

K. L. E. Society's



G. I. Bagewadi Arts, Science and Commerce College, Nipani - 591237

Accredited at 'A' level by NAAC with CGPA 3.35

Affiliated to Rani Channamma University, Belagavi, Karnataka, India

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Ref. No.

Date : 23.11.2021

1.3.2. Courses that include experiential learning through project work/field work/internship during last five years

Year 2020-21

Total Courses 15

Sl. No	Program Name	Program Code	Name of the Course that include experiential learning through project work/field work/internship	Course Code	No of student
01	BSC-Botany	BSC5	Biodiversity	A0231	31
02	BSC-Botany	BSC5	Plant Ecology and Diversity of Angiosperms	B0231	31
03	BSC-Botany	BSC4	Diversity of Cryptogams	C231	38
04	BSC-Botany	BSC4	Diversity of Angiosperms & their Systematic, Economic, Medicinal botany	D231	38
05	BSC-Botany	BSC4	Plant breeding, Tissue culture and Horticultural practices	E231	55
06	BSC-Botany	BSC4	Ecology, Environmental Biology, and Phytogeography	E241	55
07	BSC-Botany	BSC4	Molecular biology, Biotechnology, and Immunology	F241	61
08	BSC-Zoology	BSC5	Animal Diversity	A0381	29
09	BSC-Zoology	BSC4	Cell Biology, Histology and Animal Behaviour	D381	38
10	BSC-Zoology	BSC4	Ecology, Evolution, Paleontology, Zoogeography, Wildlife Conservation	E461	62
11	BSC-Zoology	BSC4	Applied Zoology	F461	62
12	BSC-Zoology	BSC4	Microbiology, Nanotechnology, Bioinformatics, Methods in Biology, Research Methodology	F471	62
13	MA-English	MAEN4	Project	D060	6
14	MSc-Maths	MSMT4	Project	D120	20
15	M Com	MCOM3	Project	D030	22



Year 2019-20**Total Courses 13**

Sl. No	Program Name	Program Code	Name of the Course that include experiential learning through project work/field work/internship	Course Code	No of student
01	BSC-Botany	BSC4	Diversity of Cryptogams	C231	64
02	BSC-Botany	BSC4	Diversity of Angiosperms & their Systematic, Economic, Medicinal botany	D231	64
03	BSC-Botany	BSC4	Plant breeding, Tissue culture and Horticultural practices	E231	48
04	BSC-Botany	BSC4	Ecology, Environmental Biology, and Phytogeography	E241	50
05	BSC-Botany	BSC4	Molecular biology, Biotechnology, and Immunology	F241	43
06	BSC-Zoology	BSC4	Biology of Chordates	B381	57
07	BSC-Zoology	BSC4	Cell Biology, Histology and Animal Behaviour	D381	64
08	BSC-Zoology	BSC4	Ecology, Evolution, Paleontology, Zoogeography, Wildlife Conservation	E461	64
09	BSC-Zoology	BSC4	Applied Zoology	F461	59
10	BSC-Zoology	BSC4	Microbiology, Nanotechnology, Bioinformatics, Methods in Biology, Research Methodology	F471	59
11	MA-English	MAEN4	Project	D060	12
12	MSc-Maths	MSMT4	Project	D030	17
13	MCom	MCOM3	Project	D120	30

Year 2018-19**Total Courses 12**

Sl. No	Program Name	Program Code	Name of the Course that include experiential learning through project work/field work/internship	Course Code	No of student
01	BSC-Botany	BSC4	Diversity of Cryptogams	C231	59
02	BSC-Botany	BSC4	Diversity of Angiosperms & their Systematic, Economic, Medicinal botany	D231	59
03	BSC-Botany	BSC3	Plant breeding, Tissue culture and Horticultural practices	E231	37
04	BSC-Botany	BSC3	Ecology, Environmental Biology, and Phytogeography	E241	37
05	BSC-Botany	BSC3	Molecular biology, Biotechnology, and Immunology	F241	37



06	BSC-Zoology	BSC4	Biology of Chordates	B381	69
07	BSC-Zoology	BSC4	Cell Biology, Histology and Animal Behaviour	D381	61
08	BSC-Zoology	BSC3	Ecology, Evolution, Paleontology, Zoogeography, Wildlife Conservation	E461	42
09	BSC-Zoology	BSC3	Applied Zoology	F461	42
10	BSC-Zoology	BSC3	Microbiology, Nanotechnology, Bioinformatics, Methods in Biology, Research Methodology	F471	42
11	MSc-Maths	MSMT4	Project	D120	16
12	MCom	MCOM3	Project	D030	27

Year 2017-18
Total Courses 12

Sl. No	Program Name	Program Code	Name of the Course that include experiential learning through project work/field work/internship	Course Code	No of student
01	BSC-Botany	BSC4	Diversity of Cryptogams	C231	42
02	BSC-Botany	BSC4	Diversity of Angiosperms & their Systematics, Economic, Medicinal Botany	D231	28
03	BSC-Botany	BSC3	Plant breeding, Tissue culture and Horticultural practices	E231	36
04	BSC-Botany	BSC3	Ecology, Environmental Biology, and Phytogeography	E241	36
05	BSC-Botany	BSC3	Molecular biology, Biotechnology, and Immunology	F241	35
06	BSC-Zoology	BSC4	Biology of Chordates	B381	65
07	BSC-Zoology	BSC3	Cell Biology, Histology and Animal Behaviour	D381	42
08	BSC-Zoology	BSC3	Ecology, Evolution, Paleontology, Zoogeography, Wildlife Conservation	E461	35
09	BSC-Zoology	BSC3	Applied Zoology	F461	35
10	BSC-Zoology	BSC3	Microbiology, Nanotechnology, Bioinformatics, Methods in Biology, Research Methodology	F471	35
11	MSc-Maths	MSMT3	Project	D120	20
12	MCom	MCOM3	Project	D030	26



2016-17

Total Courses 12

Sl. No	Program Name	Program Code	Name of the Course that include experiential learning through project work/field work/internship	Course Code	No of student
01	BSC-Botany	BSC3	Diversity of Cryptogams	C231	34
02	BSC-Botany	BSC3	Diversity of Angiosperms & their Systematic, Economic, Medicinal botany	D231	35
03	BSC-Botany	BSC3	Plant breeding, Tissue culture and Horticultural practices	E231	30
04	BSC-Botany	BSC3	Ecology, Environmental Biology, and Phytogeography	E241	30
05	BSC-Botany	BSC3	Molecular biology, Biotechnology, and Immunology	F241	35
06	BSC-Zoology	BSC3	Biology of Chordates	B381	47
07	BSC-Zoology	BSC3	Cell Biology, Histology and Animal Behaviour	D381	36
08	BSC-Zoology	BSC3	Ecology, Evolution, Paleontology, Zoogeography, Wildlife Conservation	E461	35
09	BSC-Zoology	BSC3	Applied Zoology	F461	35
10	BSC-Zoology	BSC3	Microbiology, Nanotechnology, Bioinformatics, Methods in Biology, Research Methodology	F471	35
11	MSc-Maths	MSMT3	Project	D120	20
12	MCom	MCOM2	Project	D010	31

Broble

IQAC Co-ordinator
K.L.E's G. I. B. College, Nipani.



Shivwahi

PRINCIPAL
K. L. E. Society's
G. I. Bagewadi College, Nipani.

First Semester B.Sc. (Botany)

Paper Code: BOTDSCT1.1

Paper Title: Biodiversity (Microbes, Algae, Fungi and Archegoniate)

Teaching Hours: 4 Hrs / Week

Marks: 1h-80+IA-20

Total hours: 60

Credits: 3

Unit1:

- **Viruses** : Discovery, general structure, replication (general account), DNA virus (T-phage); Lytic and lysogenic cycle, RNA virus (TMV); Economic importance;
- **Bacteria**: Discovery, General characteristics and cell structure; Reproduction – vegetative, asexual and recombination (conjugation, transformation and transduction); Economic importance.
- **Viral Plant Diseases**: TMV. Vein clearing, Dwarfing, Yellowing and BBTV disease.
- **Bacterial Plant Disease**: Citrus canker, Bacterial blight and Crown gall disease.

15 hours

Unit2:

- **Algae**: General characteristics; Ecology and distribution; Range of thallus organization and reproduction; Classification of algae by smith; Morphology and life-cycles of the following: *Nostoc*, *Oedogonium*, *Vaucheria*, *Volvox*, *Ectocarpus* & *Batrachospermum*. Economic importance of algae.
- **Fungi**: Introduction- General characteristics, ecology and significance, range of thallus organization, cell wall composition, nutrition, reproduction and classification; True Fungi- General characteristics, ecology and significance, life cycle of *Rhizopus* (Zygomycota), *Penicillium* (Ascomycota), *cercospora* (Deutoromycota), *Puccinia*, *Agaricus* (Basidiomycota);
- **Fungal Diseases**: Late blight of potato, White rust of *Albugo candida.*, Black rust of *Puccinia*, Powdery mildew and Early Blight of Tomato.
 - **Symbiotic Associations-Lichens**: General account, reproduction and significance; Mycorrhiza: ectomycorrhiza and endomycorrhiza and their significance

15 hours.

Unit 3:

- **Introduction to Archegoniate**: Unifying features of archegoniate, Transition to land habit, Alternation of generations.
- **Bryophytes**: General characteristics, adaptations to land habit, Classification, Range of thallus organization. Classification (up to family), morphology, anatomy and reproduction of *Riccia*, *Marchantia*, *Anthoceros* and *Funaria* (Developmental details not to be included). Ecology and economic importance of bryophytes with special mention of *Sphagnum*.

15 hours

Unit 4:

- **Pteridophytes**: General characteristics, classification, Early land plants (*lepidodendron*, *Lepidocarpon*, *Calamites*). Classification (up family), morphology, anatomy and reproduction of *Selaginella*, *Equisetum* and *Pteris*. (Developmental details not to be included). Heterospory and seed habit, stelar evolution. Ecological and economical importance of Pteridophytes.
- **Gymnosperms**: General characteristics, classification. Classification (up to family), morphology, anatomy and reproduction of *Cycas*, *Gnetum* and *Pinus*. (Developmental details not to be included). Ecological and economical importance.

15 hours



Practical

Paper Code: BOTDSCTP1.1 **Paper Title:** Biodiversity (Microbes, Algae, Fungi and Archegoniate)
Teaching Hours: 3 Hrs / Week

Marks: Th-40+IA-10

Credits: 1

1. EMs/Models of viruses – T-Phage and TMV, Line drawing/Photograph of Lytic and Lysogenic Cycle.
2. Types of Bacteria from temporary/permanent slides/photographs; EM bacterium; Binary Fission; Conjugation; Structure of root nodule.
3. Gram staining
4. Study of vegetative and reproductive structures of *Volvox*, *Nostoc*, (electron micrographs), *Oedogonium*, *Vaucheria*, *Ectocarpus* and *Batrachospermum* through temporary preparations and permanent slides.
5. *Rhizopus* and *Penicillium*: Asexual stage from temporary mounts and sexual structures through permanent slides.
6. *Cercospora Specimens*/photographs and tease mounts.
7. *Puccinia*: Herbarium specimens of Black Stem Rust of Wheat and infected Barberry leaves; section/tease mounts of spores on Wheat and permanent slides of both the hosts.
8. *Agaricus*: Specimens of button stage and full grown mushroom; Sectioning of gills of *Agaricus*.
9. Lichens: Study of growth forms of lichens (crustose, foliose and fruticose)
10. Mycorrhiza: ectomycorrhiza and endomycorrhiza (Photographs)
11. *Marchantia*-morphology of thallus, w.m. rhizoids and scales, v.s. thallus through gemma cup, w.m. gemmae (all temporary slides), v.s. antheridiophore, archegoniophore, L.S. sporophyte (all permanent slides).
12. *Funaria*- morphology, w.m. leaf, rhizoids, operculum, peristome, annulus, spores (temporary slides); permanent slides showing antheridial and archegonial heads, L. S. capsule and protonema.
13. *Selaginella*- morphology, w.m. leaf with ligule, T.S. stem, w.m. strobilus, w.m. microsporophyll and megasporophyll (temporary slides), L.S. strobilus (permanent slide).
14. *Equisetum*- morphology, T.S. internode, L.S. strobilus, T.S. strobilus, w.m. sporangiophore, w.m. spores (wet and dry) (temporary slides); T.s rhizome (permanent slide).
15. *Pteris*- morphology, T.S. rachis, v.s. sporophyll, w.m. sporangium, w.m. spores (temporary slides), T.S. rhizome, w.m. prothallus with sex organs and young sporophyte (permanent slide).
16. *Cycas*-morphology (coralloid roots, bulbil, leaf), T.S. coralloid root, T.S. rachis, v.s. leaflet, v.s. microsporophyll, w.m. spores (temporary slides), L.S. ovule, T.S. root (permanent slide).
17. *Pinus*- morphology (long and dwarf shoots, w.m. dwarf shoot, male and female), w.m. dwarf shoot, T.S. needle, T.S. stem, L.S./T.S. male cone, w.m. microsporophyll, w.m. microspores (temporary slides), L S. female cone, T. L.S. & R. L.S. stem (permanent slide).
18. Study tour two days compulsory.



Second Semester B.Sc. (Botany)

Paper Code: BOTDSCT2.1

Paper Title: Plant Ecology and Diversity of angiosperms

Teaching Hours: 4 Hrs / Week

Marks: Th-80+IA-20

Teaching hours: 60

Credits: 3

Unit1:

- **Atmosphere:** Atmosphere gaseous composition and Atmospheric layers.
- **Ecological factors:** Soil, weathering, composition, pedogenesis and soil profile. Water: States of water in the environment, precipitation types. Light and temperature: Variation Optimal and limiting factors; Shelford law of tolerance. Adaptation of hydrophytes and xerophytes.

15 hours

Unit 2:

- **Plant Succession:** Characters; Ecotone and edge effect; Succession; Hydrosere and Xerosere.
- **Ecosystem:** Structure; energy flow trophic organisation; Food chains and food webs, Ecological pyramids production and productivity; Biogeochemical cycles; carbon, nitrogen and Phosphorous cycles.
- **Phytogeography:** Principle, biogeographical zones; Endemism.

15 hours

Unit3

- **Morphology of Angiosperms:** Root, Stem, leaf and its modifications: inflorescence, flower and fruit.

15 hours

Unit4:

- **Plant Taxonomy:** Introduction, Identification Functions of Herbarium, important herbaria and botanical gardens of the world and India; Documentation: Flora, Keys: single access and multi-access
- **Classification**
Types of classification-artificial, natural and phylogenetic. Bentham and Hooker (upto series), Engler and Prantl (upto series).
- **Taxonomic hierarchy**
Ranks, categories and taxonomic groups, Taxonomic evidences from palynology, cytology, phytochemistry and molecular data.
- **Botanical nomenclature**
Principles and rules (ICN); ranks and names; binominal system, typification, author citation, valid publication, rejection of names, principle of priority and its limitations.

15 hours



Practical

Paper Code: BOTDSCP2.1
Teaching Hours: 3 Hrs / Week

Paper Title: Plant Ecology and Diversity of angiosperms
Marks: Th-40+IA-10
Credits: 1

1. Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer /hygrometer, rain gauge and lux meter.
2. Determination of pH, and analysis of two fertile soil samples for carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency by rapid field test.
3. (a) Study of morphological adaptations of hydrophytes (Submerged, Free floating, Amphibious and Rooted floating) and xerophytes (succulent and non succulent).
(b) Study of biotic interactions of the following: Stem parasite (*Cuscuta*), Root parasite (Orobanche), Epiphytes, Predation (Insectivorous plants)
4. Morphology of Angiosperms: Root, Stem, leaf and its modifications: Inflorescence, Flower and Fruit.
5. Study of vegetative and floral characters of the following families (Description, V.S. flower, section of ovary, floral diagram/s, floral formula/e and systematic position according to Bentham & Hooker's system of classification): Polypetalae: Magnoliaceae, Malvaceae, Rutaceae, Brassicaceae. Gamopetalae- Rubiaceae, Asteraceae, Apocynaceae, Asclepiadaceae. Apetalae-Euphorbiaceae. Monocot- Poaceae
6. Mounting of a properly dried and pressed specimen of any wild plant with herbarium Label (Herbarium any 10 to be submitted in the record book).
7. Study tour for minimum 3 days compulsory.

