SARVODAYA KELAVANI SAMAJ MANAGED,

SHREE MANIBHAI VIRANI & SMT. NAVALBEN VIRANI SCIENCE COLLEGE

AN AUTONOMOUS COLLEGE- AFFILIATED TO SAURASHTRAUNIVERSITY, RAJKOT

Re-accredited at the 'A' Level (CGPA 3.28) by NAAC
'STAR' College Scheme & Status by MST-DBT
A College with Potential for Excellence - CPE (Phase-II) by UGC
UGC-DDU KAUSHAL Kendra
Accredited at the G-AAA Highest Grade 'A-1′ Level by KCG, Govt. of Gujarat
UGC-DDU KAUSHAL Kendra
GPCB-Government of Gujarat approved Environment Audit Centre

Board of Studies (BoS)

Department of Biology

COMPOSITION / AGENDA/NOTES/ATTENDANCE / MoM

Academic Year	Meeting Number	Date
2020 - 2021	Sixth	26- 06-2020

Shree Manibhai Virani & Smt. Navalben Virani Science College, Rajkot

(Autonomous)

Affiliated to Saurashtra University, Rajkot

Department of Biology

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Shree Manibhai Virani & Smt. Navalben Virani Science College, Rajkot

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BOARD OF STUDIES - BIOLOGY

Date: 26/09/2020 **Time: 04:00 am** **Venue: Online**

MINUTES OF THE MEETING

AGENDA:

Resolutions are required from all members of 6th BoS in the following agendas

1. Welcome and introductory remarks by Chairman
2. ATR of the recommendations / resolutions made in previous BoS meeting.
3. Online TL & E methodologies/ strategies adopted for A.Y. 2019-20 & 2020-21 as per UGC, Government and University preventive guidelines for Covid-19 pandemic.
4. Adoption and implementation of UGC – Learning Outcomes based Curriculum Framework (LOCF) for Undergraduate Education from A.Y. 2021-22 in harmony with National Education Policy-2020.
5. Updation of List of Question Paper Setters and Examiners-Theory & Practical for UG Program.
6. Any other

The following members were present/absent in the meeting:

S.No.	Name	Membership	Present/Absent
1.	Dr. Reena P. Dave	Head of Department, Chairperson	Present
2.	Dr. Anvay Upadyay	VC Nominee	Present
3.	Dr. Rutva H. Dave	VC Nominee	Present
4.	Dr. Y. M. Kadiyani	Subject Expert	Present
5.	Dr. Nikesh Kotadiya	Subject Expert	Present
6.	Dr. Manish N. Jani	Subject Expert	Present
7.	Dr. R. S. Patel	Subject Expert	Absent
8.	Dr. B. B. Radadia	Member	Present
9.	Dr. Rahul S. Gohel	Member	Present
10.	Dr. Neha T. Patel	Member	Present

The chairperson, **Dr. Reena P. Dave**, well-comed all the members of BoS.

Welcome to all the members of the Board of Studies to the first meeting after conferment of extension of the autonomous status (up to 2023-24) to the college by UGC. Chairperson Dr. of the BoS place on record the gratitude of the department to the previous members of this BoS for their kind and able contribution towards the effective implementation of academic autonomy.
Due to C-19 pandemic first national lockdown was observed on 22nd March 2020 followed by Phase-1 to till date; following activities have been carried out by the college.

The chairperson **Dr. Reena P. Dave** took up the agendas point by point.

I. Three Blood donation camps for the benefit of thalassemia patients (104-units) were organized in association with Red Cross Blood Bank, Atmiya University and Saurashtra University during April-2020.

Following events were organized in association with Atmiya University, Rajkot.

Event	Topic	Date	Resource Person
OBE – FDP (02)	Rubrics as an Assessment Tool - Part I	28-04-20	Prof. Sheela Ramachandran Pro-Chancellor, Atmiya Uni., Rajkot
	Rubrics as an Assessment Tool - Part II	06-05-20	
Webinar (05)	Development of Testing-Kits & Global Diagnostics Methodologies for COVID-19	23-05-20	Dr. Vraj Rabadia, Head, Non-Clinical Discovery, ApoPharma Inc, Apotex, Toronto, Canada
	Technologically Important Materials	17-06-20	Prof. S. Kalainathan, Director, Centre for Crystal Growth, VIT, Vellore, TN
	Understanding Innate Immunity in CANCER	18-06-20	Dr. Riva Verma, Cancer Immunology, Uni. of Singapore
	Electronic Materials & Devices for Select Space & Defense Applications - An Overview	19-06-20	Prof. V. N. Mani, Sr. Scientist-E, Centre of Materials for Elec. Tech., IT Dept., Govt. of India, Hyderabad
	Relevance of X-Rays : A WONDER RADIATION (For Men and Materials)	20-06-20	Prof. Rajni Kant, Dean-Faculty of Science, CoE, Uni. of Jammu, Jammu Tawi
E-Content FDP (01)	E-content development: Video Recording & Editing	9th & 10th June 2020	ICT experts of the college and Atmiya University.
MS Teams-FDP (02)	Online Teaching using MS-Teams	17th to 20th June 2020	KCG and Microsoft Trainers (for 1. Principal + ETRP 2. All teaching staff)
NEP-FDP (01)	National Education Policy 2020 - Overview	23-09-20	Dr. Y. M. Jayaraj, Hon. VC, Pravara Institute of Medical Sciences, Loni Bk, MH

