 0 | 0 | 4
Pre-requisite | Basic knowledge of Chordata | Syllabus Version | 2020 – 2021

Course Objectives:
1. To understand the taxonomy and relationship and evolution of animals.
2. To identify the class of vertebrate animals, and recognize their distinguishing features.
3. To appraise the diversity of animals in a phylogenetic context.
4. To understand how different body designs solve biological problems related to physiological and environmental challenges.
5. To develop an appreciation for the role of vertebrates in biological communities, ecological interactions, and conservation problems.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:

1. Understand the diversity of chordates and their classification. K2
2. Analyze the significant adaptive features in Fishes, Amphibians, Reptiles, Aves and Mammals. K4
3. Understand physiological and anatomical peculiarities, adaptations necessary to survive in diverse adaptive zones. K2
4. Familiarize with gradual development of habit and habitats of various animals and physiological system of chordate K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

Unit:1 | FISHES | 17 Hours
---|---|---
General characters and classification of Chordata (up to class) with examples. Brief descriptions of *Amphioxus, Ascidia, Hag fish, Scolidon, Mullet, Anabas, Cat fish, Sea horse.*
**General topics:** Affinities of Prochordates, Accessory respiratory organs in Teleost, Types of Fins and function Comparison of Teleost and elasmobranches, Evolutionary significance of Dipnoi, Migration of Fishes.

Unit:2 | AMPHIBIA | 17 Hours
---|---|---
Classification and characters of Amphibia (up to order with examples). Habitat, classification, examples and brief descriptions of Frog, Toad, Salamander, Ambystoma, Tree frog.
**General topics:** Origin of Amphibia, Metamorphosis of Frog, Limbless amphibians, Parental care in amphibian, Paedomorphosis.

Unit:3 | REPTILITA | 18 Hours
---|---|---
Classification and characters of Reptilia (up to order with examples). Habitat, classification,
examples and descriptions of *Calotes*, *Sphenodon*, Varanus, Chameleon, Snakes, Chelonia and Crocodilia

**General topics:** Identification of Poisonous and non-poisonous snakes – Poison apparatus and types of poison.

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<th>Unit:4</th>
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<th>18 Hours</th>
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<td>Classification and characters of Aves (up to order with examples). Habitat, classification, examples and brief descriptions of Pigeon, Horn bills, Kingfisher, Heron, Parrot, Wood pecker, Finches and Sunbird.</td>
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**General topics:** Flightless Birds, Flight Adaptations in Birds, Feet and Beak modifications, Wetland birds, Sound production in Birds.

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<th>Unit:5</th>
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<td>Classification and characters of Mammals (up to order with examples). Habitat, classification, examples and brief descriptions of Kangaroo, Bat, Rabbit, <em>Panthera</em>, <em>Hyena</em>, Monkey, Apes, Deer, Elephant and <em>Rhinoceros</em>.</td>
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**General topics:** Diversity of Marsupials, Affinities of Echidna, Dentition in Mammals, Aquatic mammals and adaptation, Odd and even toed ungulates, Insectivorous mammals, Adaptive radiation in Mammals, Oestrous cycle in mammals.

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<th>Unit:6</th>
<th>CONTEMPORARY ISSUES</th>
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<td>Expert lectures, Online Seminars - Webinars and Field Visits.</td>
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**Total Lecture hours:** 90 Hours

**Text Book(s)**


**Reference Books**


## Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

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**Course Designed By:** Dr. A. RAJA RAJESWARI, Asst. Prof, Sri Vasavi College, Erode.

### Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
Course code: 23P

Core/Elective/ SBS: CORE PRACTICAL - I

Pre-requisite: Practical knowledge of Non-Chordata and Chordata

Syllabus Version: 2020 – 2021

Course Objectives:
1. Learn and be familiar with the Laboratory techniques by means of using digital different methodologies.
2. Examine and understand the external and internal anatomy of Invertebrate and Chordate.
3. To understand the taxonomic position, body organization and evolutionary relationship of animals.
4. To inculcate the significance of various non chordates and chordates.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:

1. Evaluate the biological significance and structure and functions of various animals. K5
2. Able to enlighten the adaptation and unique characters of animals and their role in the development. K2
3. Apply knowledge and come to know how to handle different organisms. K3
4. Analyze and to observe various specimens by using Microscope. K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

INSTRUCTION:
The Board of studies do not encourage the dissection of animals and advised to rely of alternative digital methods. Those departments undertaking dissection should compulsorily constitute a dissection monitoring committee as per UGC rules. It is to be ensured that the animals used for dissection is not removed from the wild and is in compliance with UGC regulations time to time. It is the duty of the college/department to adhere strictly to the Wildlife Protection Act and its amendments.

MAJOR PRACTICAL

Prawn / Cockroach / Earthworm/ Fish (Any two) Digestive System and Nervous system.
Micrometry measurement of given Protozoan /Micro arthropod / Any sample.

MINOR PRACTICAL

1. Prawn/ Cockroach/Mosquito (Any two): Mounting of Appendages /
   Mouth parts Earth worm: Mounting of body setae
2. Fish: Mounting of Scales

SPOTTERS

1. Classify Giving Reasons:
   Paramecium, Obelia, Liver Fluke, Ascaris, Pila, Star Fish, Balanoglossus, Any Fish, Tree Frog, Snake, King Fisher And Bat.

2. Draw Labeled Sketches:
   Trochophore, Any Echinoderm Larvae.

3. Biological Significance:
Paramecium – Conjugation, Malaria Parasite, Gemmules, Limulus, Hippo Campus, Nautilus. Axolotl Larva,

4. Relate Structure And Function:
Spicules Of Sponges, Scolex Of Tapeworm, Nereis Parapodium, Carapace And Plastron, Electric Organ – Narcine.

5. Descriptive Notes:
Hydra, Physalia, Rotifer, Sea Cucumber, Chiton, Placoid Scales, Chameleon, Quill Feather.

VISIT AND SUBMISSION OF REPORT
1. To any nearby area of biodiversity significance (Report should be included in record).
2. Photo Album of invertebrates and Vertebrates with identification and classification (Evaluation of report should be based on field effort, diversity of photos, classification and identification. Costly presentation of photos albums should compulsorily be discouraged, as the objective of this is to make students familiar with fauna).

QUESTION PATTERN: 60 MARKS
Major: 20, Minor: 10, Record: 5, Spotter: 15 (5 spotters each carry 3 marks), Album: 10 marks.

Total Practical hours 60 (Each Semester) x 2 = 120 Hours Per Year

Text Book(s)

Course Designed By: Dr. A. RAJA RAJESWARI, Asst. Prof, Sri Vasavi College, Erode.

Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low
Course code: 33A  
COMPARATIVE ANATOMY OF VERTEBRATES  

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<td>Syllabus Version</td>
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**Course Objectives:**

1. Recognition of the morphological and anatomical structure for the major groups of vertebrates from an evolutionary point of view.

2. Gain understanding of how organism form, function and diversity evolved

3. To understand the structural complexity in advanced taxa.

**Expected Course Outcomes:**

On the successful completion of the course, student will be able to:

1. Familiarize with structural organization, biology, and functioning of each organ and formation of organ systems.  

2. Students also gain knowledge about fundamental steps in vertebrate development and understand the increasing complexity of organ systems with advancement of evolution.

3. The students will be able to describe the vertebrate structures and relate morphology, function and evolution.

4. Relate the concepts of homology, analogy, morphogenesis, ontogeny, and phylogeny relative to the anatomical features of vertebrates.

5. Provide a strong basic insight in understanding advanced courses like Physiology and Biochemistry.

**K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create**

**Unit: 1**  
DIGESTIVE AND RESPIRATORY SYSTEM  
15 Hours


**Unit: 2**  
NERVOUS SYSTEM  
14 Hours

Comparative account on structure of Brain, Cranial and spinal nerves of Shark, Frog and Rabbit. Sense organs of vertebrates.

**Unit: 3**  
SKELETAL SYSTEM  
15 Hours

Regions of Vertebral column - Structure of typical vertebrae - Types of vertebrae – Ribs and sternum. Comparison of Skull, Pelvic, pectoral girdle and limbs of Shark, Frog and Rabbit. Account of skull of Reptiles. Exoskeleton of Vertebrates (Scales, Feathers, hairs etc.).

**Unit: 4**  
CIRCULATION AND MUSCULATURE  
15 Hours
Aorta and aortic arches – Comparative account of heart, arterial system and venous system in shark, frog, *Calotes*, pigeon and rabbit. Brief account of appendicular musculature – Electric organs in fish.

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<th>Unit:5</th>
<th>UROGENITAL SYSTEM</th>
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<td>Comparison of Pronephros – Mesonephros and Metanephros with examples. Comparison of Urogenital system of frog</td>
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**Text Book(s)**

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**Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]**

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**Course Designed By:** Dr. A. RAJA RAJESWARI, Asst. Prof, Sri Vasavi College, Erode.

**Mapping with Programme Outcomes**

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*S-Strong; M-Medium; L-Low.*
Course code: 3ZA  
Core/Elective/ SBS: Skill Based Course - I
Pre-requisite: Basic knowledge on Silkworms and Rearing Techniques
Syllabus Version: 2020 – 2021

Course Objectives:
1. Introduce the concepts of origin, growth and study of Sericulture as science.
2. To develop a basic skill and knowledge in Sericulture.
3. Enlighten the general aspects of Sericulture industry.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:

1. The learner will be able to practice Sericulture as a passion or profession. K2
2. Understand the scientific approach of mulberry Cultivation and silk worm rearing techniques. K2
3. Able to identifying and follow regulation practices for the disease and pest control of the mulberry plant and silk worm. K3
4. Learn about the various skills that are necessary for self employment. K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

Unit: 1  
MULBERRY CULTIVATION  
9 Hours


Unit: 2  
SILK WORMS  
8 Hours


Unit: 3  
REARING  
9 Hours


Unit: 4  
DISEASES  
9 Hours

Hygiene conditions in silk production – Diseases of silk worm-Bacterial and Viral diseases – Prevention – Fungal infection to Cocoon. Disease of Mulberry trees- Protozoan and Bacterial diseases and Prevention.

Unit: 5  
PROCESSING  
8 Hours


Unit: 6  
CONTEMPORARY ISSUES  
2 Hours
Expert lectures, Online Seminars - Webinars and Field Visits.

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<tr>
<th>Text Book(s)</th>
<th>Total Lecture hours</th>
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**Reference Books**

| 3 Pradan S. (1983. *Agricultural Entomology and Pest Control*. Published by ICAR, New Delhi |                     |

**Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]**

| 1 [https://swayam.gov.in/nd2_cec19_bt05/preview](https://swayam.gov.in/nd2_cec19_bt05/preview) |                     |
| 2 [http://agritech.tnau.ac.in/sericulture/seri_dept%20of%20seri_training.html](http://agritech.tnau.ac.in/sericulture/seri_dept%20of%20seri_training.html) |                     |

Course Designed By: Dr. A. RAJA RAJESWARI, Asst. Prof, Sri Vasavi College, Erode.

**Mapping with Programme Outcomes**

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*S-Strong; M-Medium; L-Low*
Fourth Semester
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<th>ECOLOGY, EVOLUTION AND ZOOGEOGRAPHY</th>
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**Course Objectives:**

1. To develop awareness about the environment and the interaction of various components.
2. Learn about the adaptations and its significance in relation to evolution.
3. To make the students aware of how organic evolution occurred and how the various life forms come into existence.
4. To make the students aware of the historical periods during the evolution of earth and status of fauna during the particular age.
5. Know about the various zoogeographical regions and their climatic and faunal peculiarities.