Suggested Readings

1. Kormondy, E.J. (1996). Concepts of Ecology. Prentice Hall, U.S.A. 4th edition.
2. Sharma, P.D. (2010) Ecology and Environment. Rastogi Publications, Meerut, India. 8th edition.
3. Simpson, M.G. (2006). *Plant Systematics*. Elsevier Academic Press, San Diego, CA, U.S.A.
4. Singh, G. (2012). *Plant Systematics: Theory and Practice*. Oxford & IBH Pvt. Ltd., New Delhi. 3rd edition.





RANI CHANNAMMA UNIVERSITY BELAGAVI

WEL-COME

**TO THE COURSE STRUCTRE AND SYLLABUS OF UNDERGRADU
PROGRAMMES – B.Sc**

III Semester



Group – II

OPTIONAL / COMPULSORY SUBJECT FOR THE DEGREE IN SCIENCE SUBJECT

Science Subjects: (any three subject of equal importance to be chosen as per the grouping given by Rani Channamma University, Belagavi)

DETAILED SYLLABUS OF FOLLOWING PAPERS WITH PRACTICAL

1. BOTANY (optional)

B.Sc. III Semester (w.e.f: 2018 – 19) and onwards.

Subject: BOTANY (optional)

Paper-: Diversity of Cryptogams (Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms).

Unit I: Algae

General characters, Pigmentation, Classification by Fritsch (up to class level). Distribution, thallus structure, reproduction and life cycle of Nostoc, Volvox, Oedogonium, Sargassum and Batrachosperm. Economic importance.

Unit II: Fungi

General characters, Classification (Alexopoulos's system). Distribution, Structure, Reproduction and life cycle of Albugo, Rhizopus, Penicillium and Puccinia. Economic importance of fungi. General account of lichens.

Unit III: Plant Pathology

General account of Bacteria and Viruses. Introduction and general symptoms of plant diseases. Symptoms, Pathogens and control measures of Late blight of potato, White rust of crucifers, Tikka disease of ground nut.

Unit IV: Bryophytes

General characters, Classification (Smith). Structure, reproduction and schematic life cycle of Riccia, Anthoceros and Funaria. (Developmental details are not expected). Evolution of sporophytes.

Unit V: Pteridophytes

General characters and classification. Distribution, Structure (External and Internal) and Reproduction of Psilotum, Selaginella, Equisetum and Nephrolepis (Developmental details are not expected). Stelar evolution. Heterospory and seed habit

Unit VI: Gymnosperms

General characters and classification. Distribution, Structure (External and Internal) and Reproduction of Cycas, Pinus and Gnetum (Developmental details are not expected).

Unit VII: Paleobotany

Geological time scale, fossilization-molds, Impression, Petrification and cast. Study of fossils - Calamitis, Lepidodendron, Lygenopteris.



B.Sc. III Semester PRACTICALS

Total number of hours per week: 04, Internal Assessment=10 Marks, Max Marks: 40 M

1. Vegetative and reproductive structures of Nostoc, Volvox and Oedogonium.
2. Vegetative and reproductive structures of Sargassum and Batrachospermum
3. Vegetative, reproductive structures and disease symptoms of Albugo, Rhizopus, Penicillium.
4. Vegetative, reproductive structures and disease symptoms of Puccinia. Lichen
5. Study of Vegetative and Reproductive structures of Riccia, Anthoceros and Funaria
6. Study of Vegetative and Reproductive structures of Psilotum and Selaginella.
7. Study of Vegetative and Reproductive structures of Equisetum and Nephrolepis
8. Study of Vegetative and Reproductive structures of Cycas, Pinus and Gnetum
9. Disease symptoms and control measures of Late blight of potato, Black rust of wheat, Tikka disease of ground nut.
10. Paleobotany- Study of fossils Lepidodendron, Calamitis, Lygenopteris.

11. Field visits.

Suggested Readings:

- Smith G.M.1971 vol 1 Algae and fungi. Tata McGraw HILL Publishing company New Delhi
Sharma O.P. 1992 Text book of thallophytes McGraw Hill Publication
Sharma P.D. 1991 The fungi Rastogi and Co Meerut
Dubey H.C.1990An Introduction to Fungi Vikas Publishing House Pvt Ltd New Delhi
Clifton, A 1958 Introduction to Bacteria McGraw Hill and Co New York
Basu A.N.1993 Essentials of plant viruses, vectors plant diseases New Age International New Delhi.
Chopra G.L. A text book of algae Rastogi and co Meerut
Rangaswami G 1998 Diseases of crop plants in India. Prentice Hall of India New Delhi.
Sunderrajan S 1997 College Botany Vol 1. S. Chand and Co Ltd New Delhi
Alexopoulos, 1992 An Introduction to Mycology. New Age International. New Delhi
Vashista B.R. 1978 Fungi. S. Chand and co. Ltd. New Delhi

B.Sc. III Semester Botany Practical Examination

Time: 4 Hours

Max M

- | | |
|---|----|
| Q1: Identify and classify specimens A, B, C giving reasons. | 09 |
| Q2: Identify and explain the internal structures of specimen D and E with the neat labelled diagrams (Show the preparation to the examiner) | 10 |
| Q 3: Identify & describe the salient features in the slides/ specimens E, F, G, H, I and J | 12 |
| Q4: Identify & describe the salient features in the fossil specimen K. | 03 |
| Journal | 04 |
| Field visit report | 03 |



Group – II

OPTIONAL / COMPULSORY SUBJECT FOR THE DEGREE IN SCIENCE SUBJECTS

RANI CHANNAMMA UNIVERSITY, BELAGAVI.

B.Sc. IV Semester (w.e.f: 2018 – 19) and onwards.

Subject: BOTANY (optional)

Paper: Diversity of Angiosperms and their systematics, Economic botany and Medicinal botany 52 hrs.

Unit I: Morphology of Angiosperms: 07 hrs.

Study of stems and its modifications, Leaf- types, stipules, Phyllotaxy and their modifications. Study of Inflorescences, flowers (Floral formula and Floral diagram to be included) and fruits.

Unit II: Angiosperm systematics: 10 hrs.

Botanical nomenclature- principles and rules, taxonomic ranks, type concept and principle of priority. Botanical survey of India. Classification of Angiosperms: Systems proposed by Bentham and Hooker, Engler Prantl. Their salient features, merits and demerits. Brief account of APG classification.

Contributions of Cytology (Cytotaxonomy), Phytochemistry (Chemotaxonomy) and Taximetrics (Numerical taxonomy) to taxonomy.

Unit III: Diversity of flowering plants as illustrated by members of the following families: 20hrs

Annonaceae, Brassicaceae, Malvaceae, Rutaceae, Rhamnaceae, Fabaceae, Myrtaceae, Combretaceae, Cucurbitaceae, Apiceae, Rubiaceae, Asteraceae, Apocyanaceae, Asclepiadaceae, Convolvulaceae, Solanaceae, Acanthaceae, Verbenaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Orchidaceae, Liliaceae, Arecaceae and Poaceae.

Unit IV: Economic Botany: 10 hrs

Origin & Distribution, Family, Botanical name and utility of following plants-

Food plants: Rice, Wheat, Maize, Pulses (Bengal gram, Pigeon pea) and Sugarcane

Fibres: Cotton, Jute.

Oil yielding plants: Ground nut, Sunflower, Palm oil, Sandalwood and Citronella oils

Paper & pulp: Bamboo & Eucalyptus

Spices: Ginger, Clove, Cinnamon, Asafoetida and Cardamom

Beverages: Tea & Coffee

Rubber: Hevea sp.

Unit V: Medicinal botany: 05hrs

Common medicinal plants in primary health care: -

Tippateega (*Tinosporacordifolia*), Tulsi (*Oscimumsanctum*) Kalabanda (*Aloe-vera*)

Turmeric (*Curcuma longa*) Ashwagandha (*Withaniasomnifera*) and Sarpagandha

(*Rauwolfiaserpentina*)



Practicals:-

1. Morphology of Root, Stem, Leaf and their modifications.
2. Study of Inflorescence and its types.
3. Study of Flower-I- Descriptive terms, Thalamus, Calyx, Corolla and Aestivation.
4. Study of Flower-II –Androecium and Gynoecium. Floral formula and Floral diagram.
5. Study of Fruit types.
6. Study of any 18 families representing from polypetalae, gamopetalae, apatalae and monocots available in the locality.
8. Economic botany and Study of Medicinal Plants (as per syllabus) available in the locality.
9. Study Tour for minimum Two days to study the Flora (Taxonomy).

Suggested readings:

1. Davis, P.H. and Heywood, V.H. 1963. Principles of angiosperm taxonomy. Oliver and Boyd, London.
2. Heywood, V.H. and Moore, D.M. (eds) 1984. Current concepts in plant taxonomy academic press, London
3. Jeffery, C. 1982. An introduction to plant taxonomy. Cambridge university press, Cambridge, London.
4. Jones, S.B. Jr and Luchsinger, A.E. 1986. Plant systematics (2nd edition). McGraw Hill book co, New York.
5. Radford, A.E. 1986. Fundamentals of plant systematics. Harper and Row, New York.
6. Singh, G. 1999. Plant systematics; theory and practice. Oxford and IBH, New Delhi.
7. Atace, C.A. 1989. Plant taxonomy and bio systematics (2nd edition). Edward Arnold, London.
8. Dutta, S.C. 1988. Systematic botany. W. B. Saunders, New Delhi.
9. Jaques, H.E. 1999. Plant families- how to know them. IBS, New Delhi.
10. Lawrence, G.H.M. 1951. Taxonomy of vascular plants. Macmillan, New Delhi.
11. Stewart, W.M. 1983. Paleobotany and the evolution of plants, Cambridge university press, Cambridge.
12. Joshi S.G. Medicinal plants Oxford and IBH New Delhi.
13. Kokate and Gokeale _pharmacognacy. Nerali publication, New Delhi.
14. Lad v Ayurveda- the science of self-healing- Motilal Banarasi Das, New Delhi.
15. Lewis W.H. and M.P.F Elwin Lewis 1976, Medical Botany plants affecting man's health. A Wiley interscience publication, John Wiley and sons New York.
16. College botany vol 1 by Gangulee, Das and Datta. New central book agency, Calcutta.
17. Systematic botany by R.N Sutaria.
18. Taxonomy of Angiosperms by B.P. Pandey.
19. Kocchar, S.L. 1998. Economic Botany in Tropics. 2nd edition, Macmillan Ltd, New Delhi.
20. Sambamurthy, A.V.S.S and Subramanyam, N.S. 1989. A Text Book of Economic Botany, Wiley Eastern Ltd. New Delhi.
21. Sharma, O.P. 1996. Hill's Economic Botany. Tata McGraw Hill Co., Ltd., New Delhi.
22. Simpson, B.B. and Conner-Ogorzaly, M. 1986. Economic Botany-plants in our world. McGraw Hill, New York.
23. Hill. A.F. 1989. Economic Botany. Tata McGraw-Hill, New York.
24. Herbs Cultivation and Medicinal Uses- H. Panda – NIIR Publication, New Delhi.
25. Chopra R.N., Badhuvar R.L. & Ghosh G. (1965) - Poisons Plant of India.



B.Sc. V Semester (w.e.f. 2019 – 20)
Botany Paper - I

50

Paper-I: Plant Breeding, Tissue Culture and Horticultural Practices.

Hrs

Unit I: Plant Breeding: History and objectives. Introduction, Selection (Pure line, Mass Selection), Hybridization- inter specific and inter generic. Mutational & Polyploidy breeding. Germ plasm and its maintenance. Pollen Bank, Quarantine method.

10 Hrs.

Unit II: Plant Tissue Culture: Scope and Significance. Basic Aspects and Cellular totipotency (Shoot tip, Embryo and Haploid culture techniques). Differentiation and morphogenesis.

10 Hrs.

Unit III: Introduction to Horticulture, Nursery management and importance.

Methods of propagation – vegetative – rhizome, bulb, corm and sucker (natural). Artificial- Cutting, layering, grafting and budding. Bonsai – methods and importance. Nursery management: Introduction, types of nurseries and cultural practices. Seed (propagule) collection, storage and treatment. Manures, fertilizers and pesticides. Methods of irrigation – drip, sprinkler and flood

12 Hrs.

Unit IV: Green House Technology – Introduction, advantages and limitations. Types of Green Houses- Green House structure, principle Greenhouse technology as applied to ornamental, vegetable and fruit plants.

08 Hrs.

Unit V: Harvest Technology and Weed Management: Harvest Technology: Flower and fruit plants management. Artificial ripening, maturity indices, methods of picking. Post-harvest technology and management of fruits: grading, processing, storage and packing. Weed Management: Introduction and significance. Invasive weeds – concept and causes of their dominance. Weed control – physical, chemical and biological methods.

10 Hrs.

Practicals:

1. Study of methods of propagation with help of tubers, bulbs rhizomes, corms suckers, runner and offset.
2. Study of propagation by cutting, layering, grafting and budding.
3. Methods of emasculation and bagging for cross-pollination.
4. Morphology and anatomy of dry and wet stigma.
5. Morphology and anatomy of solid and hollow styles.
6. Study of pollination types.
7. Demonstration of tissue culture techniques.
8. Visit to nursery - poly house /Green house and tissue culture lab.
9. Preparation of MS media for culture. 10. Bonsai techniques.



Semester V
(w.e.f 2016-17)
Botany Paper – II

Paper-II: Ecology, Environmental Biology and Phytogeography

50 hrs

Objectives:- This paper has topics on pollution, pollution control and forestry. Considering the present scenario with respect to environment these topics are most valuable.

Unit 1: Plant and environment: Atmosphere (gaseous composition), water (properties of water cycle), light (global radiation, photo synthetically active radiation), temperature, soil (development, soil profiles, physico-chemical properties), and biota.

Morphological, anatomical and physiological responses of plants to water (hydrophytes, xerophytes and epiphytes), temperature (thermoperiodicity and vernalization), light (photoperiodism, heliophytes and sciophytes) and salinity.

12 Hrs.

Unit 2: Population ecology and Ecosystems: Growth curves; ecotypes; ecads, Ecological succession-hydrach and xerarch. Structure of Ecosystems (Pond and Forest): abiotic and biotic components; food chain, food web, ecological pyramids, energy flow.

10 Hrs.

Unit 3: Phytogeography: Botanical regions of world, Vegetation types of Karnataka and India.

06 Hrs.

Unit 4: Conservation of Natural resources: Different types of natural resources and their conservation.

Forest and Forest Management: Forest and its ecological significance, deforestation, forest management and social forestry. Natural depletion of vegetation endangered and threatened economic plants of India and red data book. Wild life management in India, Indian board of wild life, national park and sanctuary.



Energy resources: conventional and non conventional sources of energy.

Biodiversity: significance, types, depletion, conservation of biodiversity.

12 Hrs.

Unit 5: Pollution: Introduction, causes, effects and control measures of Water pollution, Air pollution, Soil pollution, Acid rain, Global warming, and Ozone depletion.

Sewage water and waste water types. Methods of effluent treatment of industrial waste water, sludge disposal and its care related to environment.