2. Following student centric co/extra-curricular activities were organized.

Day	Competition	Date	Remark
Gujarat Establishment	Essay, Painting and Poem	01-05-20	Saptadhara Competitions
World Environment	Quiz	05-06-20	In association with Gujarat Pollution Control Board, Rajkot
International Yoga	Quiz	21-06-20	In association with Gujarat State Yoga Board, Gandhinagar

World Photography	*Photography*	*24-08-20*	*In association Atmiya University, Rajkot*
Independence Day	*Total 18 NCC cadets, 08 NSS volunteers and NCC officer of the college have served Rajkot district administration for C-19 preventive measures for two months April & May 2020 and they were felicitated for exhibiting extra ordinary courage as Corona warriors.*		

3. **MOOCs**:
   The college has been benefited by the partnership of Atmiya University with COURSERA (American MOOC provider) for free Certificate Courses during the C-19 pandemic.

   Five certificate courses have been completed by the Faculty members of the department.

2. ATR of the recommendations / resolutions made in previous BoS meeting.

Following recommendations / resolutions were made in the previous BoS meeting held on 5th June 2019.

4. Syllabus revision of allied courses for following B.Sc. program Semester – I to IV for students admitted from AY 2019 - 2020 & onwards.

Sr. No.	Program	Semester	DSE-Allied
1.	B. Sc. Biochemistry	I	Botany
2	B. Sc. Biochemistry	II	Zoology-I
3.	B. Sc. Biochemistry	III	Zoology-II
4.	B. Sc. Microbiology	II	Botany
5.	B. Sc. Microbiology	I	Zoology
6.	B. Sc. Microbiology	III	Sustainable Management
7.	B. Sc. Microbiology	IV	Basics of Ecology
8.	B. Sc. Biotechnology	III	Plant Science
9.	B. Sc. Biotechnology	IV	Animal Science

5. Revision of syllabi & evaluation norms framed for GE course – Wildlife Ecology for B.Sc. semester-6 students admitted form AY 2017-2018 & onwards
6. Updated list of question paper setter and examiners for theory and practical for allied course of all relevant B.Sc. program.

The above recommendations / resolutions were approved in the Academic Council meeting held on 12th June 2019 and implemented by the department.

The above be effective for students admitted from **AY 2019 - 2020** & onwards, details in **ENCLOSURE I (A to I).**

ENCLOSURE I (A to I)

3. Online TL & E methodologies/ strategies adopted for A.Y. 2019-20 & 2020-21 as per UGC, Government and University preventive guidelines for Covid-19 pandemic.

A.Y. 2019-20

As per the academic calendar A.Y. 2019-20 of the college, the teaching & learning process of all UG, PG & Integrated programs have ended on/before 9th March 2020; the 2nd internal evaluation (i.e. 2nd CIE) was scheduled from 23rd March 2020 and subsequently Semester End Examination (theory) – 2019-20 for all UG, PG & Integrated programs were scheduled from 1st April 2020 & onwards. The SEE (practical) have commenced from 11th March 2020.

Due to Covid-19 pandemic; first National lockdown was observed on 22nd March 2020 followed by Phase-I to till date and as per the approval of the Governing Body of the college (GB in C dated 21/07/2020) based on various circulars / C-19 preventive guidelines of UGC, Education Department and affiliating University; the internal & semester end evaluations – T & P were conducted giving proctored online / offline options to the students in two phases.

The evaluation of Allied courses (Sem.- 2 & 4) & GE courses (Sem.-6) was conducted for CIE-2 during April / May 2020 and SEE during July / August 2020 of B.Sc. Microbiology/ Biochemistry programs.

A.Y. 2020-21

The college has initiated online / offline admission processes on 15th May 2020 as per admission / admission processing committee's resolution the merit list schedule was published on college website on 6th June 2020. The admission counseling was made online as well as at college following the guidelines issued by the Government.

The Department of Education, Government of Gujarat has implemented UDAYAM-Unlimited Digital Advanced Yearlong Academic Method of Learning project for providing Administrative and Academic resources to the HEIs during C-19 pandemic (Education Department, GoG, Circular No. PaRaCh/2020/OnlineEdu/Kh dated 22/06/2020).

The Department of Education, Government of Gujarat has facilitated all the GIA Colleges with Single sign on system-COGENT and Microsoft Teams platform for online Teaching Learning & Evaluation-TLE. The KCG and MS Teams trainers have conducted online two trainings for Principal, ETRP and all staff members. The Government has also established cluster lead college for the rectification of relevant issues and queries.

The Sarvoday Kelavani Samaj, managing trust of the college have also facilitated with all digital and physical resources required for the conduction of SIP & TLE during Covid-19 pandemic. The college has conducted two days FDP on E-content development: Video Recording & Editing on 9th & 10th June 2020.

The online teaching-learning classes started with Student Induction Program (SIP) for Semester-3 & 5 of UG programs and Semester-3 for PG program in phased manner from 9th July 2020 & onwards for A.Y. 2020-21.