**Expected Course Outcomes:**

On the successful completion of the course, student will be able to:

1. The students will be able to present an overview of diversity of life forms in an ecosystem. K2
2. The learner can correlate choice of habitat for organisms to abiotic factors, aspects of energy transfer and will be able to explain the necessity for and adaptations, providing examples. K3
3. To describe the history and development of evolutionary thought, list and describe the evidence for evolution and its required corollaries and mechanisms by which evolution occurs. K2
4. Able to explain the history of life on earth, climatic and faunal peculiarities. K2
5. Understand the Zoogeographical regions, distribution, climate change and gain knowledge about evolution of human. K2

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

**Unit:1 ECOLOGICAL CONCEPTS**

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**Unit:2 ECOSYSTEMS**

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**Unit:3 THEORIES OF EVOLUTION**

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### Unit: 4 - GEOLOGICAL TIME SCALE

15 Hours

Hardy Weinberg Equilibrium and Genetic drift. Colouration - Mimicry types and Significance. Geological time scale (Pre-Cambrian Eon; Up to periods for Paleozoic and Mesozoic era; up to epoch for Cenozoic era).

### Unit: 5 - ZOOGEOGRAPHY

15 Hours


### Unit: 6 - CONTEMPORARY ISSUES

2 Hours

Expert lectures, online seminars – webinars

---

### Text Book(s)


### References


### Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]


2. https://nptel.ac.in/gate_paper.html

3. https://swayam.gov.in/nd2_cec20_hs31/preview


5. www.kanchiuniv.ac.in/assets/SWAYAM-BOOKLET.pdf

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Course Designed By: Dr. K. SARASWATHI, Assistant Professor, Chikkaiah Naicker College, Erode.
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*S-Strong; M-Medium; L-Low*
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<tr>
<th>Course code</th>
<th>4ZB</th>
<th>BIOSTATISTICS AND COMPUTER APPLICATIONS</th>
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<td>Basic knowledge on Statistical tools and Computer Applications</td>
<td>Syllabus Version</td>
<td>2020 – 2021</td>
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**Course Objectives:**

1. To develop awareness about the application of statistics in Zoology.
2. To train how the biological data are processed and interpretations are made.
3. To give an introduction to computer and data bases.

**Expected Course Outcomes:**

On the successful completion of the course, student will be able to:

1. The course will give an idea how data should be managed and Processed. K2
2. Express statistical reasoning skills correctly and contextually. K4
3. The course will develop the research aptitude of the students. K3
4. Apply basic statistical concepts commonly used in Use basic analytical techniques to generate results K4

**K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create**

**Unit: 1**

**SAMPLING AND GRAPHS**

9 hours


**Drawing practice:** Histogram, Ogive, Bar, Pie chart.

**Unit: 2**

**MEASURES OF CENTRAL TENDENCY**

8 hours

Concepts and equations of Mean and Deviation (individual, discrete and continuous series).

**Problem Solving:** Mean, median, mode and Standard Deviation (individual series alone).

**Unit: 3**

**CO-RELATION AND REGRESSION**

8 hours

Concept and types of Co-relation and regression.

**Problem Solving:** Co-efficient of Correlation, Regression for X on Y and Y on X.

**Unit: 4**

**TEST OF SIGNIFICANCE**

9 hours

Hygiene conditions in silk production – Diseases of silk worm-Bacterial and Viral diseases – Prevention – Fungal infection to Cocoon. Disease of Mulberry trees- Protozoan and Bacterial diseases and Prevention

**Unit: 5**

**COMPUTER APPLICATIONS**

9 hours

Central Processing Unit – Output and Input devices – Storage devices – Software and Hardware – Basic Operatio of MS Word, Excel and Power point – Browsers and search engines. Introduction to Biological Databases – Significance of NCBI

**Unit: 6**

**CONTEMPORARY ISSUES**

2 hours

Expert lectures, Online Seminars - Webinars and Field Visits.

**Total Lecture hours** 45 hours

**Text Book(s)**


**Reference Books**

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**Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]**

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Course Designed By: Dr. P. STALIN, Asst,Prof, Erode Arts and Science College, Erode.

### Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
Course code | 43P |  |  |  |  | L | T | P | C
--- | --- | --- | --- | --- | --- | --- | --- | --- | ---
Core/Elective/ SBS | CORE PRACTICAL - II | | | | | 0 | 0 | 2 | 2
Pre-requisite | Practical knowledge on Ecology, Anatomy and Evolution | Syllabus Version | 2020 – 2021

**Course Objectives:**
1. To train and be familiar with the Laboratory techniques by means of using multimedia (digital) methodologies.
2. To understand how change in population affect the ecosystem.
3. To inculcate the significance of various species and evolutionary relationship of animals.

**Expected Course Outcomes:**

On the successful completion of the course, student will be able to:

1. Get practical knowledge about the species identification, diversity and their ecological significance
   - K2
2. Gain knowledge about the various systems of animals,
   - K2
3. Understand about the water pollution due to anthropogenic activity through various practical estimations.
   - K2
4. Apply practical knowledge on digital techniques and plankton analysis.
   - K3
5. Analyze and able to describe specific fauna in relation to practical and filed knowledge.
   - K4

**INSTRUCTION:**

The Board of studies does not encourage the dissection of animals and advised to rely of alternative digital methods. Those departments undertaking dissection should compulsorily constitute a dissection monitoring committee as per UGC rules. It is to be ensured that the animals used for dissection is not removed from the wild and is in compliance with UGC regulations time to time. It is the duty of the college/department to adhere strictly to the Wildlife Protection Act and its amendments.

**MAJOR PRACTICAL**

1. Estimation of dissolved oxygen of river, pond, sewage and industrial effluent.
2. Estimation of salinity.
4. Estimation of Carbonate and Bicarbonates.
5. Demonstration of Vertebrate (Frog / Rat):
   - Dissection using Multimedia – Digestive, Brain, 5th Cranial, 10th Cranial, Urinogenital System
   (Wherever possible digital dissections recommended).

**MINOR PRACTICAL**

1. Estimation of pH of given water Samples.
2. Estimation of Temperature of Given Water Samples.
3. Mounting of Zooplankton (from local waterbody)
4. Identification of Zoogeographical realms from the world Map and describe the specific fauna.

**SPOTTERS**

1. Identify the given Vertebrae / Skull:
Fish, Frog, *Calotes*, Pigeon, Rat.

2. **Identify the Fore/Hind Limb:**
Fish, Frog, *Calotes*, Pigeon, Rat.

3. **Comment of Animal Relation Ship:**
*Sacculina* on Crab /Hermit Crab and Sea Anemone.

4. **Ecological Adaptation:**
*Chameleon, Balanus, Chaetopterus, Anabas.*

5. **Comment on the Evolutionary Significance:**
Fossil, Limmus, Analogous and Homologous organs.

**VISIT AND SUBMISSION OF REPORT**
Visit to any Polluted / Pond Ecosystem and submission of a study report with Photos.

**QUESTION PATTERN: 60 MARKS**
Major: 20, Minor: 10, Record: 5, Spotter: 20 (5 spotters each carry 4 marks), Report: 5 marks.

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<th>Total Practical hours</th>
<th>(Each Semester) x 2 = 60 Hours Per Year</th>
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Course Designed By: Dr. A. RAJA RAJESWARI, Asst. Prof, Sri Vasavi College, Erode.

**Mapping with Programme Outcomes**

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<th>Course code</th>
<th>53A</th>
<th>CELL BIOLOGY AND BIOCHEMISTRY</th>
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<td>Pre-requisite</td>
<td>Basic Knowledge of Cell Organelles and Biochemical Nature</td>
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### Course Objectives:
1. To understand the cytological techniques, types of microscopes and structure and functions of cell organelles.
2. To Learn about cellular components underlying the mitotic division.
3. To explain the co-ordination of several organelles which bring out the cellular function.
4. Know about the structure classification and mechanism of different pathways and biochemical reactions.

### Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1. Understand the structures and purposes of basic components of cells, especially bimolecular, membranes, and organelles. K3
2. Students can understand how the cellular components are used to generate and utilize energy in cells. K2
3. Able to explain the cellular components underlying mitotic cell division. K2
4. Gain knowledge of genetic code and process of protein synthesis. K4
5. Apply their knowledge of cell biology to selected examples of changes or losses in cell function. These can include responses to environmental or physiological changes, or alterations of cell function brought about by mutation. K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

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<th>Unit:5</th>
<th>BIOCHEMISTRY</th>
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<td>Structure and Classification of Carbohydrates, Protein and lipids. Enzymes: - mechanism of action -</td>
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**Unit: 6**

**CONTEMPORARY ISSUES** 2 Hours

Expert lectures, Online Seminars - Webinars and Field Visits.

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**Text Book(s)**


**Reference Books**


**Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]**


3. [https://swayam.gov.in/NPTEL](https://swayam.gov.in/NPTEL)

4. [https://nptel.ac.in/courses/102/106/102106025/](https://nptel.ac.in/courses/102/106/102106025/)

**Course Designed By: Dr. K. SARASWATHI, Asst. Prof, Chikkaiah Naicker College, Erode.**

**Mapping with Programme Outcomes**

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*S-Strong; M-Medium; L-Low
Course code | 53B | MICRO-BIOLOGY | L | T | P | C
---|---|---|---|---|---|---
Core/Elective/ SBS | Core Course - VI | 4 | 0 | 0 | 4 | Syllabus Version 2020-2021
Pre-requisite | Basic Knowledge about Diversity, Structure and Applications of Microbiology | | | | | |

### Course Objectives:

1. The course is intended to make aware of the students about the classification, diversity, organization, application and pathogenicity of the microorganisms existing the ecosystem.
2. The course will help the students to learn about the various microbial culture techniques and its handling.
3. The course will give an idea that how microbes are used in various industries for generation of various products related to day to day life.

### Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1. Provides basic knowledge about taxonomy, diversity and general structure of microorganisms.
2. Familiarize with the culture, sterilization, handling, identification and assessing growth characters of microorganisms.
3. Understand the general microbial techniques for isolation of pure cultures of bacteria, fungi and algae.
4. Get idea about the microbial spoilage and the potentials in the usage of microbes in agriculture.
5. Familiarize with various aspects of microbial diseases and preventive measures.

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

### Unit: 1 - CLASSIFICATION

| | | 15 Hours |
---|---|---|

### Unit: 2 - BACTERIAL CULTURE

| | | 15 Hours |
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### Unit: 3 - FOOD AND AGRICULTURE

| | | 15 Hours |
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### Unit: 4 - INDUSTRIAL MICROBIOLOGY

| | | 14 Hours |
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Unit: 5

MEDICAL MICROBIOLOGY


Unit: 6

CONTEMPORARY ISSUES

Expert lectures, Online Seminars - Webinars and Field Visits.