10 Hrs.

Practical:

1. Study of frequency and density of herbaceous plants by quadrat method.
2. To determine moisture content and water holding capacity of different types of soils.
3. To estimate the alkalinity of water samples.
4. Ecological instruments.
5. Morphology and anatomical adaptations in three hydrophytes.
6. Morphology and anatomical adaptations in xerophytes: One succulent and one non-succulent, one epiphyte and one halophyte.
7. Waste water analysis, physical chemical parameter, pH, turbidity, TDS, BOD, COD, temperature and any other inorganic elements.
8. Visit to effluent treatment plant to study recycling of waste water near by industry and study the effect of industrial pollution nearby water bodies (Biomagnification & Eutrophication).
9. Assignment of Project related to practical number eight.



10. Study tour of minimum two days to study forest types and ecological groups.

Books for Reference:

1. Sharma P.O. (1993)-Ecology and Environment – Rastogi Publication, New Delhi.
2. Mishra R. - Ecology Work Book- Oxford and IBH, New Delhi.
3. Agarwal K.C. (1993)- Environmental Biology- Agro Botanical Publishers, Jodhapur.
4. Mishra K.C. (1992)- Manual of Plant Ecology – Oxford & IBH Publication, New delhi.
5. Kochar P.L. (1980) – Plant Ecology – S. Nagin & Co., Jalandhar.
6. Kormandi E.J. (1984)- concept of Ecology- Printice Hall Ind., New Delhi.
7. Asthana R.K. (1998) – Environmental Problems and Solution- S.Chand & Co. Pvt. Ltd., New Delhi.
8. Verma P.S., V.K. Agarwal (1983) – Environmental Biology - S.Chand & Co. Pvt. Ltd., New Delhi.
9. Subramanyam N.S. A.V.S.S. Samburthy (2000)- Ecology- Narosa Publishing House, New Delhi.
10. Sharma O.P. (1993) – Ecology & Environmental Biology- Rastogi Publication, Meerut.
11. Nebel B.J. (1990) – Environmental Science – Printice Hall Indu. Pvt. Ltd. New Delhi.
12. Trivedi R.K. Etal (1987) – Practical Ecology – Anmol Publication, Jodhapur.
13. Rao K.S. (1971) - Fundamentals of Ecology – W.B. Saunders co. Philadelphia.
14. Shukla R.S. & Chandel P.S. (2000) – Plant Ecology – S.Chand & Co. Pvt. Ltd., New delhi.
15. Odum, E.P 1983. Basic Ecology, Saunders. Philadelphia.



D. III Descriptive Answers

21. From Unit 1: Cell Biology: 01 sub question. 1 X 10 = 10

OR

From Unit 2: Morphology of Chromosomes-01 sub question.

22. From Unit 3: Cell division: 01 sub question. 1 X 10 = 10

OR

From Unit 4: Genetics: 01 sub question.

23. From Unit 4: Genetics: 01 sub questions. 1 X 10 = 10

OR

From Unit 5: Evolution: 01 sub question.

B.Sc VI semester

(w.e.f 2016 -17)

Botany paper -II

(Molecular Biology, Biotechnology & Immunology)

50 hrs

Objectives: - Molecular Biology, Biotechnology and Immunology has some recent trends in the concern fields. This will help students to pursue research in concerned fields.

Unit 1: Nucleic Acids: DNA & RNA, occurrence, types and chemical compositions,

Experimental evidences for DNA as genetic material. Structure of DNA, Replication, semiconservative method, RNA and types, post transcription changes.

10 Hrs.

Unit 2: Gene Expression: Gene concept, Genetic code & protein synthesis. Regulation of gene expression in prokaryotes & eukaryotes.

08Hrs.

Unit 3: Recombinant DNA technology and Bioinformatics:

Enzyme, vector (plasmid PBR 322), marker gene, Steps of cloning technique, PCR and its application, Genomic DNA and cDNA library. Brief concept on Genomics and proteomics.

08 Hrs.

Unit 4: Biotechnology and Genetic engineering of plants:

Basic concepts, principles and scope. Aims, strategies for development of transgenic plants (with suitable example). Agrobacterium-The natural genetic engineer. T-DNA and transposon mediated Gene tagging, intellectual. Property rights, possible ecological risks and ethical concerns.

12Hrs.

Unit 5: Microbial genetic manipulation and Immunology:

Microbial genetic manipulation: Bacterial transformation, selection of recombinant and transformants, genetic improvement of industrial microbes, nitrogen fixers & fermentation technology.

Immunology: Immuno-systems, Immunotechniques in Agriculture, ELISA method to detect Plant diseases & Monoclonal antibodies.

12 Hrs.

Practicals:

1. DNA estimation by DPA diphenyl amine method.
2. RNA estimation by orcinol method.
3. Extraction and estimation of protein from plant source.
1) Salt precipitation method 2) solvent method
4. Culturing of Rhizobium-YEMA media.
5. Culturing of Azatobacteria-ASHBY'S media.
6. Demonstration of Electrophoresis technique
7. Agarose gel electrophoresis.
8. Demonstration and comparison of GM Plants with Non GM Plants (BT- Cotton, BT-Brinjal, BT Tomato).
9. Visit to Biotechnology Research Laboratory.

First Semester B.Sc. (Zoology)

Paper Code: ZOODSCT 1.1
Teaching Hours: 4 H / Week
Total hours:60

Paper Title: Animal Diversity
Marks: Th-80+IA-20
Credits :3

UNIT – 1

15 Hours

Kingdom Protista: General characters and classification up to classes with one example for each class. locomotion in Protozoa

Phylum Porifera: General characters and classification up to classes with one example for each class. Canal System in *Sycon*

Phylum Cnidaria: General characters and classification up to classes with one example for each class. Polymorphism

Phylum Platyhelminthes: General characters and classification up to classes with one example for each class. Parasitic adaptations

Phylum Nematelminthes: General characters and classification up to classes with one example for each class. Life history of *Ascaris*. Parasitic adaptations in roundworms

UNIT – 2

15 Hours

Phylum Annelida: General characters and classification up to classes with one example for each class. Metamerism in Annelida

Phylum Arthropoda: General characters and classification up to classes with one example for each class. Metamorphosis in Insects

Phylum Mollusca: General characters and classification up to classes with one example for each class. Torsion in gastropods

Phylum Echinodermata: General characters and classification up to classes with one example for each class. Water-vascular system in Asteroidea

UNIT – 3

15 hours

Phylum Chordata: Characters of chordates. Differences between chordates and non-chordates. General features of Protochordata (Brief note on Hemichordata, Urochordata, Cephalochordata)

Agnatha and Gnathostomata: General features of Agnatha and Gnathostomata. Classification of cyclostomes up to classes

Pisces: General features and classification up to living orders. Scales in fishes Migration in Fishes

Amphibia: General features and classification up to living orders. Parental care in amphibians

Reptiles: General features and Classification up to living orders. Differences between poisonous and non-poisonous snakes. Snake bite and treatment

UNIT – 4

15 Hours

Aves: General features. Salient features of Passeriformes, Pisciformes, Columbiformes,

Mammals: General characters. Salient features of Monotremes, Marsupialia, Insectivora, Rodentia, Perissodactyla, Chirpotera, Edentata, Cetaceae and Primates with one example for each. Ear ossicles in mammals.

Suggested Readings:

1. Agarwal V. P. and Dalela R. C. (1975): Textbook of Vertebrate Zoology. Jai Prakashnath Co.
2. Barnes, R.D. (1982): Invertebrate Zoology. Fifth edition
3. Barnes, R.D. (1982): Vertebrate Zoology. Fifth edition
4. Barnes, R.S.K., Calow, P., Olive, P.J.W. Golding, D.W. and Spicer, J.I. (2002): The Invertebrates: A
5. New Synthesis, III Edition, Blackwell Science
6. Barrington E. J. W. (1981): Invertebrate structure and Function. ELBS. Dhami P.S. and Dhami J. K.
7. (2000): Chordate Zoology. S. Chand & Co. Dhami P.S. and Dhami J. K. (2000): Invertebrate Zoology. S. Chand & Co.
8. Ekambaranatha Iyer M. and Anantakrishnan T. N. (1990): A manual of Zoology. Vol. I. Invertebrata (Part 1 &2). S. Vishwanathan Pvt. Ltd.
9. Ekambaranatha Iyer M. and Anantakrishnan T. N. (1990): A manual of Zoology. Vol. II. Chordata S. Vishwanathan Pvt. Ltd.
10. Jordan E. L. and Verma P.S. (1976): Chordate Zoology. S. Chand & Co. Jordan E. L. and Verma
11. P.S. (1976): Invertebrate Zoology. S. Chand & Co.
12. Kotpal R. L. (1993): Protozoa- Echinodermata (all volumes). Rastogi Publ. Pough H (2004): Vertebrate life, VIII Edition, Pearson International.
13. Ruppert and Barnes, R.D. (2006): Invertebrate Zoology, VIII Edition. Holt Saunders International Edition.

First Semester B.Sc. (Zoology)

Paper Code: ZOODSCP 1.1
Teaching Hours: 3 H / Week
Total hours: 45

Paper Title: Practicals-1
Marks: Th-40+IA-10
Credits : 1

ZOODSC P11-PRACTICAL-I

1. Study of the following specimens making use of permanent slides / specimens:

- i. Study of unicellular and cellular grade organized animals: *Amoeba*, *Euglena*, *Paramecium* and *Sycon*
 - ii. Study of tissue grade organized animals: *Obelia*, *Physalia*, *Aurelia*, *Metridium*, Study of flat worms: *Planaria*, *Taenia solium*
 - iii. Study of round worms: Male and female *Ascaris lumbricoides*
 - iv. Study of segmented Animals: *Nereis*, *Pheretima*, *Hirudinaria*,
 - v. Study of animal forms with jointed appendages: *Palaemon*, *Cancer*, *Limulus*, *Apis*,
 - vi. Study of soft bodied animals: *Chiton*, *Dentalium*, *Pila*, *Unio*, *Loligo*, *Sepia*,
 - vii. Study of spiny skinned animals: *Pentaceros*, *Ophiura*, *Echinus*, *Cucumaria* and *Antedon*
 - viii. Study of Protochordates: *Balanoglossus*, *Herdmania*, *Branchiostoma*
 - ix. Study of Fishes: *Torpedo*, *Labeo*, *Exocoetus*, *Anguilla*
 - x. Study of Amphibians: *Ichthyophis*, *Salamandra*, *Bufo*, *Hyla*
 - xi. Study of Reptiles: *Chelone*, *Chamaeleon*, *Draco*, *Vipera*, *Naja*
 - xii. Study of Birds: *Duck*, *Cuckoo*, *Wood pecker*, *Kingfisher*, *Owl*, *Peacock*
 - xiii. Study of Mammals: *Duck billed platypus*, *Manis*, *Bat*, *Loris*
2. Mounting of setae, blood glands, nephridia in Earthworm
(Collect the dead worms from vermicompost pits of farmers and preserve)
3. Mounting of mouth parts of honeybee, cockroach, housefly, mosquitoes
4. Mounting of brain in fowl / rat (collect dead fowl / rat heads and preserve)
5. Study tour / field visit: Compulsory tour / visit to understand faunal diversity

SUGGESTED READINGS

1. Ruppert and Barnes, R.D. (2006): Invertebrate Zoology, VIII Edition. Holt Saunders International Edition.
2. 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
3. Young, J. Z. (2004): *The Life of Vertebrates*. III Edition. Oxford university press.
4. Pough H (2006): *Vertebrate life*, VIII Edition, Pearson International.
5. Hall B.K. and Hallgrimsson B. (2008): Strickberger's Evolution. IV Edition. Jones and Bartlett Publishers Inc.
6. P. S. Dhami and J. K Dhami (2000): Practical Zoology S. Chand and Co, New Delhi

11.ZOOLOGY (Optional)

**B.Sc IV Semester Scheme (CBSC - Pattern)
Zoology (Optional) Syllabus(Revised)
2018 -19 Onwards**

Semesters	Syllabus	Total Hours	Theory & Practical/ Week
IV	Cell Biology, Histology & Animal Behaviors	50hrs.	4 hrs.
	PRACTICAL	12	4 hrs.

NOTE:

THEORY MARKS			PRACTICAL MARKS		
Internal	Annual	Total Marks	Internal	Annual	Total Marks
20	80	100 marks	10	40	50 marks

Question paper pattern for THEORY examination

Que.No.	Marks	Solve	Total Marks
I	02	10	20
II	04	05	20
III	10	04	40
TOTAL --- 80 MARKS			

PRACTICAL pattern for examination

Que.No.	Solve	Total Marks
I	Make a temporary preparation of Histology slide.	10
II	Make a temporary squash preparation of Onion root tip/Grasshopper Testis/Onion flower bud	08
III	Identification (6X2)	12
IV	Field study report & viva	05
V	Journal	05

TOTAL --- 40 MARKS



**B.Sc IV Semester Syllabus Revised (2018-19) Onwards
ZOOLOGY (Optional)**

Total Marks--80

Total Teaching--50hrs.

Cell Biology, Histology & Animal Behaviors

UNIT-I Cell Biology

Cell Biology: Ultra structure of animal cell, Cell theory & cell cycle. **1hr**
Ultra Structure & function of cell organelles: Plasma membrane, Endoplasmic reticulum, Ribosome's, Golgi-complex, Lysosomes, Mitochondria and Nucleus. **8hrs**

UNIT-II Cell Biology

Chromosomes: Structure & types of chromosomes. Ultra structure of chromosome. **2hrs**
Cell division: Types- mitosis & meiosis. **2hrs**
Cellular Aging & Cell Death: Concept of Aging theories, Effect of Aging on Cell organelles. Apoptosis, Necrosis-Definition & significance. **2hrs**
Cancer Biology: Introduction, Characteristics of cancer cells. Carcinogens, cause & prevention. **3hrs**

UNIT-III Histology

Histo chemical Techniques: Cytoplasmic & Nuclear stains. **3hrs**
Preparation of histological slides.
A). Study of histological structure and functions of the following Mammalian organs. 8hrs
a). Tongue b). Salivary glands
c). Stomach d). Intestine
e). Liver f). Kidney

UNIT-IV Histology

B). Study of histological structure and Endocrine functions of the following Mammalian organs 9hrs
a) Pituitary b) Pancreas c) Adrenal d) Thyroid
e) Parathyroid f) Thymus g) Testes h) Ovary

UNIT-V Ethology (Animal Behaviour)

Ethology: Introduction Definition, Scope of ethology. Brief Contributions of Konard Lorenz, Niko Tinbergen and Karl Von Frisch. **2hrs**

Types of Animal Behaviour: 7hrs

- 1). **Innate Behaviour:** Taxes, Reflexes, Instincts & Motivation.
 - 2). **Learned Behaviour:** Habituation, Imprinting, Conditioned, Reflexes and Insight learning.
 - 3). **Social behaviour:** Types of animal society & Colony in Honey Bees and Monkey troops.
 - 4). **Territoriality & Courtship Behaviour** in Scorpion, Stickle Back Fish & Peacock.
 - 5). **Study of nesting behavior and mimicry in animal.**
 - 6). **Biological clock, Circadian rhythm and Chronobiology.**
- Animal Communication:** Chemical, visual and Audio. Function of



Signals odours, sounds and light.	2hrs
Parental care: Concepts, Fishes, Amphibians and Birds.	3hrs

PRACTICALS

	Total Practicals-12 hr
1) Study of permanent cytology slides of Mitosis & Meiosis.	2hrs
2) Study of temporary preparation of Mitotic stages from onion Root tip cells.	2hrs
3) Study of temporary preparation of Meiotic stages from onion Flower bud/Grass Hooper testis.	2hrs
4) Preparation and observation of permanent histological slides Stomach, Intestine, Liver, Pancreas, Kidney, Adrenal Thyroid, Testis & Ovary.	4hrs
5) Study of mimicry in leaf insect, Chameleon, Butterflies, Stick Insect, Ants, Wasps and Spiders.	1hr
6) Study of Nest and nesting material.	1hr
7) Internal Practical Test	1hr

NOTE:

1. With the help of Charts/Models/Diagrams/Printouts & Xerox
Sheets are used in practical demonstration

2. Compulsory field visit to study Mimicry, Habitats and Community.

3. Submission of field visit report carries 5 marks.

REFERENCE BOOKS

1. Introduction to Histology. Gauba R.K. Tata Mc Graw Hill New Delhi.
2. Cells and Tissues: Introduction to Histology ND Cells :Rogers:A.W. Academic Press .
3. Basic medical Histology :Biology of cells & tissues & organs Kessel R.G. oupNew York.
4. Text Book of Histology :Bloom and Fawcett.Saunders Publ.Philadelphia.
5. Bailey's Text Book of Histology.Bailee Baltimore,Willims andWilkins.
6. Text Book of Ecology : Odum.
7. Introduction to animal behavior:Aubrey Manning and Marian.S.DawkinsCambridge Uni Press.
- 8.Essentials of organizational behavior:Stephan Robbins,Prentice Hall of IndiaNew Delhi.
9. Animal Behaviour :McFarland D ELBS with Longman.
10. Ethology " Barnett.
11. An introduction to Behavioural Ecology J.R. Krebs & N.B. Davies Black wellScientific Publ.
12. Text Book of Animal Behaviour: Fatik Baran mandal. PHI Learning Pvt Ltd newDelhi.
13. Animal Behaviour :Reena Mathur,Rastogi and Coimpani.
14. Cell Biology -Chennarayappa - Unniversity Press





RANI CHANNAMMA UNIVERSITY, BELAGAVI

WEL-COME

**TO THE COURSE STRUCTRE AND SYLLABUS OF UNDERGRADUATE
PROGRAMMES – B.Sc**

V Semester

w.e.f.