The online Student Induction Program (SIP) followed by teaching, learning & evaluation has started from 25th August 2020 for UG semester-1 students admitted in 2020-21 as per academic calendar. During five days SIP, thrust was given on Life Skills (VECD), Basic Computer Skill, E-learning Resources and Communication Skills.

As per the academic calendar of the college the first CIA: Component Test-1 for Allied courses of B.Sc. Microbiology / Biochemistry students of semester-3 & 5 from 21st to 25th Sept. 2020.

4. **Adoption and implementation of UGC – Learning Outcomes based Curriculum Framework (LOCF) for Undergraduate Education from A.Y. 2021-22 in harmony with National Education Policy-2020.**

The Learning Outcomes-based Curriculum Framework (LOCF) works towards a more holistic experience for the students, while focusing not just on knowledge delivery in higher education but also on the application of knowledge through field and lab work and emphasizes on application of knowledge to real life experiences. Besides this, students will attain various 21st century skills like critical thinking, problem solving, analytic reasoning, cognitive skills, self-directed learning etc.

The LOCF is a framework based on the expected learning outcomes and academic standards that are expected to be attained by graduates of a program of study and holder of a qualification.

The college has already implemented Outcome based Education System for M.Sc. programs from 2019-20 & onwards. The college will come up with the key outcomes that underpin curriculum planning and development at the UG level include Graduate Attributes, Qualification Descriptors, Program Learning Outcomes, and Course Learning

Outcomes and Teaching - learning process & Assessment methods for the students admitted in various UG programs from AY 2021-22.

Details in Encloser II above be effective for student admitted from academic year 2021-22

5. **Updation of List of Question Paper Setters and Examiners-Theory & Practical for UG Program.**

Details given in Encloser III

The meeting ended with vote of thank by the chairperson **Dr. Reena P. Dave**.

Enclosure I (A)

DSE – Allied BOTANY
SEMESTER I
(With Biochemistry)

19UBCDA101	**BOTANY**	**3 Hrs/Week**	**3 Credit**

OBJECTIVE

1. This course is survey of the botanical aspects of plant diversity, morphology, Reproduction, and Physiology.
2. Improve understanding of the structure functioning, life histories and diversity of plants.
3. Development of personal perception of plants and environment.

Unit I: Plant Kingdom **(09 Hrs)**

- General characters, Smith's Classification & economics importance of Algae
- General characters, Smith's Classification & economics importance of Fungi
- General account and outline classifications of Bryophytes
- General account and outline classifications of Pteridophytes
- General account and outline classifications of Gymnosperms

Unit II: Plant Morphology **(09 Hrs)**

- General study of Root and Stem
- General study of Leaf
- Types of Fruit
- Flower – Epigynous, Perigynous, Hypogynous
- General characteristics of herb, shrub, tree, climber and creeper

Unit III: Plant Diversity of Angiosperms **(09 Hrs)**

- Binomial Nomenclature of angiosperms
- Systems of classification
- Classification System of Bentham & Hooker.

- Taxonomic studies of Dicot plants from each following Families with its medicinal value.
    - *Malvaceae*
    - *Solanaceae*
    - *Apocynaceae*
- Taxonomic studies of Monocot plants from each following families with its medicinal value
    - *Poaceae*
    - *Amaryllidaceae*

Unit IV: Method of Plant Reproduction (09 hrs)

- Fission
- Fragmentation
- Vegetative reproduction
- Asexual reproduction
- Sexual reproduction

Unit V: Plant Physiology (09 Hrs)

- Opening and closing of stomata
- Plant-water relations
- Translocation in the phloem
- Photoperiodism
- Seed dormancy

Text Books:

1. V.K. Jain (2000) Fundamental of Plant Physiology , S. Chand (G/L) & Company Ltd; 5th Revised edition .(For Unit 5)
2. V. Singh D. K. Jain P. C. Pande (2010) A Text Book of Botany: Angiosperms, Rastogi Publications-Meerut. (for Unit 1, 2, 3, 4)

Reference Books:

1. Raven, P.H., Johnson, G.B., Losos, J.B., Singer, S.R. (2005). Biology. Tata McGraw Hill, Delhi.
2. Campbell, N.A., Reece J.B., Urry L.A., Cain M.L., Wasserman S.A. Minorsky P.V., Jackson R.B. (2008). Biology, Pearson Benjamin Cummings, USA. 8th edition.
3. Taiz, L., Zeiger, E., MØller, I.M. and Murphy, A (2015). Plant Physiology and Development. Sinauer Associates Inc. USA. 6th edition.

PRACTICALS:

19UBCDA102	Botany Practical	6 Hrs/wk	2 Credit

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Objectives:

- This course is survey of the botanical aspects of plant diversity, morphology, Reproduction, and Physiology.
- Improve understanding of the structure functioning, life histories and diversity of plants.
- Development of personal perception of plants and environment.

1. Identification and observational Study of Herbs Diversity through field visit/Lab specimens
2. Identification and observational Study of Shrubs Diversity through field visit/Lab specimens
3. Identification and observational Study of Tree Diversity through field visit/Lab specimens
4. Identification and observational Study of Climbers Diversity through field visit/Lab specimens
5. Identification and observational Study of Creepers Diversity through field visit/Lab specimens
6. To Study Morphology of Root.
7. To Study Morphology of Stem.
8. To Study Morphology of Leaf.
9. To Study Morphology of Flower.
10. To Study Morphology of types of calyx.
11. To Study Morphology of types of corolla and perianth.