Total Lecture hours 75 Hours

Text Book(s)


Reference Books


Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1. [https://nptel.ac.in/courses/102/103/102103015/](https://nptel.ac.in/courses/102/103/102103015/)
2. [https://nptel.ac.in/courses/102/103/102103015/](https://nptel.ac.in/courses/102/103/102103015/)
3. [https://nptel.ac.in/courses/102/103/102103015/](https://nptel.ac.in/courses/102/103/102103015/)

Course Designed By:
S. SUDHA, Asst. Prof, LRG Govt. Arts College for Women, Tirupur

Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
Course code | 53C | GENETICS AND IMMUNOLOGY | L | T | P | C
---|---|---|---|---|---|---
Core/Elective/ SBS | Core Course - VII | 4 | 0 | 0 | 4
Pre-requisite | Basic Knowledge of Genetics, Recombination and Concepts of Immune System | Syllabus Version | 2020-2021

Course Objectives:
1. To learn the basic principles of inheritance at the molecular, cellular and organismal levels.
2. To understand causal relationships between molecule/cell level phenomena and organism-level patterns of heredity.
3. To learn the mechanism of Mutation and will able to understand how mutations bring changes in an organism.
4. To give an insight to the cellular components involved in the immunity.
5. To give an awareness of the mechanism, types and concepts regarding immune response.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:

1. Students will be able to describe and apply the principles of Mendelian genetics. K3
2. Capable to describe the flow of genetic information from DNA to RNA to protein. K2
3. Make clear how genes are regulated. The students will be able to explain how mutations occur and how its role in adaptation and speciation occurs. K3
4. Able to develop an idea about the cellular and molecular basis of immune response. K3
5. Understand the principles of self-tolerance and autoimmunity and will be able to relate the potentials of immunology in relation to biotechnology and applied sciences. K2

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Unit:1 FUNDAMENTALS OF GENETICS 14 Hours


Unit:2 RECOMBINATION AND GENETICAL DISORDERS 15 Hours

Unit:3  MUTATION  14 Hours

Unit:4  CELLS OF IMMUNE SYSTEM  15 Hours

Unit:5  BASIC CONCEPTS OF IMMUNE SYSTEM  15 Hours

Unit:6  CONTEMPORARY ISSUES  2 Hours
Expert lectures, Online Seminars - Webinars and Field Visits.

Total Lecture hours  75 Hours

Text Book(s)

Reference Books

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1  https://swayam.gov.in/nd2_cec20_ma13/preview
2  https://swayam.gov.in/nd2_cec20_bt05/preview

Course Designed By:
DR.PAWLIN VASANTHI JOSEPH, Asso. Prof, Nirmala College for Women, Coimbatore.

Mapping with Programme Outcomes

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**CO5**

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*S-Strong; M-Medium; L-Low*

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<td>2020-2021</td>
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**Course Objectives:**

1. To develop skill in understanding and handling molecular science and instrumentation.
2. To make the students capable of understanding the underlying principles of various reaction and biological interactions.
3. To understand the principles and applications of various laboratory instruments.

**Expected Course Outcomes**

On the successful completion of the course, student will be able to:

1. Able to know the basics about the molecular bonds and interactions
2. The learner will be trained in preparing solutions and handling instruments at basic level.
3. The students will be capable of interpreting and understanding the basis of bioenergetics in living system.
4. Gain the knowledge in the area of enzyme and its action.
5. Understand and apply skills in biological tools and techniques.

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

**Unit:1**

**BIMOLECULAR INTERACTIONS**

9 Hours

Valence of carbon - Polar and non polar molecules – Covalent, ionic and Co-ordinate bonds. Hydrogen bonding - weak interactions, ester linkage, electrostatic, Disulphide and peptide bonds - Van-der Waals forces. Isomerism and optical activity.

**Unit:2**

**SOLUTIONS**

8 Hours

Hydrophiles and hydrophobes - Acid-Base concept, Molarity, Molality and Normality, Ampholyte, pH and pKa value - Redox potential – Principles of diffusion and Osmosis – Hypo, hyper and isotonic solutions.

**Unit:3**

**THERMODYNAMICS**

9 Hours
First and Second laws of thermodynamics, Biological applications of enthalpy, free energy, activation energy, unavailable energy and entropy, Thermodynamics of passive and active transport - high energy phosphate bond - Electron-transport chain.

**Unit: 4**

**SIGNALING AND KINETICS**

9 Hours


**Unit: 5**

**INSTRUMENTATION PRINCIPLES**

8 Hours


**Unit: 6**

**CONTEMPORARY ISSUES**

2 Hours

Expert lectures, Online Seminars - Webinars and Field Visits.

Total Lecture hours 45 Hours

**Text Book(s)**


**Reference Books**


**Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]**

1. [https://nptel.ac.in/courses/102/105/102105034/](https://nptel.ac.in/courses/102/105/102105034/)

2. [https://nptel.ac.in/courses/102/103/102103083/](https://nptel.ac.in/courses/102/103/102103083/)

**Course Designed By:**

S. SUDHA, Asst. Prof, LRGGovt.ArtsCollegefor Women, Tirupur

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*S-Strong; M-Medium; L-Low
Sixth Semester
Course code | 63A | ANIMAL PHYSIOLOGY | L | T | P | C
---|---|---|---|---|---|---
Core/Elective/ SBS | Core Course - VIII | 4 | 0 | 0 | 4 | Syllabus Version 2020-2021
Pre-requisite | Basic Knowledge of various Physiological Aspects

Course Objectives:
1. To familiarize students with the principles and basic facts of Animal Physiology.
2. To give students an insight about the molecular and cellular basis of physiological functions in animals.
3. To give an idea about the regulation of organ system functions in a whole animal using a conceptual model of feedback to explain homeostasis.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:
1. Associate the transport of gases and its influence on metabolism of major food constituents. K2
2. Explain the mechanism of circulation and excretion among different vertebrates. K2
3. Present the structure of a muscle and a nerve and infer its functions. K3
4. Relate the structure and mechanism of sense organs in animals. K3
5. Categorize the impact of hormones in the reproductive mechanism of the male and female organism. K4

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

Unit:1 | NUTRITION AND RESPIRATION | 15 Hours

Unit:2 | CIRCULATION AND EXCRETION | 15 Hours

Unit:3 | MUSCLE AND NERVE PHYSIOLOGY | 14 Hours

Unit:4 | SENSE ORGANS | 15 Hours
Structure of eye, physiology of vision, visual elements and pigments, photo chemistry of vision –

**Unit:5**  
**REPRODUCTIVE PHYSIOLOGY**  
14 Hours


**Unit:6**  
**CONTEMPORARY ISSUES**  
2 Hours

Expert lectures, Online Seminars – Webinars and Field Visits.

| Total Lecture hours | 75 Hours |

**Text Book(s)**


**Reference Books**


**Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]**

1. [https://www.classcentral.com/course/swayam-animal-physiology](https://www.classcentral.com/course/swayam-animal-physiology)

**Course Designed By:**

Dr. ROSILINE MARY, Asst, Prof, Nirmala College For Women, Coimbatore.

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### Mapping with Programme Outcomes

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<th>Course code</th>
<th>63B</th>
<th>DEVELOPMENTAL BIOLOGY</th>
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<td>Basic Knowledge of Embryology and Techniques in Developmental Biology</td>
<td>Syllabus Version</td>
<td>2020-2021</td>
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Course Objectives:
1. To make aware of the students about the theories, concepts and basics of Developmental Biology.
2. To provide students the idea of sex cells, fertilization, cleavage, differentiation and development of organs.

Expected Course Outcomes:

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<td>1</td>
<td>Understand the concepts of basic developmental biology and needs of Artificial intelligence.</td>
<td>Remember;</td>
<td>Understand;</td>
<td>Apply;</td>
<td>Analyze;</td>
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<td>2</td>
<td>Able to know about pattern, plans and morphogenetic techniques of developing egg.</td>
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<td>3</td>
<td>Gain knowledge about the development of organs in different animals.</td>
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<td>Know and apply the techniques involved in embryology field.</td>
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<td>5</td>
<td>Familiar with reproductive technology and embryo transfer technology.</td>
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K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Unit:1 **GAMETES AND FERTILIZATION** 15 Hours


Unit:2 **BLASTULATION AND GASTRULATION** 14 Hours

Cleavage - Planes and Patterns of cleavage - Factors controlling cleavage - Fate map. Blastulation – Morphogenetic movements - gastrulation Frog and Chick.

Unit:3 **ORGANOGENESIS** 14 Hours

Development of Brain, Eye and Heart in frog. Development of Nervous system in chick and Foetal membranes in Chick and Mammals.
### Unit: 4  
**APPLIED EMBRYOLOGY**  
15 Hours


### Unit: 5  
**PLACENTATION AND TECHNIQUES**  
15 Hours


### Unit: 6  
**CONTEMPORARY ISSUES**  
2 Hours

Expert lectures, Online Seminars - Webinars and Field Visits.

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**Reference Books**


**Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]**

1. [https://swayam.gov.in/nd1_noc20_bt35/preview](https://swayam.gov.in/nd1_noc20_bt35/preview)


**Course Designed By:**

Dr. ROSILINE MARY, Asst, Prof, Nirmala College For Women, Coimbatore.

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**Mapping with Programme Outcomes**

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*S-Strong; M-Medium; L-Low*
Course code | 63C | BIOTECHNOLOGY | L | T | P | C
---|---|---|---|---|---|---
Core/Elective/ SBS | Course Course - X | 4 | 0 | 0 | 4

Pre-requisite | Basic Knowledge about Principles and Techniques in Biotechnology | Syllabus Version 2020-2021

Course Objectives:
1. Give a firm foundation in the fundamentals of modern Molecular techniques.
2. The course will give an insight to the mechanism of Gene Expression and Regulation.
3. The course will give idea about various protocols followed in Biotechnology in relation to Animal science.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:

1. Give an idea about the various techniques used in modern biotechnology. K2
2. The course will give an insight into the current applications of biotechnology and advances in the different areas like medical, microbial, environmental, bioremediation, agricultural, animal and forensics. K2
3. Able to understand how microbes are used to engineer various genes. K3
4. Explain the general principles of generating genetically modified organisms and modern artificial methods in biotechnology. K3
5. Appreciate the importance of Biotechnology in enzyme production, cryopreservation and biosensors. K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Unit:1 | RECOMBINANT DNA TECHNOLOGY | 15 Hours

Unit:2 | MOLECULAR TECHNIQUES | 14 Hours
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<th>ANIMAL TISSUE CULTURE</th>
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<td>Applications – Primary culture. Steps involved in mammalian cell culture- He la and WI38 cell lines – Maintenance of cell lines – Techniques and Application of organ culture. Animal cloning – Dolly.</td>
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<tr>
<td>DR.PAWLIN VASANTHI JOSEPH, Asso.Prof, Nirmala College for Women, Coimbatore.</td>
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<td>CORE PRACTICAL - III</td>
<td>Practical Knowledge in the field of Cell biology, Physiology adaptations and Developmental Stages of Cells</td>
<td>Syllabus Version</td>
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Course Objectives:

1. To observe and identify different cell types and structures using different microscopic techniques.
2. To get awareness of physiological processes of cell and physiological activities of aquatic organisms.
3. To learn the developmental stages of organisms by permanent microscopic slides.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1. Apply concepts and knowledge of the general terminology, cell structure and function. K3
2. Utilize some of the useful techniques in the field of cell biology (Hematology and staining) and understand the basic concepts behind these techniques. K2
3. Assess and able to examine various practical techniques in physiological field. K3
4. Demonstrate an understanding the scientific methods of physiological adaptations of animal. K2
5. Able to discriminate the developmental stages of cells of various living organisms. K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

MAJOR PRACTICAL
2. Estimation of RBC and WBC in human Blood (Not for colleges offering CLT).
3. Oxygen consumption of fresh water fish.
4. Identification of given biochemical sample:
   Monosaccharide, Polysaccharide, Aminoacid, Protein, Lipid.
5. Analysis of excretory products - Ammonia, urea and uric acid.

**MINOR PRACTICAL**

1. Study of Opercula movement of a fish at 10 degree increase and Q10.
2. Activity of salivary amylase (Qualitative analysis).
3. Preparation of Haemin crystals.