Academic Year 2019-20 and onwards



B Sc V Semester (5.1)
Paper-I
ZOOLOGY (optional)

(Ecology, Evolution, Paleontology, Zoogeography, Wild life Conservation)

Total-hours,50

Marks-80

Ecology.

Earth as Living.-Planet. Sub divisions_of ecology, Scope of ecology, Biosphere
1 hr

Abiotic factors ____
Light, Temperature (Effect on Animals and Plants)
2hr

Biotic Factor

Mutualism,Commensalism,Amensialism,Parasitism,Predation
,Competition,Parasitism.
2hrs

Habitats
4hrs

Freshwater habitat — Lotic and Lentic systems
Zonation of Sea,Marine Biota, Esturine ecology, & Mangrooves
Terrestrial habitat — A brief account of Biomes.

Ecological Adaptations — Freshwater, Marine and Terrestrial.

Biogeochemical Cycles - Principles and concepts of Water, Nitrogen, Carbon,
2hrs

Oxygen cycles

Community Ecology-Community structure, Ecological niches, Edge effect,
Stratification, Ecoton.
2hrs

Population Ecology: Density, natality, mortality.Age distribution

Population growth, types and curves.
2hrs



Evolution.

The Solar System Origin of Earth , Origin of Life and its theories	03hrs
The geological time scale	03hrs
Fossils: Definition and Kinds of fossils, How fossils are formed, Methods of Preservation. Connecting links and Living fossils. The importance of fossils	02hrs
Theories of Organic Evolution :	06hrs
Lamarckism, Darwinism, Mutation Theory And the Modern Synthesis Theory;(population gene Pool, Gene Frequency . Variations — gene mutation, chromosomal mutation; Isolation and recombination.Genetic drift,Hardiwiensberg equilibrium)	
Modes of Evolution : Microevolution, Macroevolution and Mega-evolution.	02 hrs
,Evolution of Man and Horse	04 hrs
Paleontology Mesozoic reptiles with a note on Dinosaurs.	03 hrs
Zoogeography: Zoogeographical realms of world , A brief account of Wallace's line	03 hrs
Wildlife Conservation : Wildlife in India,Causes for the depletion of wildlife. Wild Life Conservation Techniques', methods'and measures Brief account of ; IUCN, WWF,Bombay Natural History Society, Indian Board for Wild Life, Red Data Book. Wild Life Act 1972 and its amendments in India,CITES. Project Tiger and Biosphere Reserve.	09hrs



Total -11 Practicals

- 1; Study of fossils (vertebrate(3) and invertebrate(3).
1hrs
2. Mesozoic reptiles (Ichthyosaur, tyrannosaur, brontosaur, triceratops, archaeopteryx .
1hr
3. Evolution of man (Homo-erectus. Hemo-habills. Homo-neandertalences)
1hr
4. Evolution of Horse
1hr
- 5 ;Connecting links and living fossils (Neopilina, Peripatus, Limulus, Latimaria; Archaeopteryx and Duckbill platypus)
1hr
- 6 Study of threatened Animals of India (Tiger,Lion,singal horned rhinoceros
1hr
Musk deer,gaur,Golden langur,Loin tailed monkey.Python)
1hr
- 7 ;Estimation of CO_2 from different water samples
1hr
- 8; Estimation of dissolved oxygen
1hr
- 9; Estimation of Total hardness
1hr
- 10;Study of Ecological Adaptations and Morphological peculiarities,;ex-Hermit crab, 1hr
Draco,Stick insect,puffer fish,Exocoetus,Phrynosoma,chamaeleon and Bat.
- 11;Visit to nearby water body to study Ecosystem
1hr

REFERENCE BOOKS:-

Evolution : Odum

Organic Evolution: N.Arumugam

Evolution, Dobzhansky, Ayala, Stebbins & Valentine

Environmental Biology. Rastogi and Company, Meerut

Evolution of the Vertebrates, Colbert E.H. John Wiley and Sons, New York

Ecology; Principles and Application. Chapman, Cambridge university press

Environmental Biology P.R. Trivedi and Gurudeep Raj.

Recent Advances in Environmental Biology – Diwan and D.K. Arora

Environmental Science; Eldon D. Enger and Bradley F. Smith



Suggestions for Practical Examination

SEM—V-5.I

Q. NO I) Estimation of Carbondioxide/O xgen/Total hardness	8marks
Q.NO II) Evolution (Two spottings)	4 marks
Q NO III) Fossils (Two spottings)	4 marks
Q NO IV) Identification (Zoogeography & Wild life)	4 marks
Q NO V) Project on Local Biodiversity	10 marks
Q NO. VI Viva	5 marks
Q NO. VII Journal	5 marks

Note 1 :- Examiners can alter the Scheme of marks for practical in consultation with the staff of the host college.

marks	Note :2	Theory	Internal	20
marks			Final	80
marks		Practical	Internal	10
marks			Final	40

Note 3: Question paper pattern for THEORY examination

	Q No. 1	02 marks = 20 marks	10* 02	
30 marks	Q No. II	05 marks	06* 05	=
10 marks	Q No. III	10 marks	01* 10	=
10 marks	Q No. IV	10 marks	01* 10	=

Rani Channamma University, Belagavi
B.Sc VI Semester _ 6.1

Paper I

Total hours – 50
Marks _ 80
Theory 4 hrs/week

APPLIED ZOOLOGY (optional)

Sericulture : Mulberry Silkworm and Life History of Bombyx mori

07 hrs

Rearing of Silkworm: Grainage management, Emergence of moth and fertilization, egg laying, hatching and moulting of-silkworm, spinning of cocoons, Cocoon processing, stiffling and spinning silk. Filature. Non mulberry silkwarm, types. in brief & Silkworm diseases- Muscardine, Grasserie, Flacherie & Pebrine.

Apiculture: Species of Honey Bees, their Social organization, Life History

05 hrs

Methods of Bee Keeping, products of Bees, & their Economic importance

Insect Pest Management : Natural control and Applied control of pests

05 hrs

Applied Control __ Mechanical, Physical, Cultural, Legal, Chemical control

Vermiculture: Eerthworm species used in vermiculture,vermiculture technique,and Importance of vermiculture.

04 hrs

Aquaculture :

10 hrs

Prawn Fisheries, Species of Prawns, Culture of freshwater and marine Prawns, Preservation and processing of Prawns.

Pearl Culture : Pearl producing molluscans, Pearl formation, Pearl producing

Sites in India. Quality and composition of Pearl.

Pearl Industry:Artificial Insertion of nucleus

Brief technique of Fish culture, Preservation of fishes and their

Byproducts



Poultry : Breeds of fowl, Diseases of poultry, Poultry maintenance and By-products, and CoMposition and Nutritive value of Egg.

06 hrs

Animal Husbandary: Maintenance, Breeds Diseases, Products and By Products of the following

10 hrs

Sheep and Goats, Cow and Buffalos, Composition and Nutritive value of Milk

Lac culture: Classification of Lac insect (Techardia lacca, Life history of Lac

Insect. Host plants, Cultivation of Lac. Compostion and properties & Economic importance

3 hrs.

**Practicals – 6.1
Practicals**

Total -11

1. Project on any of the applied branch studied in theory	1
2. Study of mulberry silkworm and Life cycle	1
3. Types of non mulberry silkworms in brief and Silkworm diseases (Pebrine, Muscardine and Grasserie & Flaturie)	1
4. Species and castes of honeybees	1
5. Agricultural pests and domestic pests (total 8 varieties)	1
6. Study of fisheries __ Molluscs (three), Crustaceans (three) And Pisces (six)	1
7. Study of Varieties of sheep and goat (from chart/photographs)	1
8. Study of varieties of Cow & Buffalos(from chart/photographs)	1
9. Vermiculture__ Study of types of Earthworm species	1
10 Study of poultry breeds	1
11 Study of Lac insect (Life cycle)	1



Scheme for practicals 6.1 APPLIED ZOOLOGY

Q No. I	Sericulture	03 marks
Q No. II	Apiculture	03 marks
Q No. III	Pest management	03 marks
Q No. IV	Pisciculture	03 marks
Q No. V	Vermiculture	03 marks
Q No. VI	Animal Husbandry	06 marks
Q No. VII	Prawn & Pearl culture	04 marks
Q No. VIII	Project report & Viva	10 marks
Q No. IX	Journal	05 marks

Total 40 marks

Note 1 :Examiners can alter the Scheme of marks for practical in consultation With the staff of the host college.

Note 2 : Theory	Internal	20 marks
	Final	80 marks
Practical	Internal	10 marks
	Final	40 marks

Note 3 : Question paper pattern for THEORY examination

Q No. I marks	02 marks	10* 02	= 20
Q No. II marks	05 marks	06* 05	= 30
Q No. III marks	10 marks	01* 10	= 10
Q No. IV marks	10 marks	01* 10	= 10
Q No. V marks	10 marks	01* 10	= 10

Note 4 : Q Nos IIIrd IV & V each should have one internal option



B.Sc Sixth semester (6.2) Paper II (Microbiology and Modern techniques in Biology)

Microbiology (18 Hours)

SMH **Microscopy:** Compound microscope and its functions. Dark field microscope, Fluorescent microscope, Phase Contrast Microscope and Electron Microscope
Uses of different types of microscopes

VRNS **Sterilization and other techniques:** Physical and chemical methods

SMH **Bacteria:** Classification based on shapes, structure. Bacterial reproduction and growth.

KIP **Virus:** Morphology, chemical properties, classification, nomenclature, DNA & RNA viruses

Fungi: Structure, classification and reproduction, Yeasts

Fermentation: Types of fermentor and basic functions. Methods of preservations and criteria for the selection of microorganisms

Production of antibodies: Penicillin, Streptomycin, Enzyme protease, Riboflavin 2

VRNS **Oral microbial flora of the human body**
Role of microbes in environment

Nanotechnology: (5 Hrs)

SMH Introduction, History, Name, Tools and Techniques in Nanotechnology.
Nanobiology - application of Nano in biology- Nano drug administration, diagnostic
And therapeutic applications. Lotus effect, Gold and Silver Nanotechnology.
Curcumin phytochemicals, Cinnamon in green nano technology

Bioinformatics (7 Hrs)

Introduction: Definition, Goal of Bioinformatics, Sequencing - Sequences analysis and Structure analysis. Applications of Bioinformatics

Classification of Biological Data Bases. Characteristics of FASTA (Fast Alignment), BLAST (Basic Local Alignment Search Tool)

Aims and goals of Human Genome Project: Main findings of human genome project.
Prediction and tools for gene prediction. Comparative genomics

SMH **Proteomics:** Two dimensional Gel Electrophoresis Mass spectrometry, SDS_PAGE. Structure of protein: Primary, Secondary, Tertiary and Quarternary.

Protein structure prediction [Ab initio modeling Example Rosetta]
Application of Proteome analysis, the future of Proteomics

Methods in Biology (10 Hours)

Techniques of cell fraction and centrifugation.

Homogenization and cell tissue disruption, centrifugation, ultra centrifugation

DNA sequencing, in situ hybridization, DNA microchips

Genetic engineering in animals - Transgenic mouse, Transgenic sheep,

Genetically altered fish, mosquito and Drosophila.

Gene therapy in Humans

Histochemical and Immunization Techniques: ELISA, RIA, Flow cytometry

Nucleic acid blotting & their applications: Southern blotting, Northern blotting, Western blotting

Radioisotopes: Techniques in Biochemistry. Types of radioactive decay- Alpha, Beta emission & Gamma rays

Biological applications of Radioisotopes

Research Methodology: (10 Hours)

Meaning and objectives of research, motivation in research, research and scientific method, understanding the research problem, Sampling Design (Sample Survey), methods of data collection, analysis of data, Interpretation and report writing, role of computer in research

**Question paper pattern for theory examination
B.Sc Sixth Semester (Paper – II)**

Q. I	2 marks	12 questions to be given	Solve any 10	20 marks
Q. II	5 marks	6 questions to be given	Solve any 5	30 marks
Q. III	10 marks	2 questions to be given	Solve any 1	10 marks
Q. IV	10 marks	2 questions to be given	Solve any 1	10 marks
Q. V	10 marks	2 questions to be given	Solve any 1	10 marks

B.Sc Sixth Semester (Practical II) Practical Syllabus Total Practicals – 11

1.	Measurement of micro organisms (Micrometry)	1 Practical
2.	Preparation of liquid medium (Broth)	1 Practical
3.	Preparation of solid media (PDA medium and PDA plates)	1 Practical
4.	Preparation of agar slants.	1 Practical
5.	Study of different types of bacteria, viruses and fungi causing diseases in man	1 Practical
6.	Bacterial cell counting using haemocytometer.	1 Practical
7.	Simple and Grams's staining differentiation of bacteria	1 Practical
8.	Isolation, Identification and enumeration of Bacteria/Protozoa from moist soil or sewage water	1 Practical
9.	Practical application of Bioinformatics: Tool BLAST and FASTA to find out sequence of nucleotides in undesired gene/Amino acid in desired protein	1 Practical
10.	Study of Microbiological Lab Equipments: Microscope, Centrifuge, Autoclave, Pressure cooker, Laminar air flow, Streak Plate, Inoculation needle etc.	2 Practicals

Question paper pattern for practical examination

I	Microbiology, Nanotechnology	8
II	Bioinformatics	6
III	Spotting (1 each from bacteria, virus, fungi)	6
IV	Viva	5
V	Submission of detailed report on specific local problem (research)	10
VI	Journal	5

Total 40

RANI CHANNAMMA UNIVERSITY, BELGAVI
MA English under CBCS Programme
SYLLABUS
 (With effect from the academic year 2018-19)

III SEM		IV SEM	
3.1	New Literatures	4.1	European Classics
3.2	Dalit Literature	4.2	English Language Teaching
3.3	Ecocriticism and Indian Writing in English	4.3	Cultural Studies
3.4 a	Post Colonial Literature and Theory- 1	4.4a	Post Colonial Literature and Theory- 3
3.4b	Indian Literatures in Translation- 1	4.4b	Indian Literatures in Translation- 3
3.5a	Post Colonial Literature and Theory- 2	4.5a	Post Colonial Literature and Theory- 4
5b	Indian Literatures in Translation- 2	4.5b	Indian Literatures in Translation- 4
3.6	OEC: Language through Literature	4.6	Project Work

Note:

Students can choose **Postcolonial Literature and Theory** (3.4a, 3.5a and 4.4a, 4.5a)

Or

Indian Literatures in Translation (3.4b, 3.5b and 4.4b, 4.5b) for their specialization.