12. To Study Morphology of types of Androecium.
13. To Study Morphology of types of Gynoecium.
14. Demonstrate water potential of given tissue (potato tuber).
15. To study evaluation of oxygen during photosynthesis.
16. To Study various types of Fruits.
17. To understand floral formula and floral diagram.
18. Taxonomic studies of Malvaceae family with its economical and medicinal value.
19. Taxonomic studies of Solanaceae family with its economical and medicinal value.
20. Taxonomic studies of Apocynaceae family with its economical and medicinal value.
21. Taxonomic studies of Poaceae family with its economical and medicinal value.
22. Taxonomic studies of Amarilidaceae family with its economical and medicinal value.
23. Preparation of Herbarium.
24. To study different methods of plant reproduction through chart/slides.
25. Calculation of stomatal index and stomatal frequency from the two surfaces of leaves of mesophytes and xerophytes.
26. Filed visit for plant diversity.

References:

- Bendre & Kumar, A text book of Practical Botany part I & II, 2010, Rastogi Publication, Meerut.
- Dr. B. P. Pandey, Modern Practical Botany (Vol-I, II & III), 2012, S. Chan Publication, New Delhi

Enclosure I (B)

DSE – Allied ZOOLOGY

SEMESTER – II

(With Biochemistry)

19UBCDA201	**Zoology - I**	**3 Hrs/Week**	**3 Credits**

OBJECTIVE

- The students pursuing this course would have to develop in depth understanding various aspects of the Zoology.
- The working principles, design guidelines and experimental skills associated with different fields of Zoology.

Unit –I Animal Taxonomy **(09 Hrs)**

- Basics of Taxonomy.
- An introduction to in-vertebrate and Vertebrate animals.
- Systematic of Non-chordate Animals.
- Systematic of Lower Chordate Animals.
- Systematic of Higher Chordate Animals.

Unit-II Forms & Functions in Animals **(09 Hrs)**

Type Study: Earth worm.

- External Characters
- Digestive system
- Reproductive system
- Nervous system
- Structure of Septal Nephridia

Unit-III: Developmental Biology **(09 Hrs)**

- Structure of Frog Sperm and Ovum.
- Fertilization in Frog.
- Cleavage in Frog.
- Blastula in Frog.
- Gastrula. in Frog.

Unit-IV: Evolution and Animal Behaviour **(09 Hrs)**

- Isolation
- Speciation
- Genetic Drift.

- Social Behaviour in Animals
  (1) Termite (2) Honey-bee
- Parental Care in Animals
  (1) Pices (2) Amphibia.

Unit-V Applied Zoology (09 Hrs)

A study of general structure and characters of following pathogenic animals.

- Entamoeba.
- Trypenosoma.
- Filarial worm.
- Guinea worm.
- Ascaris.

Text Books:

1. Jordan E. L & Varma P.S.(2010) Non-chordate Zoology, S.Chand & Co. Ltd. New Delhi, 4th edition.(for unit 1, 2 &5).
2. Gilbert S.F. (2010) Developmental Biology (Sinauer) 10th edition.(for unit 3).
3. Mathur R (2010) Animal Behaviour, Rastogi Publications, Merrut (for unit 4).
4. Rastogi, V. B. (1994) Organic evolution. Kedernath Ramnath, India.(for unit 4).

Reference Books:

1. Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). *The Invertebrates: A New Synthesis*, III Edition, Blackwell Science.
2. Walter, H.E. and Sayles, L.P; *Biology of Vertebrates*, Khosla Publishing House

PRACTICALS:

19UBCDA202	Zoology-I Practical	6 Hrs/Week	2 Credits

Objectives:

- The students pursuing this course would have to develop in depth understanding various aspects of the Zoology.
- The working principles, design guidelines and experimental skills associated with different fields of Zoology.

1. Identification and Classification of Protozoa and Porifera.
2. Identification and Classification of Coelenterate to Annelida.

3. Identification and Classification of Arthropoda.
4. Identification and Classification of Mollusc & Echinodermata.
5. Identification and Classification of Protochordate and Pisces.
6. Identification and Classification of Amphibia & reptiles.
7. Identification and Classification of Aves and Mammal.
8. Study of most diversified some animals.
9. Systems of Earthworm.
10. Developmental Biology of Frog.
11. To compare embryonic development of Frog and Chick.
12. Study of Animal Behaviour.
13. To study the Learning behavior in animals.
14. Study of Pathogenic Animals.
15. Digestion of starch by salivary Amylase.
16. To determine the presence of Lipid by qualitative test.
17. Ascending paper chromatography
18. Circular paper chromatography.
19. To study Mitosis division.
20. To study Meiosis division.
21. Isolation and identification of Chick embryo.
22. To study the isolation among Lung fishes.
23. Study of Zoogeography as reference to speciation.
24. Study of Living fossils and connective link.

References:

1. Lal S. S., Practical book of Non-chordate.

2. Lal S. S., Practical book of Chordate., 2014, Rastogi publication, Meerut .

3. Jaysurya, Arumugam A., Zoology Practical, 2015, Saras Publication, South India.

Enclosure I (C)

DSE Allied Zoology

Semester III

(With Biochemistry)

19UBCDA301	Zoology - II	3 Hrs/Week	3 Credits

Objective:

- Educating the students about the need to necessity, conservation and protection about ecology and environment and microbial ecology as welfare of human and its future.
- To enable the students to understand the roll of ecology in environment, its importance, habitat, interaction, and abiotic component cycle etc.