**SPOTTERS**

1. Giant Chromosome (Demonstration of Polytene chromosome preparation).
4. T.S of Pituitary, Thyroid, Adrenal, Ovary and testis.
5. Sperm of Man.
7. Blastula of Frog.
8. Gastrula of Frog.
9. Development of Chick 18, 24, 48, 72hr.

**QUESTION PATTERN: 60 MARKS**

   Major: 20, Minor: 10, Record: 5, Spotter: 25 (5 spotters each carry 5 marks).

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Course Designed By: Dr. A. RAJA RAJESWARI, Asst. Prof, Sri Vasavi College, Erode.

**Mapping with Programme Outcomes**

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*S-Strong; M-Medium; L-Low*
### Course Objectives:

1. To impart hands-on training in basic microbiological techniques.
2. To understand the concepts and obtain practical knowledge in genetics and biotechnology through experiments.
3. To familiarize students with various immunological techniques.

### Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1. Familiar with practical skills in the use of tools, technologies and methods common to microbiology and biotechnology. **K3**
2. Able to test the microbiological quality of samples from different sources and differentiate between Gram-positive and Gram-negative bacteria. **K4**
3. Gain knowledge about basic immunological principles involved in clinical and applied science. **K2**
4. Trained in basic enzyme and immunological assays and be taught to present the results both qualitatively and quantitatively. **K4**
5. Understand different sterilization procedures, mounting techniques and media preparation when handling advanced Biotechnological equipments. **K2**

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

### MAJOR PRACTICAL

1. Isolation of DNA from any fruit/tissue.
2. Preparation of Culture Media : Liquid and Solid
3. Enumeration of microbes in soil
4. Gram staining Technique.
5. Thin layer chromatography of any Biological sample (Optional).

### MINOR PRACTICAL

1. Quality of Milk – MBR test.
3. Antigen – Antibody reaction: ABO blood group.
4. Sterilization of the Culture Medium in Autoclave / pressure cooker.
5. Estimation of sugar in given wine sample.
6. Determination of Motility of Microbe:
   
   Hanging drop technique (Do not use curd as Lactobacillus is not motile).
SPOTTERS
Genetics:
Genetic importance - Drosophila male and female, Giant Chromosome.

Microbiology:
Autoclave/Pressure Cooker, Electrophoresis unit, Culture media-Plate, Slant and Broth.

Immunology:
Thymus gland, WIDAL kit, VDRL kit, Antibiotic sensitivity test.

Biotechnology:
Spirulina, Yeast, Penicillin, Azolla, Mushroom seeds, Bio-pesticide (BT/Fungi), Biofertiliser (Nitrosomonas/ Rhizobium/Phosphobacter)

VISIT AND SUBMISSION
Visit to an industry or lab of Biotechnology or Microbiological importance. Report should be submitted in the Practical.

QUESTION PATTERN: 60 MARKS
Major: 20, Minor: 10, Record: 5, Spotter: 20 (5 spotters each carry 4marks), Report: 5.

Total Practical hours
30(Each Semester) x 2 = 60 Hours Per Year

Text Book(s)

Course Designed By: Dr. A. RAJA RAJESWARI, Asst. Prof, Sri Vasavi College, Erode.

Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low
Course code   | 6ZP  
---|---
SKILL BASED PRACTICAL |  
Core/Elective/ SBS | SKILL BASED COURSE - IV | L | T | P | C 
---|---|---|---|---
Pre-requisite | Practical Knowledge in Sericulture, Statistical tools and Principles of Instrumentation | Syllabus Version | 2020 – 2021 

**Course Objectives:**

1. To understand the working principles of the instruments in biological instruments.
2. To inculcate the practical knowledge on moriculture and sericulture,
3. To discuss about the basic principles of physics in biology.

**Expected Course Outcomes:**

On the successful completion of the course, student will be able to:

1. Relate knowledge on Silkworm rearing and evaluate the quality of cocoon and silk. K3
2. Apply the concepts of computer science related with the statistical analysis. K3
3. Familiarize with the applications of statistics and able apply in the different fields of biology. K4
4. Understand the basic operations of MS Office in computer applications K2
5. Gain knowledge and understands the working principles of the instruments in biology. K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

**MAJOR PRACTICAL**

1. Preparation of Chromate solution at various 5 concentration, measure the OD to verify Beer Lambert law.
2. Prepare isotonic, hypotonic and hypertonic solution and put a drop of blood and observe under the microscope.
3. Measure the length of given leaf samples or any other of choice (minimum 20 samples) and calculation of Mean, Median, Mode and Standard Deviation.
4. Given are two groups of samples A and B. A contain 10 leaves (or any other of choice) of a locality and B from other species or locality. Measure the length and check do the samples differ significantly using students “t”.

**MINOR PRACTICAL**

1. Preparation of Buffer (acetate/ phosphate/ citrate/ borate) of given pH.
2. Identification, sorting and percentage calculation of different types of cocoons.
3. Based on the given values calculate the Correlation coefficient.
4. Based on the given values calculate the regression equation based on a variable.
SPOTTERS

Mulberry leaf, Silk worm moth, Different instars of larvae, Cocoon, Fungal Parasite of Silk Worm.

Light microscope, pH Meter, Centrifuge, Chromatograph, Colorimeter.

VISIT AND SUBMISSION
Visit to an industry or lab of Biotechnology or Microbiological importance. Report should be submitted in the Practical.

QUESTION PATTERN: 45 MARKS
Major: 15, Minor: 10, Record: 5, Spotter: 10 (5 spotters each carry 2 marks), Report: 5 marks.

Total Practical hours 30 Hours Per Year (Practical for end semester only)

Text Book(s)


Course Designed By: Dr. A. RAJA RAJESWARI, Asst. Prof, Sri Vasavi College, Erode.

Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low
Elective Course
Course code | 5EB | HUMAN GENETICS AND COUNSELING I | L | T | P | C
--- | --- | --- | --- | --- | --- | ---
Core/Elective/ SBS | Elective I-A | 3 | 0 | 0 | 3
Pre-requisite | Basic Knowledge of Chromosomes, Inheritance and Syndromes | Syllabus Version | 2020 – 2021

Course Objectives:
1. The objective of this course is to give a firm foundation on the fundamentals of human chromosomes and their nomenclature and banding methods.
2. The give an idea about various aspects of human genetics, heredity and genetic diseases.
3. Students to gain the knowledge of pedigree analysis and to identify the complications to the basic patterns.
4. To make the students aware of the chromosomal syndromes.
5. To train the students to seek the possibilities of identifying Human genetics as a Profession.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:
1. The course will give an idea about the various genetic disorders. K2
2. Students get the knowledge to apply the real life situations. K3
3. Give an idea to employ the scientific method to generate new knowledge and to solve problems, regarding human heredity. K4
4. Able to explain the genetic disorders and prompt them to undertake genetics as subject of research in higher studies. K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

Unit:1 | CHROMOSOMES | 8 Hours
--- | --- | ---
Human chromosome – International system of Nomenclature - Chromosome number, Idiogram, Banding methods (Q, C, G and R banding).

Unit:2 | INHERITANCE | 9 Hours
--- | --- | ---
Monogenic traits, autosomal inheritance, dominant, recessive, Sex-linked inheritance, Sex-limited and sex-influenced traits, mitochondrial inheritance, MIM number, consanguinity and its effects,

Unit:3 | PEDIGREE | 8 Hours
--- | --- | ---
Pedigree, gathering family history, pedigree symbols, construction of pedigrees, presentation of molecular genetic data in pedigrees, - Complications to the basic pedigree patterns.

Unit:4 | SYNDROMES | 9 Hours
--- | --- | ---
Human chromosomal disorders (Syndromes) Disorders of chromosome structure and disorders of chromosome number-Trisomy 18, Down’s syndrome, Trisomy 13, Cri-du chat syndrome, Parderville syndrome, Jacob’s syndrome Robertson Syndrome Cystic fibrosis, Muscular dystrophy, Thalassemia, Major Fragile x Syndrome.

Unit:5 | METABOLIC ERRORS | 9 Hours
--- | --- | ---

Unit:6 | CONTEMPORARY ISSUES | 2 Hours
--- | --- | ---
Expert lectures, Online Seminars - Webinars and Field Visits.

Total Lecture hours | 45 Hours
### Text Book(s)


### Reference Books


### Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1. [www.classcentral.com › Subjects › Science › Biology](https://www.classcentral.com)
2. [nptel.ac.in › courses › noc20 › SEM1 › noc20-bt06](https://nptel.ac.in)
3. [swayam.gov.in › explorer](https://swayam.gov.in)
4. [swayam.gov.in › nd1_noc20_bt06 › preview](https://swayam.gov.in)

### Course Designed By: Dr. K. SARASWATHI, Asst. Prof, Chikkaiah Naicker College, Erode.

### Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
 Course code: 6EB  
Core/Elective/ SBS: Human Genetics and Counseling II  
Elective I-A: 3 0 0 3  
Pre-requisite: Basic Knowledge of Diseases, Diagnosis and Behavioral Genetics  
Syllabus Version: 2020 – 2021

Course Objectives:

1. The give an idea about various aspects of human genetics, heredity and genetic disease and various methods of prenatal diagnosis.  
2. To make the students aware of the human genome project promises and achievements.  
3. To make the students understand the central and unifying position of genetics in biological services and to create awareness for a better community.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1. The students will be able to get the knowledge of physiology and genetics of blood groups.  
2. Knowledge of research principles and methods applicable in the discipline of genetic testing approach taken for specific genetic disorders.  
3. Gain knowledge of the role of genetics as the underlying cause of various disorders of the human body.  
4. The course will give an idea about genes related to behavior and behavioral disorders.  
5. To train the students to seek the possibilities of identifying Human genetics and counseling as a Profession.

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

Unit: 1  
BLOOD GROUP  

Unit: 2  
DIAGNOSIS  
Prenatal diagnosis: Chorionic villi sampling, foetoscopy, ultrascopy, amniocentesis - peripheral blood leucocyte culture. Dermatoglyphics: Terminology, methods of observation and printing, dermatoglyphic features of syndrome.

Unit: 3  
BRAIN DISEASES  

Unit: 4  
BEHAVIOURAL GENETICS  
9 Hours
Genes related to behaviour - Genetic and environmental manipulations, learning and memory. Dementia – Schizophrenia - Mood disorders - Anxiety disorders - childhood personality disorders - antisocial personality - criminal behavior.

**Unit:5 HUMAN GENOME PROJECT**

8 Hours

Human Genome Project – History - Sequencing of Human Genome - Promises and Achievements - Ethical, Legal and Social issues. Other Genome Projects initiated as a direct consequence of HGP completion,Human Genome Diversity Project.

**Unit:6 CONTEMPORARY ISSUES**

2 Hours

Expert lectures, Online Seminars - Webinars and Field Visits.

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<td>4  Rickie Lewis. (2011). Human Genetics – Concept and Application, 2nd edition, McGraw-Hill Education Publisher, Europe.</td>
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Course Designed By: Dr. K. SARASWATHI, Asst. Prof, Chikkaiah Naicker College, Erode.

Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
Course code | 5EB | PEST AND THEIR CONTROL - I | L | T | P | C
---|---|---|---|---|---|---
Core/Elective/ SBS | Elective I-B | 3 | 0 | 0 | 3 | Syllabus Version 2020 – 2021
Pre-requisite | Basic Knowledge in Identification of Pests and Control Measures | Syllabus Version 2020 – 2021

Course Objectives:

1. To make the learner aware of various pest, pest outbreak and its control methods.
2. Learn to manage pest and diseases in diverse environment.
3. To study the different theories related to the ecology of the insects.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1. Understand the basic classification and identify the insects using taxonomic keys. K2
2. Able to explain the external morphology of insects and their modifications and adaptations suitable to the eco-system. K2
3. Acquired the knowledge about various methods and tools adopted for pest control strategies. K4
4. Gain knowledge about the various biological agents, entomopathogenic organisms and the importance of IPM in pest management. K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Unit:1 INTRODUCTION,CLASSIFICATION AND IMPORTANCE 8 Hours
Introduction, definition and causes for insect assuming pest status Classification of pest Types of damage caused by pests Importance of pest control Pest surveillance and forecasting and pest outbreak.

Unit:2 GENERAL CHARACTERS, BIONOMICS AND CONTROL MEASURES 9 Hours
Paddy pest:
1. Tryporyza incertulus (Lepidoptera) 2. Orseoliaoryzae (Diptera)
3. Hieroglyphus shanian (Orthoptera) 4. Dicladisarmigera (Coleoptera)

Wheat pest:
1. Anaphothripssudanensis (Thysonoptera) 2. Odentodermis obesis (Isoptera)
3. Mythimana separate (Lepidoptera).

Unit:3 GENERAL CHARACTERS, BIONOMICS AND CONTROL MEASURES 9 Hours
Sugarcane pest:
1. Chilo infuscetellus (Lepidoptera) 2. Pyrillaperpusilla (Hemiptera)
3. Aleurolovus barodensis (Hemiptera) 4. Scirphophaganivella (Lepidoptera)

Cotton pest:
1. Pectinophora gossypiella (Lepidoptera) 2. Aphid gossypii(Hemiptera)
3. Earias vitella (Lepidoptera) 4. Dysder cuscingulatus (Hemiptera).

Unit:4 GENERAL CHARACTERS, BIONOMICS AND CONTROL MEASURES 9 Hours
Cereals:
1. *Chilopartellus* (Lepidoptera) 2. *Antherigonasoccata* (Diptera).

Pulses:
1. *Helicoverpa armigera* (Lepidoptera) 2. *Melanogromyza* obtuse (Diptera)

Vegetables:
1. *Leucinodes orbonalis* (Lepidoptera) 2. *Pieris brassicae* (Lepidoptera)

Fruits:

Unit: 5

**GENERAL CHARACTERS, BIONOMICS AND CONTROL MEASURES**

8 Hours

**Stored Grain pest:**

**House Hold pest:**

Unit: 6

**CONTEMPORARY ISSUES**

2 Hours

Expert lectures, Online Seminars - Webinars and Field Visits.

**Text Book(s)**


**Reference Books**


**Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]**

1. [https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=5007](https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=5007)

2. [https://www.pestcontrolcourses.com/pest-control-training-courses-online/](https://www.pestcontrolcourses.com/pest-control-training-courses-online/)

**Course Designed By: Dr. A. RAJA RAJESWARI, Asst. Prof, Sri Vasavi College, Erode.**

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Page 61 of 113
**Course code** | **6EB** | **PEST AND THEIR CONTROL - II** | **L** | **T** | **P** | **C**
---|---|---|---|---|---|---
Core/Elective/ SBS | Elective I-B | 3 | 0 | 0 | 3 | 3

**Pre-requisite**
Basic Knowledge of Principles and Methods of Pest Control and Insecticide Technologies

**Syllabus Version**
2020 – 2021

**Course Objectives:**
1. To make the learner aware of various pest, pest outbreak and its control methods.
2. Learn to manage pest and diseases in diverse environment.
3. To study the different theories related to the ecology of the insects.

**Expected Course Outcomes:**
On the successful completion of the course, student will be able to:
1. Gain knowledge and apply various techniques in the field to control the pest. K2
2. Familiarized with classification of insecticides, pesticide residue and environmental pollution due to toxic insecticides. K2
3. Acquired the knowledge about various methods and tools adopted for pest control strategies. K4
4. Aware about the various techniques and the importance of IPM in pest management. K5
5. Realize the interaction between plants and insects. K4

**K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

**Unit:1**  
**PRINCIPLES AND METHODS OF PEST CONTROL**  
Using techniques such as mechanical, biological, ecological, cultural, genetic techniques – sterile male techniques, Quarantine, legislative measures.

**Unit:2**  
**CLASSIFICATION OF INSECTICIDES**  
9 Hours
Based on Mode entry, Mode of action
Chemical nature - Inorganic, Organic compounds- DDT, Endosulfan, Fenitrothion, Malathion, Monocrotophous, Oxime Carbamates.

**Unit:3**  
**INSECTICIDE FORMULATIONS AND APPLICATION TECHNOLOGY**  
9 Hours
Aerosols, Fumigants, Baits.
Dusting and dusters, sprayers – Manually operated – Hydraulic sprayers, Power operated – Pneumatic sprayer.

**Unit:4**  
**INTEGRATED PEST MANAGEMENT**  
8 Hours
Integrated Pest Management (IPM), Chemosterilants, Sex attractants, Pheromonal control.

**Unit:5**  
**OTHER PESTS**  
Crab, Snail, Peacock, Parrot and Rat
Concept of host-pest interaction.

### Unit 6: CONTEMPORARY ISSUES

2 Hours

Expert lectures, Online Seminars - Webinars and Field Visits.

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#### Text Books(s)


#### Reference Books


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1. [https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=5007](https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=5007)

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**Course Designed By: Dr. A. RAJA RAJESWARI, Asst. Prof, Sri Vasavi College, Erode.**

### Mapping with Programme Outcomes

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**Course Objectives:**

1. The course is framed to give introduction to Wildlife management and Conservation.
2. To make student aware of the various areas of wildlife and Job opportunities.

**Expected Course Outcomes:**

On the successful completion of the course, student will be able to:

1. The course will give an idea about the wildlife Management techniques (K2)
2. The course train the students to assess various conservation strategies (K3)
3. Gain knowledge about terminology and identification of birds and butterflies (K3)
4. Understand the importance of fauna in different reserves. (K2)

**K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create**

**Unit:1**

**INTRODUCTION TO WILDLIFE**

9 Hours

Scope and opportunities of Wildlife Sciences – Major types of forest types of India - Protected areas – Sanctuaries - National Parks – Tiger reserves – Biosphere Reserves and their role.

**Unit:2**

**WILDLIFE CONSERVATION**

9 Hours


**Unit:3**

**ORNITHOLOGY**

9 Hours

Terms used in description of Birds Plumage and parts – Types of Bills – Types of feet – Identification of birds in the field based on tail, bill, crest, leg and colour.

**Unit:4**

**INDIAN BUTTERFLIES**

8 Hours


**Unit:5**

**IMPORTANT RESERVES**

8 Hours


**Unit:6**

**CONTEMPORARY ISSUES**

2 Hours

Expert lectures, online seminars – webinars, field visits

**Total Lecture hours**

45 Hours

**Text Book(s)**


**Reference Books**


**Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]**

1. [https://www.worldwildlife.org/teaching-resources](https://www.worldwildlife.org/teaching-resources)


3. [https://swayam.gov.in/nd1_noc20_bt38/preview](https://swayam.gov.in/nd1_noc20_bt38/preview)

4. [https://swayam.gov.in/nd1_noc19_bt32/preview](https://swayam.gov.in/nd1_noc19_bt32/preview)

**Course Designed By:** Dr. SANIL R., Associate Professor, Government Arts College, Ooty

**Mapping with Programme Outcomes**

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*S-Strong; M-Medium; L-Low*
Course code | 6EB | WILDLIFE MANAGEMENT AND CONSERVATION II | L | T | P | C
---|---|---|---|---|---|---
Core/Elective/ SBS | Elective I-C | 3 | 0 | 0 | 3
Pre-requisite | Basic Knowledge about Wildlife Techniques, Census and Animal Behavior | Syllabus Version | 2020-2021

**Course Objectives:**

1. The course is framed to train the students about various wildlife techniques.

2. To train the students to find job opportunities as biologists in Reserves.

**Expected Course Outcomes:**

On the successful completion of the course, student will be able to:

1. The course will give an idea about the wildlife Management techniques

2. The course trains the students to conduct wildlife related surveys and analyses the wildlife related threats.

3. Gain knowledge about different behavior of wild animals.

4. Get aware about the management of forest and importance of conservation of wild animals.

5. Familiarized with diversity act and eco-tourism as a career development.

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

**Unit:1**

WILDLIFE TECHNIQUES.

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**Unit:2**

WILDLIFE CENSUS.

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**Unit:3**

ANIMAL BEHAVIOUR

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**Unit:4**

WILDLIFE CONSERVATION

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**Unit:5**

WPA AND ECOTOURISM

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**Unit:6**

CONTEMPORARY ISSUES

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Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

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Course Designed By: Dr. SANIL R., Associate Professor, Government Arts College, Ooty

Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
Course code | 5EE | PATHOLOGY AND CLINICAL LABORATORY – I | L | T | P | C |
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Core/Elective/ SBS | ELECTIVE II-A | 3 | 0 | 0 | 3 |
Pre-requisite | Basic Knowledge about Clinical Laboratory Principles and Techniques | Syllabus Version | 2020 – 2021 |

Course Objectives:
1. To evaluate laboratory and pathologic testing and to learn the pathogenesis of a variety of common and uncommon diseases.
2. To develop knowledge of basic pathologic processes and skills to interpret laboratory data as well as make clinic pathologic correlations.
3. To provide experience in laboratory direction and encourage residents to assume a leadership role in the education of other physicians and allied health professionals.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:

1. Understand the pathologic basis of disease for which a particular test is performed. K2
2. Greater knowledge related to specimen collection, handling methodologies, and the skills of individuals performing those tests. K2
3. Gain knowledge to Practice the technical and mechanical aspects of laboratory pathology and effectively manage a laboratory. K3
4. Familiarize with the following blood bank and serology testing, hematologic tests, microscopic examination, Gram-stained techniques etc., K4
5. Able to identify and understand the limitations of such studies in order to select proper tests suited to a particular diagnostic problem. K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

Unit:1

BASIC LABORATORY PRINCIPLES

9 Hours

Organization of clinical laboratory - Safety measures - Chemical, fire and Electrical - Lab Technician Duties and Responsibilities - Professionalism and Ethics in laboratory workers, Modern Laboratory set up - Clinic borne infection and personelhygiene.

Unit:2

BASIC LABORATORY EQUIPMENTS

8 Hours


Unit:3

PREPARATIONOFREAGENTS

9 Hours

Buffer and pH - Preparation of Normal, Per cent and Molar solutions - Physiological saline, Clinical
Laboratory records- -Quality control: Accuracy, Precision, and Reference values, use of chemicals and their interactions, danger signs, production techniques, and disposal methods.

**Unit: 4**  
**BASICCLINICALCHEMISTRY**  
9 Hours


**Unit: 5**  
**AUTOMATIONINCLINICALLABORATORY**  
8 Hours

Semi and Fluid Auto Analyzer – ELISA – Use of PCR – Haemotology Analyser – Cell counter – HPLC Analysis for Haemoglobin Fraction

**Unit: 6**  
**CONTEMPORARY ISSUES**  
2 Hours

Expert lectures, Online Seminars - Webinars and Field Visits.