RANI CHANNAMMA  **UNIVERSITY, BELAGAVI**

Department of Mathematics

Syllabus
for
Master of Science in Mathematics
I to II Semester
(with effect from 2017 – 18)



Department of Mathematics

Choice based credit system (CBCS)

Course structure

Sl. No.	Paper & Title	Credit	No of Hrs/week Theory/ Practical	Duration of exam in Hrs Theory/ Practical	IA Marks Theory/ Practical	Marks at the Exams	Total Marks
I Semester							
1.1	Algebra -I	4	4	3 Hrs	20	80	100
1.2	Topology	4	4	3 Hrs	20	80	100
1.3	Real Analysis	4	4	3 Hrs	20	80	100
1.4	Linear Algebra	4	4	3 Hrs	20	80	100
1.5	Ordinary Differential Equations	4	4	3 Hrs	20	80	100
1.6	Discrete Mathematical Structures	4	4	3 Hrs	20	80	100
II Semester							
2.1	Algebra – II	4	4	3 Hrs	20	80	100
2.2	Complex Analysis	4	4	3 Hrs	20	80	100
2.3	Partial Differential Equations	4	4	3 Hrs	20	80	100
2.4	Functions of Several Variables	4	4	3 Hrs	20	80	100
2.5	Classical Mechanics	4	4	3 Hrs	20	80	100
2.6	Open Elective Course I. Set Theory (Arts & Commerce stream)	4	4	3 Hrs	20	80	100
	II. Integral Transforms (Science stream)						



Department of Mathematics

III Semester							
3.1	Measure Theory & Lebesgue Integration	4	4	3 Hrs	20	80	100
3.2	Differential Geometry	4	4	3 Hrs	20	80	100
3.3	Numerical Analysis	4	4	3 Hrs	20	80	100
3.4	Elective- I I. Mathematical Finance II. Fluid Mechanics III. Commutative Algebra IV. Coding Theory	4	4	3 Hrs	20	80	100
3.5	Elective- II I. Algebraic Topology II. Number Theory and Cryptology III. Fourier Analysis IV. Fuzzy Sets and Fuzzy Systems	4	4	3 Hrs	20	80	100
3.6	Open Elective Course I. Statistics (Arts & Commerce stream) II. Computational Methods (Science stream)	4	4	3 Hrs	20	80	100
IV Semester							
4.1	Functional Analysis	4	4	3 Hrs	20	80	100
4.2	Mathematical Methods	4	4	3 Hrs	20	80	100
4.3	Probability Theory	4	4	3 Hrs	20	80	100
4.4	Elective-I I. Riemannian Geometry II. Advance Graph Theory III. Mathematical modeling IV. Galois Theory	4	4	3 Hrs	20	80	100
4.5	Elective-II I. Advanced Numerical Methods II. Banach Algebra III. Operations Research IV. Computation Complexity	4	4	3 Hrs	20	80	100
4.6	Project	4	The candidate shall submit a dissertation carrying 80 marks and appear for viva-voce carrying 20 marks				100
Total		96					2400



Department of Mathematics

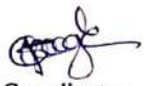
4.6 PROJECT

The candidate shall submit a dissertation carrying 80 marks and appear for viva-voce carrying 20 marks.



K. L. E Society's
G.I. Bagewadi Arts, Science & Commerce College, Nipani
Department of Mathematics
Project List for M.Sc. IV Sem. 2020-21

S. No.	Roll. No.	Register No.	Name of the Student	Project Topic	Guide
1	08	MT191209	Jyoti Bharat Sutar	Network topology and applications	Sri. S. A. Chougale
2	11	MT191212	Neeta M.Bhate		
3	03	MT191204	Anita R. Hamidwade	Applications of Discrete Mathematics	Sri. S. A. Chougale
4	16	MT191217	Snehal M. Jadhav		
5	04	MT191205	Anuja G.Patil		
6	17	MT191218	Sushmita S.Pattankude	Conformal Mapping and its applications	Miss N. S. Jadhav
7	13	MT191214	Prajakta L.Bhore		
8	12	MT191213	Prachi S.Mayanna		
9	07	MT191208	Jyoti A.Patil	Mathematical methods and its applications	Miss N. S. Jadhav
10	02	MT191202	Akshata G.Majalatti		
11	06	MT191207	Arati S.Patil		
12	01	MT191201	Aishwarya Zele	Number theory and its applications	Miss V. U. Khot
13	15	MT191216	Shweta Patil		
14	14	MT191215	Sangeeta More		
15	09	MT191210	Lata R.Bharmal	Matrix representation of graphs	Sri. S. A. Chougale
16	05	MT191206	Anuradha V. Hindalkar		
17	10	MT191211	Namarata A.Patil		
18	18	MT191219	Trupti Magadam	Applications of Fourier Series and Fourier Transforms	Sri. J. N. Magadam
19	19	MT191220	Varsha Patil		
20	20	MT191221	Vijaylaxmi Kakoli		


 Coordinator
Co-ordinator
 P. G. [M.Sc., Maths]
 K.L.E's G. I. B. College, Nipani,




 Principal
PRINCIPAL
 K. L. E. Society's
 G. I. Bagewadi College, Nipani.

RANI CHANNAMMA UNIVERSITY, BELAGAVI.**Department of Post Graduate Studies and Research in Commerce****Syllabus of Master of Commerce****(With effect from Academic Year 2017-18)****IV Semester**

M.Com Course Structure

Sem	Paper Code	Course	IA Marks	Sem End Marks	Total	Hrs/Week	Credits	
III	3.1	Business Research Methods	20	80	100	04	04	
	3.2	International Financial Management	20	80	100	04	04	
	Group- A : Accounting and Finance							
	3.3 A	Financial Markets and Institutions	20	80	100	04	04	
	3.4 A	Corporate Accounting	20	80	100	04	04	
	3.5 A	Accounting for Specialised Institutions	20	80	100	04	04	
	Group- B: Cost Accounting							
	3.3 B	Production and Operation Management	20	80	100	04	04	
	3.4 B	Cost Management	20	80	100	04	04	
	3.5 B	Cost Accounting Standards	20	80	100	04	04	
	Group - C: Banking							
	3.3 C	Bank Marketing	20	80	100	04	04	
	3.4 C	Banking in India	20	80	100	04	04	
	3.5 C	Management Accounting for Bankers	20	80	100	04	04	
	Open Elective Course							
	3.6	To be chosen from the other Department	20	80	100	04	04	
		Open Elective Course meant for other Departments - Personal Financial Planning	20	80	100	04	04	
		Total Marks/Credits	120	480	600	24	24	
	IV	4.1	E-Commerce	20	80	100	04	04
		4.2	International Business	20	80	100	04	04
4.3		Project Report	50	50	100	04	04	
Group A: Accounting and Finance								
4.4 A		Security Analysis and Portfolio Management	20	80	100	04	04	
4.5 A		Innovations in Accounting	20	80	100	04	04	
4.6 A		Mutual Funds	20	80	100	04	04	
Group- B: Cost Accounting								
4.4 B		Techniques of Costing	20	80	100	04	04	
4.5 B		Strategic Cost Management	20	80	100	04	04	
4.6 B		Recent Developments in Cost Accounting	20	80	100	04	04	
Group - C: Banking								
4.4 C		Foreign Exchange and Risk Management	20	80	100	04	04	
4.5 C	Financial Management in Commercial Banks	20	80	100	04	04		
4.6 C	Fund Management in Commercial Banks	20	80	100	04	04		
	Total Marks/Credits	150	450	600	24	24		





RANI CHANNAMMA UNIVERSIT BELAGAVI

WEL-COME

**TO THE COURSE STRUCTRE AND SYLLABUS OF UNDERGRADU
PROGRAMMES – B.Sc**

III Semester





Group – II

OPTIONAL / COMPULSORY SUBJECT FOR THE DEGREE IN SCIENCE SUBJECT

Science Subjects: (any three subject of equal importance to be chosen as per the grouping given by Rani Channamma University, Belagavi)

DETAILED SYLLABUS OF FOLLOWING PAPERS WITH PRACTICAL

1. BOTANY (optional)

B.Sc. III Semester (w.e.f: 2018 – 19) and onwards.

Subject: BOTANY (optional)

Paper-: Diversity of Cryptogams (Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms).

Unit I: Algae

General characters, Pigmentation, Classification by Fritsch (up to class level). Distribution, thallus structure, reproduction and life cycle of Nostoc, Volvox, Oedogonium, Sargassum and Batrachospermum. Economic importance.

Unit II: Fungi

General characters, Classification (Alexopoulos's system). Distribution, Structure, Reproduction and life cycle of Albugo, Rhizopus, Penicillium and Puccinia. Economic importance of fungi. General account of lichens.

Unit III: Plant Pathology

General account of Bacteria and Viruses. Introduction and general symptoms of plant diseases. Symptoms, Pathogens and control measures of Late blight of potato, White rust of crucifers, Tikka disease of ground nut.

Unit IV: Bryophytes

General characters, Classification (Smith). Structure, reproduction and schematic life cycle of Riccia, Anthoceros and Funaria. (Developmental details are not expected). Evolution of sporophytes.

Unit V: Pteridophytes

General characters and classification. Distribution, Structure (External and Internal) and Reproduction of Psilotum, Selaginella, Equisetum and Nephrolepis (Developmental details are not expected). Stelar evolution. Heterospory and seed habit

Unit VI: Gymnosperms

General characters and classification. Distribution, Structure (External and Internal) and Reproduction of Cycas, Pinus and Gnetum (Developmental details are not expected).

Unit VII: Paleobotany

Geological time scale, fossilization-molds, Impression, Petrification and cast. Study of fossils - Calamitis, Lepidodendron, Lygenopteris.





B.Sc. III Semester PRACTICALS

Total number of hours per week: 04, Internal Assessment=10 Marks, Max Marks: 40 M

1. Vegetative and reproductive structures of Nostoc, Volvox and Oedogonium.
2. Vegetative and reproductive structures of Sargassum and Batrachospermum
3. Vegetative, reproductive structures and disease symptoms of Albugo, Rhizopus, Penicillium.
4. Vegetative, reproductive structures and disease symptoms of Puccinia. Lichen
5. Study of Vegetative and Reproductive structures of Riccia, Anthoceros and Funaria
6. Study of Vegetative and Reproductive structures of Psilotum and Selaginella.
7. Study of Vegetative and Reproductive structures of Equisetum and Nephrolepis
8. Study of Vegetative and Reproductive structures of Cycas, Pinus and Gnetum
9. Disease symptoms and control measures of Late blight of potato, Black rust of wheat, Tikka disease of ground nut.
10. Paleobotany- Study of fossils Lepidodendron, Calamitis, Lygenopteris.

11. Field visits.

Suggested Readings:

- Smith G.M. 1971 vol 1 Algae and fungi. Tata McGraw HILL Publishing company New Delhi
 Sharma O.P. 1992 Text book of thallophytes McGraw Hill Publication
 Sharma P.D. 1991 The fungi Rastogi and Co Meerut
- Dubey H.C. 1990 An Introduction to Fungi Vikas Publishing House Pvt Ltd
 Dehli Clifton, A 1958 Introduction to Bacteria McGraw Hill and Co New York
- Basu A.N. 1993 Essentials of plant viruses, vectors plant diseases New Age International New Delhi.
 Chopra G.L. A text book of algae Rastogi and co Meerut
- Rangaswami G 1998 Diseases of crop plants in India. Prentice Hall of India New Delhi.
 Sunderrajan S 1997 College Botany Vol 1. S. Chand and Co Ltd New Dehli
 Alexopoulos, 1992 An Introduction to Mycology. New Age International. New Dehli
 Vashista B.R. 1978 Fungi. S. Chand and co. Ltd. New Delhi

B.Sc. III Semester Botany Practical Examination

Time: 4 Hours

Max M

Q1: Identify and classify specimens A, B, C giving reasons.	09
Q2: Identify and explain the internal structures of specimen D and E with the neat labelled diagrams (Show the preparation to the examiner)	10
Q 3: Identify & describe the salient features in the slides/ specimens E, F, G, H, I and J	12
Q4: Identify & describe the salient features in the fossil specimen K .	03
Journal	04
Field visit report	03





Group – II

OPTIONAL / COMPULSORY SUBJECT FOR THE DEGREE IN SCIENCE SUBJECTS

RANI CHANNAMMA UNIVERSITY, BELAGAVI.

B.Sc. IV Semester (w.e.f: 2018 – 19) and onwards.

Subject: BOTANY (optional)

Paper: Diversity of Angiosperms and their systematics, Economic botany and Medicinal botany 52 hrs.

Unit I: Morphology of Angiosperms: 07 hrs.

Study of stems and its modifications, Leaf- types, stipules, Phyllotaxy and their modifications. Study of Inflorescences, flowers (Floral formula and Floral diagram to be included) and fruits.

Unit II: Angiosperm systematics: 10 hrs.

Botanical nomenclature- principles and rules, taxonomic ranks, type concept and principle of priority. Botanical survey of India. Classification of Angiosperms: Systems proposed by Bentham and Hooker, Engler Prantl. Their salient features, merits and demerits. Brief account of APG classification.

Contributions of Cytology (Cytotaxonomy), Phytochemistry (Chemotaxonomy) and Taximetrics (Numerical taxonomy) to taxonomy.

Unit III: Diversity of flowering plants as illustrated by members of the following families: 20hrs

Annonaceae, Brassicaceae, Malvaceae, Rutaceae, Rhamnaceae, Fabaceae, Myrtaceae, Combretaceae, Cucurbitaceae, Apiceae, Rubiaceae, Asteraceae, Apocyanaceae, Asclepiadaceae, Convolvulaceae, Solanaceae, Acanthaceae, Verbenaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Orchidaceae, Liliaceae, Arecaceae and Poaceae.

Unit IV: Economic Botany: 10 hrs

Origin & Distribution, Family, Botanical name and utility of following plants-
Food plants: Rice, Wheat, Maize, Pulses (Bengal gram, Pigeon pea) and Sugarcane
Fibres: Cotton, Jute.

Oil yielding plants: Ground nut, Sunflower, Palm oil, Sandalwood and Citronella oils

Paper & pulp: Bamboo & Eucalyptus

Spices: Ginger, Clove, Cinnamon, Asafoetida and Cardamom

Beverages: Tea & Coffee

Rubber: Hevea sp.

Unit V: Medicinal botany: 05hrs

Common medicinal plants in primary health care: -

Tippateega (*Tinosporacordifolia*), Tulsi (*Oscimumsanctum*) Kalabanda (*Aloe-vera*)

Turmeric (*Curcuma longa*) Ashwagandha (*Withaniasomnifera*) and Sarpagandha (*Rauwolfiaserpentina*)





Practicals:-

1. Morphology of Root, Stem, Leaf and their modifications.
2. Study of Inflorescence and its types.
3. Study of Flower-I- Descriptive terms, Thalamus, Calyx, Corolla and Aestivation.
4. Study of Flower-II –Androecium and Gynoecium. Floral formula and Floral diagram.
5. Study of Fruit types.
6. Study of any 18 families representing from polypetalae, gamopetalae, apatalae and monocots available in the locality.
8. Economic botany and Study of Medicinal Plants (as per syllabus) available in the locality.
9. Study Tour for minimum Two days to study the Flora (Taxonomy).