Unit 1: Introduction to Environmental Biology **(9Hrs)**

- History, basic concepts and Applications.
- Chemical evolution for the Origin of life.
- Biological evolution for the Origin of life.
- Ecosystem – structure, function and types.
- Abiotic factors – Water, Light and Temperature.

Unit 2: Habitat Ecology **(9Hrs)**

- Soil formation, constituents and types.
- Soil profile and Soil organism in Terrestrial habitat.
- Types, Stratification and Zonation in Aquatic habitat
- Atmosphere – Structure and Stratification, Air and Gases, Aerosol.
- Causes and Effects of Habitat loss.

Unit 3: Community and interaction **(9Hrs)**

- Composition, Structure, Quantitative characters, Qualitative characters of Community
- Interaction – Mutualism, Commensalism, Antagonism, competition
- Introduction, General process, Causes and types of Successions.

- Population Ecology- Population characteristics; Size, Frequency, Density and Abundance.
- Population dynamics- Natality, Mortality, Age structure and Dispersion.

Unit 4: Environmental pollutions and Biogeochemical Cycles (9Hrs)

- Types of Pollutants, Air, water and Soil pollution and strategies to control.
- Environmental policies of India to control the pollution.
- Carbon cycle, Nitrogen Cycle
- Phosphorous cycle and Sulfur cycle
- Oxygen and Water cycle

Unit 5: Human Welfare and Wild Life Management (9Hrs)

- Classification and Conservation of natural Resources
- Types of Agriculture, Introduction to Aquaculture and Waste management
- Concept of threatened species, reasons and modes of wild life conservation;
- National parkas and Sanctuaries of India,
- Wild life Projects- Projects tiger, Asian elephant project, Conservation of Rhinos

Text Books:

- Arumugam, Concepts of Ecology, seventh edition, 2010, Saras publication.
- Verma, P. S., & Agarwal, V. K. (2015). *Environmental Biology: Principles of Ecology*., S. Chand publication, New Delhi.

Reference Books:

- Odum, E. P., & Barrett, G. W. (1971). *Fundamentals of ecology*. Philadelphia: Saunders.
- Groom, M. J., Meffe, G. K., & Carroll, C. R. (2006). *Principles of conservation biology*, Sunderland: Sinauer Associates publishing.

PRACTICALS:

19UBCDA302	Zoology II Practical	6 Hrs/wk	2 Credits

Objectives:

- Enhancing the students practical work about the environmental conservation and protection by ecological grip on hands.
- To enable the students to understand the roll of ecology in environment, its importance, future necessity and control of pollution by practical works.

1. Study of Aquatic ecosystem
    a. Pond ecosystem
    b. Oceanic Zonetion
2. To Compare the chemical characteristics of soil - I
    a. pH
    b. Moisture content
3. To Compare the chemical characteristics of soil - II
    a. Carbonate content
    b. Nitrate content.
4. Estimation of Chlorinity in water.
5. Estimation of Carbon dioxide in tap water.
6. Measurement of water quality, based on Hardness.
7. Measurement of water quality, based on BOD and COD.
8. Study of Biotic-interaction.
9. Study of Ecological adaptation part I.
10. Study of Ecological adaptation part II.
11. To determine ‘species Area curve’ and community size by quadrate method.
12. To determine Frequency of the community by quadrate method.
13. To determine Density of the community by quadrate method.
14. To determine Abundance of the community by quadrate method.
15. To calculate Mean for community dynamics.
16. To calculate Median for community dynamics.
17. To calculate Mode for community dynamics.
18. To determine population strength by quadrate method.

19. To determine Water holding capacity of the soil from deferent soil samples.
20. To count planktonic population among polluted water.
21. Study of Marine Zonetion and stratification.
22. Habitat study of Desert Area.
23. Habitat study of Forest Area.
24. Habitat study of Fresh water Area.

References:

- Arumugam, Concepts of Ecology, seventh edition, 2010, Saras publication.
- Verma, P. S., & Agarwal, V. K. (2015). *Environmental Biology: Principles of Ecology*., S. Chand publication, New Delhi.

Enclosure I (D)

DSE – Allied BOTANY
SEMESTER II

(With Microbiology)

19UMBDA201	Botany	3 Hrs/Week	3 Credits

Objective

- This course is survey of the botanical aspects of plant diversity, morphology, physiology Anatomy.
- Improve understanding of the structure functioning of medical botany and plant pathology.
- Development of personal perception of plants and environment.