**Total Lecture hours**  
45 Hours

**Text Book(s)**


**Reference Books**


**Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]**

1. [https://www.emagister.in/distance_learning_pathology_courses-tdist-236.htm](https://www.emagister.in/distance_learning_pathology_courses-tdist-236.htm)

**Course Designed By:** Dr. A. RAJA RAJESWARI, Asst. Prof, Sri Vasavi College, Erode.

**Mapping with Programme Outcomes**

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**Course Objectives:**
1. To evaluate laboratory and pathologic testing and to learn the pathogenesis of a variety of common and uncommon diseases.
2. To develop knowledge of basic pathologic processes and skills to interpret laboratory data as well as make clinic pathologic correlations.
3. To provide experience in laboratory direction and encourage residents to assume a leadership role in the education of other physicians and allied health professionals.

**Expected Course Outcomes:**
On the successful completion of the course, student will be able to:

1. Greater knowledge related to specimen collection, handling methodologies, and the skills of individuals performing those tests.  
   - **K2**
2. Able to prepare culture and histopathological techniques to analyze different samples.  
   - **K3**
3. Familiarize with the following blood bank and serology testing, hematologic tests, microscopic examination, Gram-stained techniques etc.,  
   - **K4**
4. Able to identify and understand the limitations of such studies in order to select proper tests suited to a particular diagnostic problem.  
   - **K3**
5. Gain knowledge to Practice the technical and mechanical aspects of laboratory pathology and effectively manage a laboratory.  
   - **K4**

**K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create**

**Unit:1**

FUNCTION TESTS 8 Hours

Renal function tests, Liver function tests, Arterial blood gas analysis.

**Unit:2**

BODY FLUIDS 9 Hours


**Unit:3**

MICROBIOLOGY AND CYTOLOGY 9 Hours

### Unit 4: Histopathology

8 Hours


### Unit 5: Blood Transfusion

9 Hours

- Screening of donor compatibility testing, safety, procurement of supplies. Screening donor's blood for infectious agents -HIV, HCV, HBV, Treponema pallidium, Plasmodium, HTLV-
- Bacterially contaminated Blood. ABO – Rh blood groups - other red cell antigens and antibodies. Coombstest.

### Unit 6: Contemporary Issues

2 Hours

- Expert lectures, Online Seminars - Webinars and Field Visits.

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### Course Designed By: Dr. A. RAJA RAJESWARI, Asst. Prof, Sri Vasavi College, Erode.

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### Pre-requisite

Practical Knowledge to Analysis, Interpret and Evaluate Laboratory test results

**Course Objectives:**

1. Competent use of laboratory tests and to Interpret laboratory test results.

2. Discuss the differential diagnosis and laboratory evaluation for a patient.

3. Demonstrate Microbiological staining techniques for rapid diagnosis of causative agents and to understand the clinical indications.

### Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1. Able to select, interpret tests and explain their clinical uses and limitations. K2
2. Explain and choose appropriate tests for monitoring various disorders. K3
3. Recognize and assess laboratory tests results of one of their patients. K4
4. Summarize and interpret the results of Differential count of Blood, WBC and Haemoglobin. K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

### MAJOR PRACTICAL

1. Total count of RBC.
2. Total count of WBC.
3. Differential count of Blood
4. Microscopic identification of pus or cast cells and qualitatively check for the presence of blood in urine.
5. Smear the given bacteria with Gram’s staining and interpret the result.

### MINOR PRACTICAL

2. Estimation of Bleeding and Clotting time
3. Estimation of specific gravity and Albumin in Urine.

5. Qualitatively detect the presence of bile salts and Urobilinogen in urine.

SPOTTERS
Malaria parasite, Filarial parasite, Tape Worm, ESR, Autoclave, Microtome, Coomb’s test, Spermatozoa, Incubator, Water bath, Centrifuge.

VISIT AND SUBMISSION OF REPORT
Visit to training lab / training to a clinical lab of nearby locality. Report should be submitted in the practical.

QUESTION PATTERN: TOTAL MARKS: 30 MARKS.
Major: 10, Minor: 08, Record: 04, Spotter: 06 (2 spotters each carry 3 marks) Report: 2 marks.

Text Book(s)

Course Designed By: Dr. A. RAJA RAJESWARI, Assl. Prof, Sri Vasavi College, Erode.

Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low
### Course Details:

**Course Code:** 5EE  
**POULTRY SCIENCE AND MANAGEMENT – I**

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### Course Objectives:

1. To provide with sufficient information and knowledge to allow them to farm poultry commercial and semi-commercial way.
2. To learn specific areas of poultry production including breeding, nutrition, health and product quality and development of entrepreneurial skills in poultry farming.
3. To provide an understanding of poultry production in a broad context from farm to fork.

### Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1. Introduces current standards for the establishment and management of poultry house.  
2. Understand the scientific methods of breeding, hatching and various techniques in the poultry field.
3. Skilfully apply the tools, equipment, and protective mechanism for Poultry farming.
4. Apply the formulation to provide of good nutrition, management of form birds and egg production.
5. Learn about the various skills that are necessary for self employment.

**K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create**

### Unit: 1  
**HISTORY AND IMPORTANCE OF POULTRY FARMING**  
9 Hours

- History and importance of poultry farming - role of poultry farming in rural development and employment potential - Economic contributions to national productivity - egg production, Table breed production and poultry manure. Anatomy and physiology of poultry birds: Digestive and reproductive system.

### Unit: 2  
**BREEDING, HATCHING, INCUBATION AND CULLING**  
9 Hours


### Unit: 3  
**POULTRY HOUSING AND EQUIPMENTS**  
8 Hours

- Space requirements - Types of housing - equipment’s of feeding and watering - protection from enemies and adverse conditions.

### Unit: 4  
**NUTRITION OF POULTRY BIRDS**  
8 Hours

- Feed requirement according to age - feed formulation - classification of feed-stuffs - milling by-products and distillery by-products. Availability of raw materials and their cost - food graders -
### Usage of Antibiotics

#### Unit 5: Brooding and Rearing (9 Hours)

- **Brooding**: types of brooding – natural and artificial brooding – temperature requirement - Rearing of chick, Sexing, characters of good layers and broilers - culling - Debeaking - Caponets and capons.

#### Unit 6: Contemporary Issues (2 Hours)

- Expert lectures, Online Seminars - Webinars and Field Visits.

**Total Lecture Hours**: 45 Hours

**Text Book(s)**

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**Reference Books**

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<td>Poultry Diseases, Diagnosis and Treatment</td>
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<td>Hand Book of Poultry Farming and Feed Formulations</td>
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**Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]**

2. [https://swayam.gov.in/nd2_nou19_ag09/preview](https://swayam.gov.in/nd2_nou19_ag09/preview)

**Course Designed By**: Dr. A. RAJA RAJESWARI, Asst. Prof, Sri Vasavi College, Erode.

### Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
Course Objectives:
1. To provide with sufficient information and knowledge to allow them to farm poultry commercial and semi-commercial way.
2. To learn specific areas of poultry production including breeding, nutrition, health and product quality and development of entrepreneurial skills in poultry farming
3. To provide an understanding of poultry production in a broad context from farm to fork.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:

1. Learn about the various skills that are necessary to manage poultry farms.  
2. Skilfully apply the tools, equipment, and protective mechanism for management of layers and broilers in Poultry farming. 
3. Apply the methods and techniques in the egg production, preservation and marketing. 
4. Able to identify and follow regulation practices for the disease and pest control for birds. 
5. Introduces current standards for the establishment and management of poultry house.

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

Unit:1 MANAGEMENT OF LAYERS 9 Hours
Characteristics of layer chicks - housing, space and lighting requirements - Summer and Winter management - Changes in feeding programme - Care of egg - Hen sampling - Cannibalism.

Unit:2 MANAGEMENT OF BROILERS 9 Hours
Characteristics of the Broiler chicks - Housing of broiler chicks - Optimum Conditions - Feeding and Feed formulations - Sampling.

Unit:3 DISEASE AND HEALTH MANAGEMENT 9 Hours
Diseases caused by viruses: Marek’s Disease, Ranikhet Disease, Fowl pox, Gumboro disease, Egg drop syndrome.
Diseases caused by Bactria: Salmonellosis, fowl cholera, Tick fever.
Diseases caused by Fungi: Aspergillosis, Aflotoxicosis.
Diseases caused by Worms and other Parasites.
Antibiotics, Vaccination, Deworming and Insecticide Treatment. Health cover.

Unit:4 MARKETING 8 Hours
Marketing, Grading and Preservation of egg - Packing and Transportation of eggs - Difference between dark and pale yellow yolk and its taste.

Unit:5 IMPORTANCE OF EGG 8 Hours
Different uses of eggs in preparation of bakery products and other edible items - Nutritive values
of egg - Relationship between customers, Maintenance of prices.

Unit:6 CONTEMPORARY ISSUES 2 Hours
Expert lectures, Online Seminars - Webinars and Field Visits.
Total Lecture hours 45 Hours

Text Book(s)

Reference Books
1 Chauhan HVS. (2018). Poultry Diseases, Diagnosis and Treatment, New Age International Publisher, New Delhi.
2 Eiri Board. (2014). Hand Book of Poultry Farming and Feed Formulations. Published by Engineers India Research Institute, Delhi.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1 https://www.classcentral.com/course/swayam-introduction-to-poultry-farming-14160
2 https://swayam.gov.in/nd2_nou19_ag09/preview

Course Designed By: Dr. A. RAJA RAJESWARI, Asst. Prof, Sri Vasavi College, Erode.

Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low
Course code | 63R | POULTRY SCIENCE AND MANAGEMENT - PRACTICAL | L | T | P | C
---|---|---|---|---|---|---
Core/Elective/ SBS | ELECTIVE COURSE III - B | 0 | 0 | 2 | 2 | Syllabus Version 2020 – 2021
Pre-requisite | Practical Knowledge to Rear and Manage Poultry Breeds |

Course Objectives:
1. To provide an opportunity to become familiar and acquire a degree of skill in poultry field.
2. To enlighten the evaluation of, the productive performance of livestock.
3. To reveal the real nature of animal production and their role in rural development.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1. Evaluate the importance and value of agricultural products as a feed source in poultry and differentiate the poultry breeds and their characteristics features. K5
2. Gain practical knowledge in analyzing the abnormalities and grading techniques of eggs. K2
3. Understand about various techniques debeaking and candling also be familiar with incubators in breeding that are necessary for manage the poultry farm. K2
4. Able to follow proper vaccination practice for the diseases and pest control. K4
5. Field visits make the students to catch up the mills processing, animal feedstuffs and Hatcheries. K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

**MAJOR PRACTICAL**

**Nutritive Value of poultry feed sources:**
- Carbohydrate sources - Maize, Rice Polish, Rice Bran, Wheat Bran
- Vegetable Protein sources - Groundnut Cake, Sesame Cake, Coconut Meal, Cotton Seed, Soybean Meal, Munflower meal
- Animal protein sources - Fish Meal, Meat Meal, Silkworm Pupae Meal
- Mineral sources - Monk meal, Oyster Shell Meal, Lime Stone

**Different type of breeds and their characteristics**
- American class: Rhode Island Red
- Mediterranean class: leghorn, Minorca
- Asiatic class: Desi birds/Aseel, Kadacknath

**Grading of eggs**
- Grade AA
- Grade A
- Grade B

**Egg abnormalities**
- Tiny eggs
1. Leathery /soft shell eggs
m. Double yoked eggs
n. Blood smeared eggs
o. Dirty eggs

MINOR PRACTICAL
1. Vaccination schedules for broilers and layers
2. Debeaking
3. Types of housing
4. Egg candling
5. Cannibalism

SPOTTERS
2. Draw labelled sketch: Digestive system, Reproductive system (male and female).
5. Short notes with diagram: Brooder and Incubator.