Suggested readings:

1. Davis, P.H. and Heywood, V.H. 1963. Principles of angiosperm taxonomy. Oliver and boyd, London.
2. Heywood, V.H. and moore, D.M. (EDS) 1984. Current concepts in plant taxonomy academic press, London
3. Jeffery, C. 1982. An introduction to plant taxonomy. Cambridge university press, cambridge, London.
4. Jones, S.B. Jr and Luchsinger, A.E. 1986. Plant systematics (2nd edition). McGraw Hill book co, newyork.
5. Radford, A.E. 1986. Fundamentals of plant systematics. Harper and Row, newyork.
6. Singh, G. 1999. Plant systematics; theory and practice. Oxford and IBH, newdelhi.
7. Atace, C.A. 1989. Plant taxonomy and bio systematics (2nd edition). Edward Arnold, London.
8. Dutta, S.C. 1988. systematic botany. walle eastern, newdelhi.
9. Jaques, H.E. 1999, Plant families- how to know them. IBS, newdelhi.
10. Lawrence, G.H.M. 1951. Taxonomy of vascular plants. Macmillan, newdelhi.
11. Stewart, W.M. 1983. Paleobotany and the evolution of plants, cambridge university press, cambridge.
12. Joshi S.G. medicinal plants oxford and IBH newdelhi.
13. Kokate and Gokeale _pharmacognacy. Nerali publication, newdelhi.
14. Lad v Ayurveda- the science of self-healing- motilal banarasidas, newdelhi.
15. Lewis W.H. and M.P, F Elwin Lewis 1976, medical Botony plants affecting maris health. A wiley interscience publication, Jhonwiley and sons newyork.
16. College botany vol 1 by Gangulee, Das and Datta. New central book agency, Calcutta.
17. Systematic botany by R.N Sutaria.
18. Taxonomy of Angiosperms by B.P. Pandey.
19. Kocchar, S.L. 1998. Economic Botany in Tropics. 2nd edition, Macmillian Ltd, New Delhi .
20. Sambamurthy, A.V.S.S and subramanyam, N.S. 1989. A Text Book of Economic Botany, Wiley Eastern Ltd. New Delhi .
21. Sharma, O.P. 1996. Hill's Economic Botany. Tata McGraw Hill Co., Ltd., New Delhi.
22. Simpson, B.B. and Conner-Ogorzaly, M. 1986. Economic Botany-plants in our world. McGraw Hill, New York.
23. Hill. A.F. 1989. Economic Botany. Tata McGraw-Hill, New York.
24. Herbs Cultivation and Medicinal Uses- H. Panda – NIIR Publication, New Delhi.
25. Chopra R.N., Badhuvar R.L. & Ghosh G. (1965) - Poisons Plant of India.





B.Sc. V Semester (w.e.f. 2019 – 20)

Botany Paper - I

Paper-I: Plant Breeding, Tissue Culture and Horticultural Practices.

50

Hrs

Unit I: Plant Breeding: History and objectives. Introduction, Selection (Pure line, Mass Selection), Hybridization- inter specific and inter generic. Mutational & Polyploidy breeding. Germ plasm and its maintenance. Pollen Bank, Quarantine method.

10 Hrs.

Unit II: Plant Tissue Culture: Scope and Significance. Basic Aspects and Cellular totipotency (Shoot tip, Embryo and Haploid culture techniques). Differentiation and morphogenesis.

10 Hrs.

Unit III: Introduction to Horticulture, Nursery management and importance.

Methods of propagation – vegetative – rhizome, bulb, corm and sucker (natural). Artificial- Cutting, layering, grafting and budding. Bonsai – methods and importance. Nursery management: Introduction, types of nurseries and cultural practices. Seed (propagule) collection, storage and treatment. Manures, fertilizers and pesticides. Methods of irrigation – drip, sprinkler and flood

12 Hrs.

Unit IV: Green House Technology – Introduction, advantages and limitations. Types of Green Houses- Green House structure, principle Greenhouse technology as applied to ornamental, vegetable and fruit plants.

08 Hrs.

Unit V: Harvest Technology and Weed Management: Harvest Technology: Flower and fruit plants management. Artificial ripening, maturity indices, methods of picking. Post-harvest technology and management of fruits: grading, processing, storage and packing. Weed Management: Introduction and significance. Invasive weeds – concept and causes of their dominance. Weed control – physical, chemical and biological methods.

10 Hrs.

Practicals:

1. Study of methods of propagation with help of tubers, bulbs rhizomes, corms suckers, runner and offset.
2. Study of propagation by cutting, layering, grafting and budding.
3. Methods of emasculation and bagging for cross-pollination.
4. Morphology and anatomy of dry and wet stigma.
5. Morphology and anatomy of solid and hollow styles.
6. Study of pollination types.
7. Demonstration of tissue culture techniques.
8. Visit to nursery - poly house /Green house and tissue culture lab.
9. Preparation of MS media for culture. 10. Bonsai techniques.





16-17



RANI CHANNAMMA UNIVERSITY, BELAGAVI

WEL-COME

**TO THE COURSE STRUCTRE AND SYLLABUS OF UNDERGRADUATE
PROGRAMMES – B.Sc**

V Semester

w.e.f.

Academic Year 2016-17 and onwards





Semester V
(w.e.f 2016-17)
Botany Paper - II

Paper-II: Ecology, Environmental Biology and Phytogeography **50 hrs**

Objectives:- This paper has topics on pollution, pollution control and forestry. Considering the present scenario with respect to environment these topics are most valuable.

Unit 1: Plant and environment: Atmosphere (gaseous composition), water (properties of water cycle), light (global radiation, photo synthetically active radiation), temperature, soil (development, soil profiles, physico-chemical properties), and biota.

Morphological, anatomical and physiological responses of plants to water (hydrophytes, xerophytes and epiphytes), temperature (thermoperiodicity and vernalization), light (photoperiodism, heliophytes and sciophytes) and salinity.

12 Hrs.

Unit 2: Population ecology and Ecosystems: Growth curves; ecotypes; ecads, Ecological succession-hydrach and xerarch. Structure of Ecosystems (Pond and Forest): abiotic and biotic components; food chain, food web, ecological pyramids, energy flow.

10 Hrs.

Unit 3: Phytogeography: Botanical regions of world, Vegetation types of Karnataka and India.

06 Hrs.

Unit 4: Conservation of Natural resources: Different types of natural resources and their conservation,

Forest and Forest Management: Forest and its ecological significance, deforestation, forest management and social forestry. Natural depletion of vegetation endangered and threatened economic plants of India and red data book. Wild life management in India, Indian board of wild life, national park and sanctuary.





Energy resources: conventional and non conventional sources of energy.

Biodiversity: significance, types, depletion, conservation of biodiversity. **12 Hrs.**

Unit 5: Pollution: Introduction, causes, effects and control measures of Water pollution, Air pollution, Soil pollution, Acid rain, Global warming, and Ozone depletion.

Sewage water and waste water types. Methods of effluent treatment of industrial waste water, sludge disposal and its care related to environment. **10 Hrs.**

Practical:

1. Study of frequency and density of herbaceous plants by quadrat method.
2. To determine moisture content and water holding capacity of different types of soils.
3. To estimate the alkalinity of water samples.
4. Ecological instruments.
5. Morphology and anatomical adaptations in three hydrophytes.
6. Morphology and anatomical adaptations in xerophytes: One succulent and one non-succulent, one epiphyte and one halophyte.
7. Waste water analysis, physical chemical parameter, pH, turbidity, TDS, BOD, COD, temperature and any other inorganic elements.
8. Visit to effluent treatment plant to study recycling of waste water near by industry and study the effect of industrial pollution nearby water bodies (Biomagnification & Eutrophication).
9. Assignment of Project related to practical number eight.





10. Study tour of minimum two days to study forest types and ecological groups.

Books for Reference:

1. Sharma P.D. (1993)-Ecology and Environment – Rastogi Publication, New Delhi.
2. Mishra R. - Ecology Work Book- Oxford and IBH, New Delhi.
3. Agarwal K.C. (1993)- Environmental Biology- Agro Botanical Publishers, Jodhapur.
4. Mishra K.C. (1992)- Manual of Plant Ecology – Oxford & IBH Publication, New delhi.
5. Kochar P.L. (1980) – Plant Ecology – S. Nagin & Co., Jalandhar.
6. Kormandi E.J. (1984)- concept of Ecology- Printice Hall Ind., New Delhi.
7. Asthana R.K. (1998) – Environmental Problems and Solution- S.Chand & Co. Pvt, Ltd., New Delhi.
8. Verma P.S., V.K. Agarwal (1983) – Environmental Biology - S.Chand & Co. Pvt, Ltd., New Delhi.
9. Subramanyam N.S. A.V.S.S. Samburthy (2000)- Ecology- Narosa Publishing House, New Delhi.
10. Sharma D.P. (1993) – Ecology & Environmental Biology- Rastogi Publication, Meerut.
11. Nebel B.J. (1990) – Environmental Science – Printice Hall Indu. Pvt. Ltd. New Delhi.
12. Trivedi R.K. Etal (1987) – Practical Ecology – Anmol Publication, Jodhapur.
13. Rao K.S. (1971) - Fundamentals of Ecology – W.B. Saunders co. Philadelphia.
14. Shukla R.S. & Chandel P.S. (2000) – Plant Ecology – S.Chand & Co. Pvt. Ltd., New delhi.
15. Odum, E.P 1983. Basic Ecology, Saunders, Philadelphia.





D. III Descriptive Answers

21. From Unit 1: Cell Biology: 01 sub question. 1 X 10 = 10
OR
From Unit 2: Morphology of Chromosomes-01 sub question.
22. From Unit 3: Cell division: 01 sub question. 1 X 10 = 10
OR
From Unit 4: Genetics: 01 sub question.
23. From Unit 4: Genetics: 01 sub questions. 1 X 10 = 10
OR
From Unit 5: Evolution: 01 sub question.

B.Sc VI semester

(w.e.f 2016 -17)

Botany paper -II

(Molecular Biology, Biotechnology & Immunology)

50 hrs

Objectives: - Molecular Biology, Biotechnology and Immunology has some recent trends in the concern fields. This will help students to pursue research in concerned fields.

Unit 1: Nucleic Acids: DNA & RNA, occurrence, types and chemical compositions,

Experimental evidences for DNA as genetic material. Structure of DNA, Replication, semiconservative method, RNA and types, post transcription changes.

10 Hrs.

Unit 2: Gene Expression: Gene concept, Genetic code & protein synthesis. Regulation of gene expression in prokaryotes & eukaryotes.

08Hrs.



Unit 3: Recombinant DNA technology and Bioinformatics:

Enzyme, vector (plasmid PBR 322), marker gene, Steps of cloning technique, PCR and its application, Genomic DNA and cDNA library. Brief concept on Genomics and proteomics.

08 Hrs.

Unit 4: Biotechnology and Genetic engineering of plants:

Basic concepts, principles and scope. Aims, strategies for development of transgenic plants (with suitable example). Agrobacterium-The natural genetic engineer. T-DNA and transposon mediated Gene tagging, intellectual, Property rights, possible ecological risks and ethical concerns.

12Hrs.

Unit 5: Microbial genetic manipulation and Immunology:

Microbial genetic manipulation: Bacterial transformation, selection of recombinant and transformants, genetic improvement of industrial microbes, nitrogen fixers & fermentation technology.

Immunology: Immuno-systems, Immunotechniques in Agriculture, ELISA method to detect Plant diseases & Monoclonal antibodies.

12 Hrs.

Practicals:

1. DNA estimation by DPA diphenyl amine method.
2. RNA estimation by orcinol method.
3. Extraction and estimation of protein from plant source.
1) Salt precipitation method 2) solvent method
4. Culturing of Rhizobium-YEMA media.
5. Culturing of Azotobacteria-ASHBY'S media.
6. Demonstration of Electrophoresis technique
7. Agarose gel electrophoresis.
8. Demonstration and comparison of GM Plants with Non GM Plants (BT- Cotton, BT-Brinjal, BT Tomato).
9. Visit to Biotechnology Research Laboratory.



12. ZOOLOGY (Optional)

BSc II Semester Scheme (CBSC - Pattern) Zoology (Optional) Syllabus(Revised) 2017 -18 Onwards

Semesters	Syllabus	Total Hours	Theory & Practical/ Week
II	BIOLOGY OF CHORDATES	50hrs.	4 hrs.
	PRACTICAL	12	4 hrs.

NOTE:

THEORY MARKS			PRACTICAL MARKS		
Internal	Annual	Total Marks	Internal	Annual	Total Marks
20	80	100 marks	10	40	50 marks

Question paper pattern for THEORY examination

Que.No.	Marks	Solve	Total Marks
I	02	10	20
II	04	05	20
III	10	04	40
TOTAL --- 80 MARKS			

PRACTICAL pattern for examination

Que.No.	Solve	Total Marks
I	Dissection (Explain any one system)	08
II	Mounting	04
III	Comparative Anatomy	06
IV	Identification / Spotting (Six)	12
V	Project Report	05
VI	Journal	05
TOTAL --- 40 MARKS		





B.Sc II Semester Syllabus

ZOOLOGY (Optional) 2017-18 Onwards

Total Marks-80

Total Teaching-50hrs.

Biology of Chordates

UNIT-I

Chordates: General characters and classification. **8 hrs**

1. Sub-phylum:Hemichordata-External Characters & Digestive system of Balanoglossus.
2. Sub-phylum:Urochordata- External Characters & Retrogressive metamorphosis in Herdmania.
3. Subphylum:Cephalochordata-ExternalCharacters & feeding mechanism in Branchiostoma.
4. Cyclostomata: External Characters &general organisation of Petromyzon & Myxine(Hagfish/Slime).

UNIT-II

Pisces: General characters & Classification of Pisces up to orders **5hrs** with examples. General characters of Chondrichthyes and Osteichthyes.Type study **Scoliodon**-Externals Characters, Digestive system, Reproductive system and Fish migration.

Amphibia: General characters & classification up to orders with **5hrs** Examples. Type study **Frog**- Externals characters, Digestive system, Circulatory & Reproductive system. Axolotl larva & its significance.

UNIT-III

Reptilia: General characters & classification up to orders with **5hrs** Examples. Type study **Calotes**-Externals characters, Digestive system, Circulatory & Reproductive system. Indian poisonous & non-poisonous snakes.

Aves - General characters & Classification up to orders with. **10hrs** Examples Type study **Pigeon**-Externals characters, Digestive System, Respiratory & Reproductive system. Bird migration, Flight adaptations, Flightless birds, Beak & Feet modification.





UNIT-IV

Mammalia: General characters & classification up to orders with **5hrs**
Examples Type study **Rat**-Externals characters, Digestive System. Circulatory, Nervous, Excretory & Reproductive Systems.

Comparative Anatomy:

Origin, development & structure of Heart, Brain **12 hrs**
and integument in Fishes, Amphibians, Reptiles, Aves and Mammals.

PRACTICALS

		Total Practicals -12
1.	Classification of Urochordata, Cephalochordata, Cyclostomes Examples: Balanoglossus, Herdmania, Branchiostoma. Peteromyzon.	01
2.	Classification of Fishes - Examples: Scoliodon, Pristis, Sphyrna, Catla catla, Labeo rohita, Hippocampus, Eel, Exocoetus & Synaptura.	01
3.	Classification of Amphibia - Examples: Frog, Toad, Ichthyophis, Ambystoma, Axolotl Larva & Rhacophorous.	01
4.	Classification of Reptilia - Examples: Calotes, Hemidactylus, Chaemaleon, Mabuya Draco, Naja naja, Python, Viper, Turtle and Crocodile.	01
5.	Classification of Aves - Examples: Psittacula, Owl, Woodpecker, Pigeon and Passer domesticus.	01
6.	Classification of Mammalia - Examples: Sorex, Bat, Loris, Pangolin, Hystrix, Herpetes & Funambulus.	01
7.	Study of Comparative Anatomy: Heart and Brain in Fishes, Amphibians, Reptiles, Aves and Mammals	02
8.	Explanation & Demonstration in Bony fish/Shark. a). External characters b). Digestive system c). Reproductive system d). Mounting of Brain	04





NOTE:

1. With the help of Charts/Models/Diagrams/Printouts & Xerox Sheets are used in practical's demonstration.
2. As per UGC guidelines **Only one** species to be demonstrated by Faculty & students should not do any dissection.
3. Students are supposed to draw neat labelled diagrams & write The explanation in their journal.
4. In practical examination question no I & II are put Charts/ Models/ Diagrams/ Printouts & Xerox Sheets of the system- Students has to identify & write the explanation in their Examination paper.
5. Compulsory Study Tour/ Field visit to study Animal diversity. (Submission of project report carries- 5 marks).