Unit I: Plant Kingdom **(09 Hrs)**

- General characters and classification of Thallophyta.
- General account and outline of classifications of Bryophyta
- General account and outline of classifications of Pteridophyta
- General account and outline of classifications of Gymnosperms
- General account and outline of classifications of Angiosperms

Unit-II Plant Physiology and Plant Anatomy **(09 Hrs)**

- Plant-water relations
- Photobiology
- Types of simple tissue
- Types of complex tissue
- Microtomy

Unit- III Plants Products **(09 Hrs)**

- Alkaloids yielding plants – Sarpgandha, Tobacco
- Dye yielding plants – Heena, Kesudo
- Oil yielding plants – Ground nut, Nilgiri
- Resin yielding plants – Pinus, Gugal
- Gum yielding plants – Neem, Baval

Unit- IV Medicinal Plants **(09 Hrs)**

- Usage of plants for wellness of respiratory disease – Ardusi, Tulsi
- Usage of plants for wellness of gastrointestinal disease – Kariyatu, Kadu
- Usage of plants for wellness of dermatological disease –, Turmaric, Chandan
- Usage of plants for wellness of cancer disease – Kuvarpathu, Barmasi
- Scope and future of medicinal plants

Unit-V Plant Pathology **(09 Hrs)**

- General symptoms of disease
- Tikka disease of ground nut
- Red rot of sugar cane
- Different methods of plant disease control
- Citrus canker

Text Books:

- Raven, P.H., Johnson, G.B., Losos, J.B., Singer, S.R. (2005). Biology. Tata McGraw Hill, Delhi (For Unit 1, 2, 3, 4).
- Sharma, P.D. (2011). Plant Pathology, Rastogi Publication, Meerut, India. (For Unit 5)

Reference Books:

- Agnes Arber (1999). Herbal plants and Drugs. Mangal Deep Publications.
- Taiz, L., Zeiger, E., MØller, I.M. and Murphy, A (2015). Plant Physiology and Development.
- Sinauer Associates Inc. USA. 6th edition.

PRACTICALS:

19UMBDA202	Botany Practical	6 Hrs/Week	2 Credit

Objective

- This course is survey of the botanical aspects of plant diversity, morphology, physiology Anatomy.
- Improve understanding of the structure functioning of medical botany and plant pathology.
- Development of personal perception of plants and environment.

1. Observational study of Blue green algae – Nostoc through specimen and slides.
2. Observational study of Green algae – Spirogyra through specimen and slides.
3. Observational study of Brawn algae – Sargassum through specimen and slides.
4. Observational study of Red algae – Batrachospermum through specimen and slides.
5. Observational study of Fungi- Mucor through specimens and slides.
6. Observational study of Fungi- Peziza through specimens and slides.
7. Observational study of Fungi- Agaricus through specimens and slides.
8. Observational study of Bryophyta – Marchantia through specimens and slides.
9. Observational study of Bryophyta – Funaria through specimens and slides.
10. Observational study of Pteridophyta – Adiantum through specimens and slides.

11. Observational study of Gymnosperm – Cycas through specimens and slides.
12. Study of Rotary Microtome.
13. Demonstrate water potential of given tissue (potato tuber).
14. To study evaluation of oxygen during photosynthesis.
15. To study of simple and complex tissue.
16. To study of plant products – Alkaloids.
17. To study of plant products – Dye.
18. To study of plant products – Oil.
19. To study of plant products – Resin.
20. To study of plant products – Gum.
21. To study of medicinal plants - wellness of respiratory disease.
22. To study of medicinal plants - wellness of Gastrointestinal disease
23. To study of medicinal plants - wellness of dermatological disease.
24. To study of medicinal plants - wellness of Cancer disease.
25. Study of Plant disease.
26. To understand floral formula and floral diagram.

References:

- Bendre & Kumar, A text book of Practical Botany part I & II, 2010, Rastogi Publication, Meerut.
- Dr. B. P. Pandey, Modern Practical Botany (Vol-I, II & III), 2012, S. Chan Publication, New Delhi

Enclosure I (E)

DSE – Allied ZOOLOGY

SEMESTER – I

(With Microbiology)

19UMBDA101	Zoology	3Hrs/Week	3 Credit

Objectives:

- To provide keen knowledge about classical zoology and animal diversity with derived forms, its important and roll for nature.
- To enhance the students regarding to human system, its structureal organization, anatomy, histology, physiology etc.

Unit -I: Systematic of Chordate animals **(09 Hrs)**

- An introduction to Invertebrate animals.
- Outline classification of Chordate animals.
- Type study : Scoliodon- Morphology and Digestive system.
- Type study : Scoliodon- Arterial system and Reproductive system.
- Type study : Scoliodon- Morphology of Brain.

Unit-II: Histology of Mammals **(09 Hrs)**

- Integumentary glands.
- Histology of Stomach.
- Histology of Pancreas.
- Histology of Liver.
- Histology of Thyroid gland.

Unit-III: Digestive system & Respiratory system in human **(09 Hrs)**

- Structural organization of Digestive track.
- Mechanical digestion.
- Chemical digestion.

- Structural organization of Respiratory system.
- Internal anatomy of Lung.

Unit-IV: Circulatory system & Excretory System in human (09 Hrs)

- Structure and function of Blood vessels.
- Morphological and internal structure of Human Heart.
- Cardiac cycle.
- Morphology and histology of Kidney.
- Structure of Nephron.

Unit-V: Co-ordinatory system. (09 Hrs)

- Structure and types of Nerve cell.
- Morphological structure of Human Brain
- Endocrine secretion and its function of Pituitary gland.
- Endocrine secretion and its function of Adrenal gland.
- Endocrine secretion and its function of Ovary and Testis.