VISIT AND SUBMISSION OF REPORT
Visit to poultry markets/farm /study of specific marketing problems/ in house training in college. Report should be submitted in the practical.

QUESTION PATTERN: TOTAL MARKS: 30 MARKS.
Major: 10, Minor: 08, Record: 04, Spotter: 06 (2 spotters each carry 3 marks) Report: 2 marks.

Text Book(s)

Course Designed By: Dr. A. RAJA RAJESWARI, Asst. Prof, Sri Vasavi College, Erode.

Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low
## Course Code: 5EE
### APICULTURE -I

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### Pre-requisite
Basic Introduction about Bees, Beekeeping and Beekeeping Appliances

### Syllabus Version
2020 – 2021

## Course Objectives:
1. To increase the knowledge of bees and bee culture;
2. To maintain small apiaries for demonstration, pollination, extraction and popularisation of honey and other by-product of beekeeping.
3. To build and manage a network of garden and independent beekeeping sites, make aware of various methods of beekeeping and the uses of its appliances.

## Expected Course Outcomes:
On the successful completion of the course, student will be able to:

1. Introduces current standards for the establishment and management of bees. **K1**
2. Familiarize with morphology, food and development of bees. **K2**
3. Skillfully apply the tools, equipment and protective gear for beekeeping. **K3**
4. Apply the knowledge of good quality of nectar and pollen to planning landscapes and gardens and Gain knowledge about various techniques followed in marketing of honey **K3, K4**

**K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create**

## Unit:1
**INTRODUCTION TO BEES**

8 Hours


## Unit:2
**LIFE CYCLE AND ANATOMY**

9 Hours


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<th>Unit:3</th>
<th>PRIMITIVE BEEKEEPING</th>
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<td><strong>Primitive Beekeeping and structure of Hives - Modern Beekeeping and structure of Hives</strong>&lt;br&gt;Advantages and disadvantages of these methods.</td>
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<td><strong>Honey extractor – Methods of extraction, Processing, Packing and Storage. Marketing of Honey.</strong></td>
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Course Designed By: Dr.A.RAJA RAJESWARI, Asst.Prof, Sri Vasavi College, Erode.
## Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low

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### Course Objectives:

1. To increase the knowledge of bees and bee culture.

2. To maintain small apiaries for demonstration, pollination, extraction and popularisation of honey and other by-product of beekeeping.

3. To build and manage a network of garden and independent beekeeping sites, make aware of various methods of beekeeping and the uses of its appliances.

### Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1. Gain knowledge about the importance of honey and also able to classify the honey. **K1**

2. Able to identify and follow regulation practices for the control diseases and control of parasites and enemies’. **K3**

3. Skillfully apply the tools, equipment, and techniques for management of bee. **K3**

4. Be relevant and follow the procedure required for rearing, caring and grafting techniques an **K4**

**K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create**

### Course Details:

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<th>Course code</th>
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<tr>
<td>Pre-requisite</td>
<td>Basic Knowledge in handling tools for Management of Bees</td>
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**Syllabus Version 2020 – 2021**

**Unit:1**

**HONEY**

9 Hours
### Types of Honey – Properties of Honey – Nutritional and Medicinal value of Honey

Bee Wax – Properties and uses. Methods to identify original honey.

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<tr>
<th>Unit: 2</th>
<th><strong>ENEMIES</strong></th>
<th>8 Hours</th>
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<tbody>
<tr>
<td></td>
<td>Damages and preventive measures for Wasps - Greater and Lesser wax moths - Wax Beetles - Black Ants Birds and Mammals.</td>
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<th><strong>STOCKS AND ECONOMICS</strong></th>
<th>9 Hours</th>
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<tr>
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<td>Uniting of Stocks - Uses and Principles - Methods of uniting. Artificial feeding methods. Economics of Beekeeping: Preparation of project – Infrastructure cost –recurring – expected income and gain – Methods to obtain loan</td>
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<td>Description of Parasite, Symptoms, Transmission, Diagnosis and Control of Brood Disease and adult diseases.</td>
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<td>Expert lectures, Online Seminars - Webinars and Field Visits.</td>
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<tr>
<th>Related Online Contents</th>
<th>[MOOC, SWAYAM, NPTEL, Websites etc.]</th>
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Course Designed By: Dr.A.RAJA RAJESWARI, Asst.Prof, Sri Vasavi College, Erode.

Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low

Course code | 63R |
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APICULTURE PRACTICAL |

**Core/Elective/ SBS**
ELECTIVE COURSE III-C

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**Pre-requisite**

Practical Knowledge about Management of Bees, Extraction and Identifying the Quality of Honey

**Syllabus Version**

2020 – 2021

**Course Objectives:**

1. To increase the knowledge of bees and bee culture;

2. To maintain small apiaries for demonstration, pollination, extraction and popularisation of honey and other by-product of beekeeping.

3. To build and manage a network of garden and independent beekeeping sites, make aware of various methods of beekeeping and the uses of its appliances.

**Expected Course Outcomes:**

On the successful completion of the course, student will be able to:

1. Introduces current standards for the establishment and management of bees. K1
2. Familiarized with various techniques like mounting and extraction of honey. K3
3. Identify and describe about different hives, appliances and parasites of bees. K3
4. Gain practical knowledge in identifying the quality of honey. K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create
### MAJOR PRACTICAL

1. Extraction of Honey.
2. Setting up of a Newton Hive (Cardboards and others can be used).
3. Estimation of Glucose in Honey.
4. Mounting of Pro, Meso and Meta thoracic legs of Honeybee.
5. Dissection of Wax glands (Optional).

### MINOR PRACTICAL

1. Mounting of Mouthparts.
2. Identifying the quality of Honey.
3. Qualitative identification of Glucose, Fructose and Sucrose in Honey.

### SPOTTERS

1. Identification and Description of Whole mount of types of Honeybees.
2. Identification and Description of types of Primitive and Modern Hives.
3. Identification and Description of Appliances Used in Apiary.
4. Identification and Description of Parasites of Honeybee.
5. Identification and Description of Worker, Drone and Queen.

### VISIT AND SUBMISSION OF REPORT

Visit to apiculture unit of nearby locality or training or in house apiculture in college. Report should be submitted in the practical.

### QUESTION PATTERN: TOTAL MARKS: 30 MARKS.

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<th>Major: 10, Minor: 08, Record: 04, Spotter: 06 (2 spotters each carry 3 marks)</th>
<th>Report: 2 marks</th>
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<td>Total Practical hours</td>
<td>30 (Each Semester) x 2 = 60 Hours Per Year</td>
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### Text Book(s)

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Course Designed By: Dr.A.RAJA RAJESWARI, Asst.Prof, Sri Vasavi College, Erode.
## Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
Value Added Course
Course code | MEDICAL EMERGENCY MANAGEMENT | L | T | P | C
---|---|---|---|---|---
Core/Elective/Supportive | Value Added Courses-I | Syllabus Version 2020-2021 |
Pre-requisite | Knowledge to Understand the First Aid Treatment and Management |

Course Objectives:
1. To understand the scope and role of First Aid treatments.
2. To manage the various incidents using First Aid Treatment measures.
3. To describe the various medical emergency situations.
4. To learn handling techniques of First Aid Treatment.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:

1. To understand the significance of First Aid treatments and utilize the possible measures for life saving in an unconscious casualty. K2
2. To explain the First Aid management for respiratory, wounds and circulation problems. K3
3. To list the techniques and equipments for First Aid. K4
4. To plan the First Aids for emergency in community and natural disorders. K4

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

THEROY 10 x 2 =20 Hours

Module 1. First Aid and Aider. Precaution and Preparation.
Module 3. Incidents: Pandemic diseases (virus and Bacteria).
Module 5. Medical Situations: Heart attack, Stroke, Hyper and Hypoglycemia, Seizures.
Module 7. First Aid materials, Dressings, Cold compresses, Removing clothing and headgear.
Module 8. Casualty handling, Principles of bandaging and types (Roller and Tubular), square knots, hand and foot cover.
Module 9. Emergency Action: Cardio Pulmonary Resuscitation for an adult and infant and chest

**PRACTICALS**

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<td>5 x 2 = 10 Hours</td>
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<td>1.</td>
<td>Blood Pressure checking Sitting, Standing and Lying Position</td>
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<td>Cardio Pulmonary Resuscitation (CPR)-handling Test</td>
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<td>RBC and WBC Count</td>
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<td>4.</td>
<td>Estimation of Bleeding and Clotting time</td>
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<td>Checking Heart Beat and Pulse Rate</td>
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**Reference Books**


Course Designed By: Dr. UTHAYAKUMAR, Asst.Prof, Sri Vasavi College, Erode.

**Mapping with Programme Outcomes**

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*S-Strong; M-Medium; L-Low*
## Course Objectives:

1. To understand the importance of Earthworms.
2. To impart the basic knowledge on Vermicomposting methods.
3. To familiarize the values of Vermitechnology and its applied aspects of organic farming.

## Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1. Student gain basic knowledge of Earthworms.  
   **K2**
2. Understand the importance of waste degradation by Eco-friendly method.  
   **K3**
3. Understand the significance of Vermicomposting methods.  
   **K4**
4. Apply knowledge on commercialization of Vermiproducts.  
   **K4**

**K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

## MODULE

15 x 2 = 30 Hours

Module 1. Definition, Concept and Need for Vermiculture.

Module 2. Classification of Earthworm Epigeic, Anecic and Endogeic forms.


Module 6. Vermiculture unit setup. Small scale and Large scale vermin composing.


Module 11. Uses of earthworms in animal feed industry.


Module 15. Recycling of different wastes by vermicomposting.

Text Books


Reference Books


Course Designed By:
S. SUDHA, Asst. Prof, LRGGovt. Arts College for Women, Tirupur

Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
Course code: ECONOMICS OF CONSERVATION

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<td>Pre-requisite</td>
<td>Basic Knowledge in Life Sciences</td>
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Course Objectives:

1. To create basic awareness about conservation
2. To create awareness to students explore biodiversity for new product development.
3. To create awareness to understand the economics aspects of Biodiversity

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1. Explore nature in search of new biodiversity products in field of medicine and agriculture. K3
2. Able to understand the significance and need of conserving resources K3
3. Gain knowledge about importance of Ecosystem services and marine resources. K2
4. Familiar and able to isolate, identify the biodiversity products. K3
5. Aware and create career opportunity in ecotourism. K5

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

MODULE 15 x 2 = 30 Hours

Module 1. Concept of Biodiversity
Module 2. Ecosystems and Community structure
Module 3. Spatial and temporal aspects of biodiversity
Module 4. Causes of the global loss of biodiversity
Module 5. Invasive species and their impact on ecosystems and biodiversity
Module 6. Conservation biology: policy and management
Module 7. Ecosystem services and their importance for human societies
Module 8. Biodiversity products
Module 9. Economics of marine resources
Module 10. Biodiversity products from Animals.
Module 11. Biodiversity products from plants.
Module 12. Biotechnology in Biodiversity
Module 13. Isolation, identification and patenting Biodiversity Products
Module 14. Biodiversity as Career
Module 15. Eco-tourism and possibilities.