REFERENCE BOOKS

1. Modern Text Book of Zoology Vertebrate-R.L.Kotpal.
2. Chordata – Dhama & Dhama.
3. Vertebrate- Majapuria.
4. Functional Organization of Vertebrate-- H Nigam & R.Sobti- Shoban Lal Nagin Chand & Co.
5. A manual of Zoology Vertebrates- M.Ekambarnath Ayyar & Swaminathan Ayyar S. Vishwanath Publisher.
6. The Vertebrates Pisces to Mammalia, Hyman L.H. McGraw Hill Co
7. The Vertebrates – Hyman et al.
8. Text Book of Zoology – Parker T.J. & Haswell W.A. Macmillan Co. London.
9. Biology of Chordates by Dr Harish .C. Nigam.Vishal Publication Lucknow.





11.ZOOLOGY (Optional)

**_BSc IV Semester Scheme (CBSC - Pattern)
Zoology (Optional) Syllabus(Revised)
2018 -19 Onwards**

Semesters	Syllabus	Total Hours	Theory & Practical/ Week
IV	Cell Biology, Histology & Animal Behaviors	50hrs.	4 hrs.
	PRACTICAL	12	4 hrs.

NOTE:

THEORY MARKS			PRACTICAL MARKS		
Internal	Annual	Total Marks	Internal	Annual	Total Marks
20	80	100 marks	10	40	50 marks

Question paper pattern for THEORY examination

Que.No.	Marks	Solve	Total Marks
I	02	10	20
II	04	05	20
III	10	04	40
TOTAL --- 80 MARKS			

PRACTICAL pattern for examination

Que.No.	Solve	Total Marks
I	Make a temporary preparation of Histology slide.	10
II	Make a temporary squash preparation of Onion root tip/Grasshopper Testis/Onion flower bud	08
III	Identification (6X2)	12
IV	Field study report & viva	05
V	Journal	05

TOTAL --- 40 MARKS



**B.Sc IV Semester Syllabus Revised (2018-19) Onwards
ZOOLOGY (Optional)**

Total Marks--80

Total Teaching--50hrs.

Cell Biology, Histology & Animal Behaviors



UNIT-I Cell Biology

Cell Biology: Ultra structure of animal cell, Cell theory & cell cycle. **1hr**

Ultra Structure & function of cell organelles: Plasma membrane, Endoplasmic reticulum, Ribosome's, Golgi-complex, Lysosomes, Mitochondria and Nucleus. **8hrs**

UNIT-II Cell Biology

Chromosomes: Structure & types of chromosomes. Ultra structure of chromosome. **2hrs**

Cell division: Types- mitosis & meiosis. **2hrs**

Cellular Aging & Cell Death: Concept of Aging theories, Effect of Aging on Cell organelles. Apoptosis, Necrosis-Definition & significance. **2hrs**

Cancer Biology: Introduction, Characteristics of cancer cells. Carcinogens, cause & prevention. **3hrs**

UNIT-III Histology

Histo chemical Techniques: Cytoplasmic & Nuclear stains. **3hrs**

Preparation of histological slides.

A).Study of histological structure and functions of the following Mammalian organs. **8hrs**

a). Tongue	b). Salivary glands
c). Stomach	d). Intestine
e). Liver	f). Kidney

UNIT-IV Histology

B). Study of histological structure and Endocrine functions of the following Mammalian organs **9hrs**

a) Pituitary	b) Pancreas	c) Adrenal	d) Thyroid
e) Parathyroid	f) Thymus	g) Testes	h) Ovary

UNIT-V Ethology (Animal Behaviour)

Ethology: Introduction Definition, Scope of ethology. Brief Contributions of Konard Lorenz, Niko Tinbergen and Karl Von Frisch. **2hrs**

Types of Animal Behaviour: **7hrs**

- 1). Innate Behaviour: Taxes, Reflexes, Instincts & Motivation.
- 2). Learned Behaviour: Habituation, Imprinting, Conditioned, Reflexes and Insight learning.
- 3). Social behaviour: Types of animal society & Colony in Honey Bees and Monkey troops.
- 4). Territoriality & Courtship Behaviour in Scorpion, Stickle Back Fish & Peacock.
- 5). Study of nesting behavior and mimicry in animal.
- 6). Biological clock, Circadian rhythm and Chronobiology.

Animal Communication: Chemical, visual and Audio. Function of





Signals odours, sounds and light. 2hrs
 Parental care: Concepts, Fishes, Amphibians and Birds. 3hrs

PRACTICALS

		Total Practicals-12 hr
1)	Study of permanent cytology slides of Mitosis & Meiosis.	2hrs
2)	Study of temporary preparation of Mitotic stages from onion Root tip cells.	2hrs
3)	Study of temporary preparation of Meiotic stages from onion Flower bud/Grass Hooper testis.	2hrs
4)	Preparation and observation of permanent histological slides Stomach, Intestine, Liver, Pancreas, Kidney, Adrenal Thyroid, Testis & Ovary.	4hrs
5)	Study of mimicry in leaf insect, Chameleon, Butterflies, Stick Insect, Ants, Wasps and Spiders.	1hr
6)	Study of Nest and nesting material.	1hr
7)	Internal Practical Test	1hr

NOTE:

1. With the help of Charts/Models/Diagrams/Printouts & Xerox Sheets are used in practical demonstration
2. Compulsory field visit to study Mimicry, Habitats and Community.
3. Submission of field visit report carries 5 marks.

REFERENCE BOOKS

1. Introduction to Histology. Gauba R.K. Tata Mc Graw Hill New Delhi.
2. Cells and Tissues: Introduction to Histology ND Cells :Rogers:A.W. AcademicPress .
3. Basic medical Histology :Biology of cells & tissues & organs Kessel R.G. oupNew York.
4. Text Book of Histology :Bloom and Fawcett.Saunders Publ.Philadelphia.
5. Bailey's Text Book of Histology.Bailee Baltimore,Willims andWilkins.
6. Text Book of Ecology : Odum.
7. Introduction to animal behavior:Aubrey Manning and Marian.S.DawkinsCambridge Uni Press.
- 8.Essentials of organizational behavior:Stephan Robbins,Prentice Hall of IndiaNew Delhi.
9. Animal Behaviour :McFarland D ELBS with Longman.
10. Ethology " Barnett.
11. An introduction to Behavioural Ecology J.R. Krebs & N.B. Davies Black wellScientific Publ.
12. Text Book of Animal Behaviour: Fatik Baran mandal. PHI Learning Pvt Ltd newDelhi.
13. Animal Behaviour :Reena Mathur,Rastogi and Coimpani.
14. Cell Biology -Chennarayappa - Unniversity Press





K.L.E. Society's

G.I. Bagewadi Arts, Science, Commerce and PG College, Nipani-591237

Re-accredited at 'A' level by NAAC with CGPA 3.35

Affiliated to Rani Channamma University, Belagavi, Karnataka, India

Website: WWW.Klegibnnpn.edu.in E-mail: klegib_npn@yahoo.co.in Ph: 08338-220116

Ref. No.: GIB/

Date: 05/02/2020

DEPARTMENT OF ZOOLOGY


Field Visit – Study of Mimicry, Habitat and Community

To,
The Principal
K.L.E. Society's
G.I. Bagewadi College, Nipani

Respected sir,

As a part of curriculum we have arranged one day field visit at Aadi(Nipani) on 06/02/2020 for the study of animal behavior for B.Sc. IV Sem students. 40 students have enrolled their names. Dr.Smt.V.R.Naik, and Smt.S.M.Hegade will be accompanying the students. This is for your kind information.

Thanking you Sir,


Head of Department
HOD
Department of Zoology
G.I. Bagewadi NIPANI


Principal
PRINCIPAL
G.I. Bagewadi Arts, Science &
Commerce College, NIPANI.





RANI CHANNAMMA UNIVERSITY, BELAGAVI

WEL-COME

**TO THE COURSE STRUCTRE AND SYLLABUS OF UNDERGRADUATE
PROGRAMMES – B.Sc**

V Semester

w.e.f.

Academic Year 2019-20 and onwards





B Sc V Semester (5.1)
Paper-I
ZOOLOGY (optional)
(Ecology, Evolution, Paleontology, Zoogeography, Wild life Conservation)

Total-hours,50
Marks-80

Ecology.

Earth as Living.-Planet. Sub divisions_of ecology, Scope of ecology, Biosphere
1 hr

Abiotic factors ____
Light, Temperature (Effect on Animals and Plants)
2hr

Biotic Factor
Mutualism,Commensalism,Amensialism,Parasitism,Predation
2hrs
,Competition,Parasitism.

Habitats
4hrs

Freshwater habitat — Lotic and Lentic systems
Zonation of Sea,Marine Biota, Esturine ecology, & Mangrooves
Terrestrial habitat — A brief account of Biomes.

Ecological Adaptations — Freshwater, Marine and Terrestrial.

Biogeochemical Cycles - Principles and concepts of Water, Nitrogen, Carbon,
2hrs

Oxygen cycles

Community Ecology-Community structure, Ecological niches, Edge effect,
Stratification, Ecoton.
2hrs

Population Ecology: Density, natality, mortality.Age distribution

Population growth, types and curves.
2hrs





Evolution.

The Solar System

Origin of Earth , Origin of Life and its theories

03hrs

The geological time scale

03hrs

Fossils: Definition and Kinds of fossils, How fossils are formed, Methods of Preservation. Connecting links and Living fossils. The importance of fossils

02hrs

Theories of Organic Evolution :

06hrs

Lamarckism, Darwinism, Mutation Theory

And the Modern Synthesis Theory;(population gene Pool, Gene Frequency . Variations — gene mutation, chromosomal mutation; Isolation and recombination.Genetic drift,Hardiwienberg equilibrium)

Modes of Evolution : Microevolution, Macroevolution and Mega-evolution.

02 hrs

,Evolution of Man and Horse

04 hrs

Paleontology

Mesozoic reptiles with a note on Dinosaurs.

03 hrs

Zoogeography: Zoogeographical realms of world ,
A brief account of Wallace's line

03 hrs

Wildlife Conservation :

09hrs

Wildlife in India,Causes for the depletion of wildlife.

Wild Life Conservation Techniques', methods'and measures

Brief account of ; IUCN, WWF,Bombay Natural History Society,

Indian Board for Wild Life, Red Data Book.

Wild Life Act 1972 and its amendments in India,CITES.

Project Tiger and Biosphere Reserve.





Total -11 Practicals

- 1; Study of fossils (vertebrate(3) and invertebrate(3)).
1hrs
2. Mesozoic reptiles (Ichthyosaur, tyrannosaur, brontosaur, triceratops, archaeopteryx .
1hr
3. Evolution of man (Homo-erectus. Hemo-habills. Homo-neandertalences)
1hr
4. Evolution of Horse
1hr
- 5 ;Connecting links and living fossils (Neopilina, Peripatus, Limulus, Latimaria; Archaeopteryx and Duckbill platypus)
1hr
- 6 Study of threatened Animals of India (Tiger,Lion,singal horned rhinoceros
1hr
Musk deer,gaur,Golden langur,Loin tailed monkey.Python)
1hr
- 7 ;Estimation of CO_2 from different water samples
1hr
- 8; Estimation of dissolved oxygen
1hr
- 9; Estimation of Total hardness
1hr
- 10;Study of Ecological Adaptations and Morphological peculiarities,;ex-Hermit crab, 1hr
Draco,Stick insect,puffer fish,Exocoetus,Phrynosoma,chamaeleon and Bat.
- 11;Visit to nearby water body to study Ecosystem
1hr

REFERENCE BOOKS:-

Evolution : Odum

Organic Evolution: N.Arumugam

Evolution, Dobzhansky, Ayala, Stebbins & Valantine

Environmental Biology. Rastogi and Company, Meerut

Evolution of the Vertebrates, Colbert E.H. John Wiley and Sons, New York

Ecology; Principles and Application. Chapman, Cambridge university press

Environmental Biology P.R. Trivedi and gurudeep Raj.

Recent Advances in Environmental Biology –Diwan and D.K. Arora

Environmental Science; Eldon. D. Enger and Bradley. F. Smith





Suggestions for Practical Examination

SEM—V-5.I

Q. NO I) Estimation of Carbondioxide/O xgen/Total hardness	8marks
Q.NO II) Evolution (Two spottings)	4 marks
Q NO III) Fossils (Two spottings)	4 marks
Q NO IV) Identification (Zoogeography & Wild life)	4 marks
Q NO V) Project on Local Biodiversity	10 marks
Q NO. VI Viva	5 marks
Q NO. VII Journal	5 marks

Note 1 :- Examiners can alter the Scheme of marks for practical in consultation with the staff of the host college.

marks	Note :2	Theory	Internal	20
marks			Final	80
marks		Practical	Internal	10
marks			Final	40

Note 3: Question paper pattern for THEORY examination

	Q No. 1	02 marks	10* 02	
		= 20 marks		
30 marks	Q No. II	05 marks	06* 05	=
10 marks	Q No. III	10 marks	01* 10	=
10 marks	Q No. IV	10 marks	01* 10	=



Rani Channamma University, Belagavi
B.Sc VI Semester _ 6.1

Paper I

Total hours – 50
Marks _ 80
Theory 4 hrs/week

APPLIED ZOOLOGY (optional)

Sericulture : Mulberry Silkworm and Life History of Bombyx mori

07 hrs

Rearing of Silkworm: Grainage management, Emergence of moth and fertilization, egg laying, hatching and moulting of-silkworm, spinning of cocoons, Cocoon processing, stiffling and spinning silk. Filature. Non mulberry silkwarm, types. in brief & Silkworm diseases- Muscardine, Grasserie, Flacherie & Pebrine.

Apiculture: Species of Honey Bees, their Social organization, Life History
05 hrs
Methods of Bee Keeping, products of Bees, & their Economic importance

Insect Pest Management : Natural control and Applied control of pests
05 hrs

Applied Control __ Mechanical, Physical, Cultural, Legal, Chemical control

Vermiculture: Eearthworm species used in vermiculture,vermiculture technique,and Importance of vermiculture.
04 hrs

Aquaculture :

10 hrs

Prawn Fisheries, Species of Prawns, Culture of freshwater and marine Prawns, Preservation and processing of Prawns.

Pearl Culture : Pearl producing molluscans, Pearl formation, Pearl producing Sites in India. Quality and composition of Pearl. Pearl Industry:Artificial Insertion of nucleus
Brief technique of Fish culture, Preservation of fishes and their Byproducts





Poultry : Breeds of fowl, Diseases of poultry, Poultry maintenance and By-products, and CoMposition and Nutritive value of Egg. 06 hrs

Animal Husbandary: Maintenance, Breeds Diseases, Products and By Products of the following 10 hrs

Sheep and Goats, Cow and Buffalos, Composition and Nutritive value of Milk

Lac culture: Classification of Lac insect (Techardia lacca, Life history of Lac Insect. Host plants, Cultivation of Lac. Compostion and properties & Economic importance 3 hrs.