Text Books:

- Jain A. K., Textbook of Physiology, Avichal Publishing Company, 6th edition.(for Unit 2 to 5)
- Vander A, Sherman J. and Luciano D. (2014). Vander's Human Physiology: The Mechanism of Body Function. XIII Edition, Mcgraw Hills.(for Unit 2 to 5)
- Jordan E.L. and Verma P.S., Textbook of Chordates, S. Chand Publication, New Delhi.(for Unit 1)

Reference Books:

- Tortora, G.J. & Grabowski, S. (2006). Principles of Anatomy & Physiology. XI Edition John Wiley & sons.
- Victor P. Eroschenko. (2008). diFiore's Atlas of Histology with Functional correlations. XII Edition.Lippincott W. & Wilkins.

PRACTICALS:

19UMBDA102	Zoology Practical	6 Hrs/Week	2 Credit

Objective

- To provide keen knowledge about classical zoology and animal diversity with derived forms, its important and roll for nature in form of Practicals.
- To enhance the students regarding to human system, its structural organization , anatomy, histology, physiology by charts, models, specimen, slides and laboratory facilities.

1. Identification and classification of Invertebrate animals Part I.
2. Identification and classification of Invertebrate animals Part II.
3. Identification and classification of Chordate animals part I.
4. Identification and classification of Chordate animals part II.
5. Study of Scoliodon system - Digestive system.
6. Study of Scoliodon system - Arterial system.
7. Study of Scoliodon system - Reproductive system.
8. Study of Scoliodon system - Brain.
9. Study of temporary mounting in Scoliodon.
10. Histological structure of mammalian organs.
11. Structural organization of Human Digestive system.
12. Digestion of starch by salivary Amylase.
13. To determine the presence of Lipid by qualitative test.
14. Comparative study of Mammalian Stomach.
15. Structural organization of Human respiratory system and T.S. of Lung.
16. Morphological and internal structure of Heart.
17. Comparative study of Heart in higher chordates.
18. Comparative study of Aortic-arch in higher chordates.
19. Morphological and internal structure of Kidney.
20. Comparative study of Kidney in higher chordates.

21. Structure of Nerve cell and Brain in human.
22. Internal anatomy of some endocrine glands.
23. Study of Mitosis.
24. Study of Meiosis.

Reference:

- Jain A. K., Textbook of Physiology, Avichal Publishing Company, 6th edition.(for Unit 2 to 5)
- Vander A, Sherman J. and Luciano D. (2014). Vander's Human Physiology: The Mechanism of Body Function. XIII Edition, Mcgraw Hills.(for Unit 2 to 5)
- Jordan E.L. and Verma P.S., Textbook of Chordates, S. Chand Publication, New Delhi.(for Unit 1)

Enclosure I (F)

DSE – Allied ZOOLOGY
SEMESTER – III

19UMBDA303	Sustainable Management	3Hrs/wk	3 Credits

Objectives:

This course is designed to provide awareness and importance about

- Environment, its condition and its impact globally and locally
- Need for sustainable management
- Agricultural biodiversity in sustainable growth
- Role of society, corporate and government in sustainable management

Unit 1: Introduction to Sustainable Management **(9Hrs)**

- What is Sustainable Management?
- Sustainable development and Green Climate Fund.
- Introduction to Corporate Social Responsibility and ISO 14001.
- Brief account on SDGs (Sustainable Development Goals)
- Agenda 21, MDGs (Millennium Development Goals) and UNDP

Unit 2: Basic concepts of Biodiversity **(9Hrs)**

- Biodiversity – Definition, Types and importance of Biodiversity.
- Global Distribution of Biodiversity
- Biodiversity Hotspots and Endemism.
- Biodiversity in India and Global biodiversity.
- Biodiversity and Wetland management.
- Marine Environment and biodiversity.

Unit 3 : Agro biodiversity and Food Security **(9Hrs)**

- Scope and importance of agricultural biodiversity and food Security.
- The decline of biodiversity.
- Agro ecosystems v/s natural ecosystems.
- Issues in sustainable agriculture
- Food Security and sustainability in India

Unit 4: Threats to Biodiversity and impact of Biodiversity loss on sustainability (9Hrs)

- Extent of Biodiversity Loss
- Biodiversity Threats
- The Indian Scenario
- Protected Areas.
- Countering Biodiversity Loss.

Unit 5: Sustainable use of Biodiversity (9Hrs)

- Sustainable use of Biodiversity.
- National Instruments Relating to Biodiversity Management.
- International Instruments Relating to Biodiversity Management.
- Gender and Biodiversity in India
- Conservation Measures of Biodiversity.

Reference Books:

- IGNOU Study Materials
- Verma, P.S., Agrawal, V.K. (2005). Ecology, Cell Biology, Molecular Biology, Genetics. New Delhi: S. Chand and Company Limited.

PRACTICALS:

19UMBDA304	Sustainable Management Practical	6 hrs/wk	2 Credits

Objectives:

- To provide Practical grips and knowledge for sustainable management.
- To orient the students by diversity its roll, importance and roll in nature.

1. Isolation of micro organism forms various soil samples.
2. Isolation of micro organism forms various water samples.
3. Herbarium preparation for agro diversity.
4. Study of Legumes agro diversity.
5. Study of Cereals agro diversity.
6. Agro diversity study among Bagayati diversity.