Reference Books

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Course Designed By: Dr. R. SANIL, Associate Professor, GAC, Ooty
## Mapping with Programme Outcomes

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*S-Strong; M-Medium; L-Low*
Course code: INTELLECTUAL PROPERTY RIGHT

Core/Elective/Supportive: Value Added Course-IV

Pre-requisite: Basic Knowledge to Aware About IPR

| Syllabus Version | 2020 – 2021 |

Course Objectives:
1. To introduce fundamental aspects of Intellectual property Rights to students who are going to play a major role in development and management of innovative projects in industries.
2. To disseminate knowledge on patents, patent regime in India and abroad and registration aspects.
3. To disseminate knowledge on copyrights and its related rights and registration aspects.
4. To disseminate knowledge on Design, Geographical Indication (GI), Plant Variety and Layout Design Protection and their registration aspects.
5. To aware about current trends in IPR and Govt. steps in fostering IPR.

Expected Course Outcomes:
On the successful completion of the course, student will be able to:

1. The students once they complete their academic projects, shall get an adequate knowledge on patent and copyright for their innovative research works.

2. During their research career, information in patent documents provides useful insight on novelty of their idea from state-of-the art search. This provide further way for developing their idea or innovations.


K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 – Create

MODULE 15 x 2 = 30 Hours

Module 1. Introduction and the need for intellectual property right (IPR)


Module 3. Layout Design and Genetic Resources.

Module 4. Traditional Knowledge and Trade Secret.

Module 5. IPR in India.

Module 6. Patents - Elements of Patentability: Novelty, Non Obviousness.


Module 8. Nature of Copyright, Registration Procedure, Ownership and licence of copyright.

Module 9. Related Rights - Distinction between related rights and copyrights.

Module 10. Concept and Kinds of Trademarks (brand names, logos, signatures, symbols).

Module 11. Registration of Trademarks - Rights of holder.


Text Book(s)

Reference Books

E-resources:


Related Online Contents
1. Cell for IPR Promotion and Management (http://cipam.gov.in/)
3. Office of the Controller General of Patents, Designs & Trademarks (http://www.ipindia.nic.in/)

Course Designed By: Dr. A. RENI PRABHA, Assoc. Prof, Chikkaiah Naicker College, Erode

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<thead>
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<th>Mapping with Programme Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cos</strong></td>
</tr>
<tr>
<td>CO1</td>
</tr>
<tr>
<td>CO2</td>
</tr>
<tr>
<td>CO3</td>
</tr>
</tbody>
</table>

*S-Strong; M-Medium; L-Low*
Annexure
B.Sc. ZOOLOGY

SYLLABUS

(With effect from 2020 - 2021 onwards)

Program Code:

DEPARTMENT OF ZOOLOGY
Bharathiar University
(A State University, Accredited with “A “Grade” by NAAC and 13th Rank among Indian Universities by MHRD-NIRF)
Coimbatore 641 046, INDIA
GUIDELINES FOR CONDUCTING VALUE ADDED COURSES

Course Structure

1. The request for approval of syllabus by the concerned authorities is mandatory at least 15 days before the date of commencement of the course. The syllabus (15/30 hours), schedule and the details of faculty handling the course approved by the Departmental Committee and forwarded by the Head of the Department should be enclosed.
   a. The course offered should not be the same as any course listed in the curriculum of the respective programme/or any other programme offered in the University/Collages.
   b. The value-added courses may be also conducted during weekends/ vacation period.
   c. The course can be offered any semester in the PG Programmes.
   d. Industry experts/eminent academicians from other Institutes are also eligible to offer the value added course.
   e. The course can be offered only if there are at least 10 students opting for it.
   f. The students may be allowed to take value added courses offered by other departments after obtaining permission from Head of the Department offering the course.

Duration

2. The duration of value added courses is 15 (30) periods of theory or a maximum of theory and laboratory courses and the course can have a maximum of three hours per day. For the one (two) credit courses, either 15 (30) periods of theory or a combination of theory and laboratory may be offered. 
   Where, 2 periods of laboratory = 1 period of theory

Evaluation

3. The value added courses shall carry 100 marks and shall be evaluated through internal assessments only.
   a. Two Assessments shall be conducted preferably one in the middle and the other at the end of the course by the Department concerned.
   b. The duration of assessment is one hour each.
   c. The total marks obtained in the tests shall be reduced to 100 marks and rounded to the nearest integer.
   d. The Head of the Department may identify a faculty member as coordinator for the course. A committee consisting of the Head of the Department, staff handling the course (if available), coordinator and a senior faculty member nominated by the Head of the Department shall monitor the evaluation process. The grades shall be assigned to the students by the above committee based on their relative performance.
e. The coordinator for the course is responsible for maintaining and processing the records with regard to assessment marks and results.

Passing Requirement and Grading

4. The passing requirement for value added courses shall be 50% of the marks prescribed for the course (Internal assessment only)

   a. The grades O, A+, A, B+, B obtained for the one/two credit shall figure in the Marksheet under the title ‘Value Added Courses’. The other grades RA, SA will not figure in the mark sheet.
   b. The credit earned through value added courses shall not be considered for calculating GPA and CGPA.
   c. The credit earned through value added courses shall not be considered for classification of degree.
   d. If the course is offered during any semester, it will appear in that semester's marksheet. However, if the course is offered in summer/wintervacations, the course will be included in the gradesheet of the subsequent semester.

Maximum Number of Courses

5. A student can earn a maximum of 3 credits during the entire programme of study by attending value added courses which would be over and above the required maximum number of credits for the award of the degrees.

Financial Commitment

6. The expenditure to be incurred for the conduct of value added courses should be met from nominal fees collected from the students at a rate fixed by the University. However, any additional expenditure may be supported by the funds of the Department.
APPLICATION FOR CONDUCTING VALUE ADDED COURSES

1. Name of the Department:
2. PG programme:

3. **Details of the Value Added Courses:**
   a. Name of the Value Added Courses
   b. Type of Value Added Courses (Theory/ Lab/ Lab integrated Theory/others)
   c. Short Description
   d. Syllabus including Reference

   Enclosure 1 enclosed - YES / NO
   Enclosure 2 enclosed - YES / NO

4. **Target audience:**
   Semester (indicate if more than one)
   others

5. **Details of Faculty handling the course:**
   a. Name of the Faculty handling the Value Added course
   b. Details including designation and expertise
   c. Contact details
   Email ID:
   Phone No:

   Enclosure 3 enclosed - YES / NO

6. **Tentative Time Table** including dates of internal assessments:

   Enclosure 4 enclosed - YES / NO

7. Number of students opting for the course:

8. Department Consultative Committee - Minutes:

   Enclosure 5 enclosed - YES / NO

9. Name and Designation of the Coordinator:

   Head of the Department
   (with date & seal)

**Note:**

- Fees if any
DETAILS OF COMPLETION OF VALUE ADDED COURSE

Name of the Department : 

Name of the Value Added course offered

Name of the Faculty offered the course : Academic / Industry

Name of the coordinator : 

E- Mail : 

Contact : 

Details of students attended the course:

<table>
<thead>
<tr>
<th>S.No</th>
<th>Name of the student</th>
<th>Reg.No.</th>
<th>Programme</th>
<th>Semester</th>
<th>Marks</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

(Faculty handling the Course (if available)  
(Senior Faculty nominated by HOD)

(Coordinator)  
(Head of the Department)  
(With date & seal)
DISTRIBUTION OF EXTERNAL AND INTERNAL MARKS FOR THEORY PAPERS

Table – 1(A): Distribution of marks for External and Internal for University (external) examination and Continuous Internal Assessment and passing minimum marks for Theory Papers.

<table>
<thead>
<tr>
<th>TOTALMARKS</th>
<th>EXTERNAL</th>
<th>INTERNAL</th>
<th>Overall Passing Minimum for total marks (Internal + External)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Max. marks</td>
<td>Passing Minimum for externalalone</td>
<td>Max. marks</td>
</tr>
<tr>
<td>100</td>
<td>75</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>75</td>
<td>55</td>
<td>22</td>
<td>20</td>
</tr>
</tbody>
</table>

Table– 1(B): Distribution of marks for the Continuous Internal Assessment in the Theory Papers of UG programmes.

<table>
<thead>
<tr>
<th>FOR THEORY UG-COURSES</th>
<th>Distribution of Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Tests (one best test out of 2 tests of 2 hours each)</td>
<td>10 8</td>
</tr>
<tr>
<td>2 End semester model test (3 hours)</td>
<td>10 8</td>
</tr>
<tr>
<td>3 Assignments – 2Nos.</td>
<td>5 4</td>
</tr>
<tr>
<td>TOTAL MARKS</td>
<td>25 20</td>
</tr>
</tbody>
</table>
DISTRIBUTION OF EXTERNAL AND INTERNAL MARKS FOR PRACTICALPAPERS

Table – 2(A): Distribution of marks for External and Internal University (external) examinations and Continuous Internal Assessments and passing minimum marks for the Practical Courses.

<table>
<thead>
<tr>
<th>TOTALMARKS</th>
<th>EXTERNAL</th>
<th>INTERNAL</th>
<th>Overall Passing Minimum for total marks (Internal + External)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Max. marks</td>
<td>Passing Minimum for externalalone</td>
<td>Max. marks</td>
</tr>
<tr>
<td>100</td>
<td>60</td>
<td>24</td>
<td>40</td>
</tr>
<tr>
<td>75</td>
<td>45</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>50</td>
<td>30</td>
<td>12</td>
<td>20</td>
</tr>
</tbody>
</table>

Table – 2(B): Distribution of marks for the Continuous Internal Assessment in UG Practical Courses.

<table>
<thead>
<tr>
<th>FOR PRACTICALUG-COURSES</th>
<th>DISTRIBUTION OF MARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Minimum 10 experiments to be conducted practical paper/semester.</td>
<td>20 15 8</td>
</tr>
<tr>
<td>2 Tests: Two tests out of which one shall be during the mid semester and the other to be conducted as model test at the end of the semester.</td>
<td>15 10 7</td>
</tr>
<tr>
<td>3 Record.</td>
<td>5 5 5</td>
</tr>
<tr>
<td>TOTAL MARKS</td>
<td>40 30 20</td>
</tr>
</tbody>
</table>
QUESTION PAPER PATTERN

The following question paper patterns shall be followed for OBE pattern syllabi for the candidates admitted from the academic year 2020-21 wherever applicable otherwise provided in syllabi itself.

MAXIMUM 75 MARKS – WHEREVER APPLICABLE

<table>
<thead>
<tr>
<th>Section A</th>
<th>Multiple choice questions with four options</th>
<th>10*1=10</th>
<th>10 questions – 2 from each unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section B</td>
<td>Short answer questions of either / or type like 1.a (or) b</td>
<td>5*5=25</td>
<td>5 questions – 1 from each unit</td>
</tr>
<tr>
<td>Section C</td>
<td>Essay-type questions of either / or type like 1.a (or) b</td>
<td>5*8=40</td>
<td>5 questions – 1 from each unit</td>
</tr>
</tbody>
</table>

MAXIMUM 55 MARKS – WHEREVER APPLICABLE

<table>
<thead>
<tr>
<th>Section A</th>
<th>Multiple choice questions with four options</th>
<th>10*1=10</th>
<th>10 questions – 2 from each unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section B</td>
<td>Short answer questions of either / or type like 1.a (or) b</td>
<td>5*3=15</td>
<td>5 questions – 1 from each unit</td>
</tr>
<tr>
<td>Section C</td>
<td>Essay-type questions of either / or type like 1.a (or) b</td>
<td>5*6=30</td>
<td>5 questions – 1 from each unit</td>
</tr>
</tbody>
</table>

The General Awareness paper to have multiple choice questions (with four option) to be evaluated by using OMR.

For other courses in Part IV of UG programmes namely, Environmental Studies, Value Education – Human Rights, Yoga for Human Excellence, Women’s Rights and Constitution of India the question paper pattern should be 5 out of 10.