7. Study of Insect diversity part I.
8. Study of Insect diversity part II.
9. Pathogenic insects and its effect on the crop.
10. Animal diversity of Invertebrate animals.
11. Animal diversity of lower Chordate.
12. Animal diversity of Higher Chordate.
13. Preparation of permanent slide by Single staining method.
14. Preparation of permanent slide by Double staining method.
15. Study of Agro ecology to compare natural ecosystem.
16. Biochemical test of Adulteration in powder form agro-product.
17. Biochemical test of Adulteration in addible liquids.
18. Group discussion.
19. Case study.
20. Field visit.

References:

- Verma, P.S., Agrawal, V.K. (2005). Ecology, Cell Biology, Molecular Biology, Genetics. New Delhi: S. Chand and Company Limited.

Enclosure I (G)

DSE Allied Zoology

Semester IV

(With Microbiogy)

19UMBDA401	**Basics Of Ecology**	**3 Hrs/Week**	**3 Credits**

Objective:

- Educating the students about the need to necessity, conservation and protection about ecology and environment and microbial ecology as welfare of human and its future.
- To enable the students to understand the roll of ecology in environment, its importance, habitat, interaction, and abiotic component cycle etc.

Unit 1: Introduction

- History, basic concepts and scopes
- Chemical evolution for the Origin of life.
- Biological evolution for the Origin of life.
- Ecosystem – structure, function and types
- Abiotic factors – Water, Light, Temperature

Unit 2: Habitat Ecology

- Terrestrial Habitat – Soil formation, constituents, types, profile, soil organism.
- Aquatic Habitat – Types, Stratification and Zonation.
- Atmosphere – Structure and Stratification.
- Air and Gases, Aerosol.
- Habitat loss - Causes and Effects.

Unit 3: Community and interaction

- Community - Composition, Structure, Quantitative characters, Qualitative characters.
- Interaction – Mutualism, Commensalism, Antagonism, competition.
- Succession – Introduction, General process, Cause, types, Hydrosere, Lithosere.

- Population Dynemics – Size, Frequency, Density, Abundance.
- Population Natality, Mortality, Dispersion and Age structure.

Unit 4: Biogeochemical Cycles

- Carbon cycle
- Nitrogene Cycle
- Phosphorous cycle
- Sulfur cycle
- Oxygen cycle

Unit 5: Microbial Ecology

- History and development, Major contribution
- Soil as habitat natural habitat, Soil microflora
- Airo microflora and Microb dispersal
- Microbiomics reference to Human.
- Micro Interaction – with Microb, Plant and Animal.

Text Books:

- Arumugam, Concepts of Ecology, seventh edition, 2010, Saras publication.
- Verma, P. S., & Agarwal, V. K. (2015). *Environmental Biology: Principles of Ecology*., S. Chand publication, New Delhi.

Reference Books:

- Odum, E. P., & Barrett, G. W. (1971). *Fundamentals of ecology*. Philadelphia: Saunders.
- Groom, M. J., Meffe, G. K., & Carroll, C. R. (2006). *Principles of conservation biology*, Sunderland: Sinauer Associates publishing.

PRACTICALS:

19UMBDA402	**Basics Of Ecology Practical**	6 Hrs/Week	2 Credits

Objectives:

- Enhancing the student's practical work about the environmental conservation and protection by ecological grip on hands.
- To enable the students to understand the roll of ecology in environment, its importance, future necessity and control of pollution by practical works.

1. Study of Aquatic ecosystem
    a. Pond ecosystem
    b. Oceanic Zonetion
2. To Compare the chemical characteristics of soil - I
    a. pH
    b. Moisture content
3. To Compare the chemical characteristics of soil - II
    a. Carbonate content
    b. Nitrate content.
4. Estimation of Clorinity in water.
5. Estimation of carbondioxide in tap water.
6. Measurement of water quality, based on Hardness.
7. Measurement of water quality, based on BOD and COD.
8. Study of Biotic-interaction.
9. Study of Ecological adaptation part I.
10. Study of Ecological adaptation part II.
11. To determine 'species Area curve' and community size by quadrate method.
12. To determine Frequency of the community by quadrate method.
13. To determine Density of the community by quadrate method.
14. To determine Abundance of the community by quadrate method.
15. To determine population strength by quadrate method.
16. To calculate Median for community dynamics.

17. To calculate Mode for community dynamics.
18. To calculate Mean for community dynamics.
19. To determine Water holding capacity of the soil from deferent soil samples.
20. To count planktonic population among polluted water.
21. Study of Marine Habitat and stratification.
22. Habitat study of Desert Area.
23. Habitat study of Forest Area.
24. Habitat study of Fresh water Area.

References:

- Arumugam, Concepts of Ecology, seventh edition, 2010, Saras publication.
- Verma, P. S., & Agarwal, V. K. (2015). *Environmental Biology: Principles of Ecology*., S. Chand publication, New Delhi.

Encloser II

Learning Outcomes based Curriculum Framework (LOCF) Commitee: AY: 2021-22
(in harmony with National Education Policy-2020.)

S.No.	Name	Member
1.	Dr. Reena P. Dave	HOD
2.	Dr. B. B. Radadia	Member
3.	Dr. Rahul S. Gohel	Member
4.	Dr. Neha T. Patel	Member