**Practicals – 6.1
Practicals**

Total -11

1. Project on any of the applied branch studied in theory	1
2. Study of mulberry silkworm and Life cycle	1
3. Types of non mulberry silkworms in brief and Silkworm diseases (Pebrine, Muscardine and Grasserie & Flaturie)	1
4. Species and castes of honeybees	1
5. Agricultural pests and domestic pests (total 8 varieties)	1
6. Study of fisheries __ Molluscs (three), Crustaceans (three) And Pisces (six)	1
7. Study of Varieties of sheep and goat (from chart/photographs)	1
8. Study of varieties of Cow & Buffalos(from chart/photographs)	1
9. Vermiculture__ Study of types of Earthworm species	1
10 Study of poultry breeds	1
11 Study of Lac insect (Life cycle)	1





Scheme for practicals 6.1 APPLIED ZOOLOGY

Q No. I	Sericulture	03 marks
Q No. II	Apiculture	03 marks
Q No. III	Pest management	03 marks
Q No. IV	Pisciculture	03 marks
Q No. V	Vermiculture	03 marks
Q No. VI	Animal Husbandry	06 marks
Q No. VII	Prawn & Pearl culture	04 marks
Q No. VIII	Project report & Viva	10 marks
Q No. IX	Journal	05 marks

Total 40 marks

Note 1 :Examiners can alter the Scheme of marks for practical in consultation With the staff of the host college.

Note 2 : Theory	Internal	20 marks
	Final	80 marks
Practical	Internal	10 marks
	Final	40 marks

Note 3 : Question paper pattern for THEORY examination

Q No. I marks	02 marks	10* 02	= 20
Q No. II marks	05 marks	06* 05	= 30
Q No. III marks	10 marks	01* 10	= 10
Q No. IV marks	10 marks	01* 10	= 10
Q No. V marks	10 marks	01* 10	= 10

Note 4 : Q Nos IIIrd IV & V each should have one internal option



B.Sc Sixth semester (6.2) Paper II (Microbiology and Modern techniques in Biology)

Microbiology (18 Hours)

Microscopy: Compound microscope and its functions. Dark field microscope, Fluorescent microscope, Phase Contrast Microscope and Electron Microscope
Uses of different types of microscopes

Sterilization and other techniques: Physical and chemical methods

Bacteria: Classification based on shapes, structure. Bacterial reproduction and growth.

Virus: Morphology, chemical properties, classification, nomenclature, DNA & RNA viruses

Fungi: Structure, classification and reproduction, Yeasts

Fermentation: Types of fermentor and basic functions. Methods of preservations and criteria for the selection of microorganisms

Production of antibodies: Penicillin, Streptomycin, Enzyme protease, Riboflavin 2

Oral microbial flora of the human body
Role of microbes in environment

Nanotechnology: (5 Hrs)

Introduction, History, Name, Tools and Techniques in Nanotechnology.
Nanobiology - application of Nano in biology- Nano drug administration, diagnostic And therapeutic applications. Lotus effect, Gold and Silver Nanotechnology.
Curcumin phytochemicals, Cinnamon in green nano technology

Bioinformatics (7 Hrs)

Introduction: Definition, Goal of Bioinformatics, Sequencing - Sequences analysis and Structure analysis. Applications of Bioinformatics

Classification of Biological Data Bases. Characteristics of FASTA (Fast Alignment), BLAST (Basic Local Alignment Search Tool)

Aims and goals of Human Genome Project: Main findings of human genome project. Prediction and tools for gene prediction. Comparative genomics

Proteomics: Two dimensional Gel Electrophoresis Mass spectrometry, SDS_PAGE. Structure of protein: Primary, Secondary, Tertiary and Quarternary.



Protein structure prediction [Ab initio modeling Example Rosetta]
Application of Proteome analysis, the future of Proteomics

Methods in Biology (10 Hours)

Techniques of cell fraction and centrifugation.

Homogenization and cell tissue disruption, centrifugation, ultra centrifugation

SMH

DNA sequencing, in situ hybridization, DNA microchips

Genetic engineering in animals - Transgenic mouse, Transgenic sheep,

Genetically altered fish, mosquito and Drosophila.

Gene therapy in Humans

Histochemical and Immunization Techniques: ELISA, RIA, Flow cytometry

Nucleic acid blotting & their applications: Southern blotting, Northern blotting, Western blotting

Radioisotopes: Techniques in Biochemistry. Types of radioactive decay- Alpha, Beta emission & Gamma rays

Biological applications of Radioisotopes

Research Methodology: (10 Hours) KIP

Meaning and objectives of research, motivation in research, research and scientific method, understanding the research problem, Sampling Design (Sample Survey), methods of data collection, analysis of data, Interpretation and report writing, role of computer in research

**Question paper pattern for theory examination
B.Sc Sixth Semester (Paper – II)**

Q. I	2 marks	12 questions to be given	Solve any 10	20 marks
Q. II	5 marks	6 questions to be given	Solve any 5	30 marks
Q. III	10 marks	2 questions to be given	Solve any 1	10 marks
Q. IV	10 marks	2 questions to be given	Solve any 1	10 marks
Q. V	10 marks	2 questions to be given	Solve any 1	10 marks

B.Sc Sixth Semester (Practical II) Practical Syllabus Total Practicals –

1.	Measurement of micro organisms (Micrometry)	1 Practical
2.	Preparation of liquid medium (Broth)	1 Practical
3.	Preparation of solid media (PDA medium and PDA plates)	1 Practical
4.	Preparation of agar slants.	1 Practical
5.	Study of different types of bacteria, viruses and fungi causing diseases in man	1 Practical
6.	Bacterial cell counting using haemocytometer.	1 Practical
7.	Simple and Gram's staining differentiation of bacteria	1 Practical
8.	Isolation, Identification and enumeration of Bacteria/Protozoa from moist soil or sewage water	1 Practical
9.	Practical application of Bioinformatics: Tool BLAST and FASTA to find out sequence of nucleotides in undesired gene/Amino acid in desired protein	1 Practical
10.	Study of Microbiological Lab Equipments: Microscope, Centrifuge, Autoclave, Pressure cooker, Laminar air flow, Streak Plate, Inoculation needle etc.	2 Practicals

Question paper pattern for practical examination

I	Microbiology, Nanotechnology	8
II	Bioinformatics	6
III	Spotting (1 each from bacteria, virus, fungi)	6
IV	Viva	5
V	Submission of detailed report on specific local problem (research)	10
VI	Journal	5

Total 40



19-20



RANI CHANNAMMA UNIVERSITY, BELGAVI
MA English under CBCS Programme
SYLLABUS
(With effect from the academic year 2018-19)

III SEM		IV SEM	
3.1	New Literatures	4.1	European Classics
3.2	Dalit Literature	4.2	English Language Teaching
3.3	Ecocriticism and Indian Writing in English	4.3	Cultural Studies
3.4 a	Post Colonial Literature and Theory- 1	4.4a	Post Colonial Literature and Theory- 3
3.4b	Indian Literatures in Translation- 1	4.4b	Indian Literatures in Translation- 3
3.5a	Post Colonial Literature and Theory- 2	4.5a	Post Colonial Literature and Theory- 4
5b	Indian Literatures in Translation- 2	4.5b	Indian Literatures in Translation- 4
3.6	OEC: Language through Literature	4.6	Project Work

Note:

Students can choose **Postcolonial Literature and Theory** (3.4a, 3.5a and 4.4a, 4.5a)

Or

Indian Literatures in Translation (3.4b, 3.5b and 4.4b, 4.5b) for their specialization.



RANI CHANNAMMA  **UNIVERSITY, BELAGAVI**

Department of Mathematics

Syllabus
for
Master of Science in Mathematics
I to II Semester
(with effect from 2017 – 18)





Choice based credit system (CBCS)

Course structure

Sl. No.	Paper & Title	Credit	No of Hrs/week Theory/ Practical	Duration of exam in Hrs Theory/ Practical	IA Marks Theory/ Practical	Marks at the Exams	Total Marks
I Semester							
1.1	Algebra -I	4	4	3 Hrs	20	80	100
1.2	Topology	4	4	3 Hrs	20	80	100
1.3	Real Analysis	4	4	3 Hrs	20	80	100
1.4	Linear Algebra	4	4	3 Hrs	20	80	100
1.5	Ordinary Differential Equations	4	4	3 Hrs	20	80	100
1.6	Discrete Mathematical Structures	4	4	3 Hrs	20	80	100
II Semester							
2.1	Algebra – II	4	4	3 Hrs	20	80	100
2.2	Complex Analysis	4	4	3 Hrs	20	80	100
2.3	Partial Differential Equations	4	4	3 Hrs	20	80	100
2.4	Functions of Several Variables	4	4	3 Hrs	20	80	100
2.5	Classical Mechanics	4	4	3 Hrs	20	80	100
2.6	Open Elective Course I. Set Theory (Arts & Commerce stream)	4	4	3 Hrs	20	80	100
	II. Integral Transforms (Science stream)						





Department of Mathematics

III Semester							
3.1	Measure Theory & Lebesgue Integration	4	4	3 Hrs	20	80	100
3.2	Differential Geometry	4	4	3 Hrs	20	80	100
3.3	Numerical Analysis	4	4	3 Hrs	20	80	100
3.4	Elective- I	4	4	3 Hrs	20	80	100
	I. Mathematical Finance						
	II. Fluid Mechanics						
	III. Commutative Algebra						
3.5	Elective- II	4	4	3 Hrs	20	80	100
	I. Algebraic Topology						
	II. Number Theory and Cryptology						
	III. Fourier Analysis						
3.6	Open Elective Course	4	4	3 Hrs	20	80	100
	I. Statistics (Arts & Commerce stream) II. Computational Methods (Science stream)						
IV Semester							
4.1	Functional Analysis	4	4	3 Hrs	20	80	100
4.2	Mathematical Methods	4	4	3 Hrs	20	80	100
4.3	Probability Theory	4	4	3 Hrs	20	80	100
4.4	Elective-I	4	4	3 Hrs	20	80	100
	I. Riemannian Geometry						
	II. Advance Graph Theory						
	III. Mathematical modeling						
4.5	Elective-II	4	4	3 Hrs	20	80	100
	I. Advanced Numerical Methods						
	II. Banach Algebra						
	III. Operations Research						
4.6	Project	4	The candidate shall submit a dissertation carrying 80 marks and appear for viva-voce carrying 20 marks				100
	Total		96				





Department of Mathematics

4.6 PROJECT

The candidate shall submit a dissertation carrying 80 marks and appear for viva-voce carrying 20 marks.





19-20



RANI CHANNAMMA UNIVERSITY, BELAGAVI.

Department of Post Graduate Studies and Research in Commerce



Syllabus of Master of Commerce

(With effect from Academic Year 2017-18)

IV Semester





M.Com Course Structure

Sem	Paper Code	Course	IA Marks	Sem End Marks	Total	Hrs/Week	Credits	
III	3.1	Business Research Methods	20	80	100	04	04	
	3.2	International Financial Management	20	80	100	04	04	
	Group- A : Accounting and Finance							
	3.3 A	Financial Markets and Institutions	20	80	100	04	04	
	3.4 A	Corporate Accounting	20	80	100	04	04	
	3.5 A	Accounting for Specialised Institutions	20	80	100	04	04	
	Group- B: Cost Accounting							
	3.3 B	Production and Operation Management	20	80	100	04	04	
	3.4 B	Cost Management	20	80	100	04	04	
	3.5 B	Cost Accounting Standards	20	80	100	04	04	
	Group - C: Banking							
	3.3 C	Bank Marketing	20	80	100	04	04	
	3.4 C	Banking in India	20	80	100	04	04	
	3.5 C	Management Accounting for Bankers	20	80	100	04	04	
	Open Elective Course							
	3.6	To be chosen from the other Department	20	80	100	04	04	
		Open Elective Course meant for other Departments - Personal Financial Planning	20	80	100	04	04	
		Total Marks/Credits	120	480	600	24	24	
	IV	4.1	E-Commerce	20	80	100	04	04
		4.2	International Business	20	80	100	04	04
4.3		Project Report	50	50	100	04	04	
Group A: Accounting and Finance								
4.4 A		Security Analysis and Portfolio Management	20	80	100	04	04	
4.5 A		Innovations in Accounting	20	80	100	04	04	
4.6 A		Mutual Funds	20	80	100	04	04	
Group- B: Cost Accounting								
4.4 B		Techniques of Costing	20	80	100	04	04	
4.5 B		Strategic Cost Management	20	80	100	04	04	
4.6 B		Recent Developments in Cost Accounting	20	80	100	04	04	
Group - C: Banking								
4.4 C		Foreign Exchange and Risk Management	20	80	100	04	04	
4.5 C		Financial Management in Commercial Banks	20	80	100	04	04	
4.6 C	Fund Management in Commercial Banks	20	80	100	04	04		
	Total Marks/Credits	150	450	600	24	24		





Group – II

OPTIONAL / COMPULSORY SUBJECT FOR THE DEGREE IN SCIENCE SUBJECTS

Science Subjects: (any three subject of equal importance to be chosen as per the grouping given by Rani Channamma University, Belagavi)
DETAILED SYLLABUS OF FOLLOWING PAPERS WITH PRACTICALS

1. BOTANY (optional)

B.Sc. III Semester (w.e.f: 2018 – 19) and onwards.

Subject: BOTANY (optional)

Paper:- Diversity of Cryptogams (Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms). 52 Hrs

Unit I: Algae	10 hrs.
General characters, Pigmentation, Classification by Fritsch (up to class level). Distribution, thallus structure, reproduction and life cycle of Nostoc, Volvox, Oedogonium, Sargassum and Batrachospermum. Economic importance.	
Unit II: Fungi	08 hrs.
General characters, Classification (Alexopoulos's system). Distribution, Structure, Reproduction and life cycle of Albugo, Rhizopus, Penicillium and Puccinia. Economic importance of fungi. General account of lichens.	
Unit III: Plant Pathology	06 hrs.
General account of Bacteria and Viruses. Introduction and general symptoms of plant diseases. Symptoms, Pathogens and control measures of Late blight of potato, White rust of crucifers, Tikka disease of ground nut.	
Unit IV: Bryophytes	06 hrs.
General characters, Classification (Smith). Structure, reproduction and schematic life cycle of Riccia, Anthoceros and Funaria. (Developmental details are not expected). Evolution of sporophytes.	
Unit V: Pteridophytes	10 hrs.
General characters and classification. Distribution, Structure (External and Internal) and Reproduction of Psilotum, Selaginella, Equisetum and Nephrolepis (Developmental details are not expected). Stellar evolution. Heterospory and seed habit	
Unit VI: Gymnosperms	08 hrs.
General characters and classification. Distribution, Structure (External and Internal) and Reproduction of Cycas, Pinus and Gnetum (Developmental details are not expected).	
Unit VII: Paleobotany	04 hrs.
Geological time scale, fossilization-molds, Impression, Petrification and cast. Study of fossils - Calamitis, Lepidodendron, Lygenopteris.	





B.Sc. III Semester PRACTICALS

Total number of hours per week: 04, Internal Assessment=10 Marks, Max Marks: 40 Marks

1. Vegetative and reproductive structures of Nostoc, Volvox and Oedogonium.
2. Vegetative and reproductive structures of Sargassum and Batrachospermum
3. Vegetative, reproductive structures and disease symptoms of Albugo, Rhizopus and Penicillium.
4. Vegetative, reproductive structures and disease symptoms of Puccinia. Lichens
5. Study of Vegetative and Reproductive structures of Riccia, Anthoceros and Funeria.
6. Study of Vegetative and Reproductive structures of Psilotum and Selaginella.
7. Study of Vegetative and Reproductive structures of Equisetum and Nephrolepis.
8. Study of Vegetative and Reproductive structures of Cycas, Pinus and Gnetum.
9. Disease symptoms and control measures of Late blight of potato, Black rust of Wheat, Tikka disease of ground nut.
10. Paleobotany- Study of fossils Lepidodendron, Calamitis, Lygenopteris.

11. Field visits.

Suggested Readings:

Smith G.M.1971 vol 1 Algae and fungi. Tata McGraw HILL Publishing company New Delhi
 Sharma O.P. 1992 Text book of thallophytes McGraw Hill Publication
 Sharma P.D. 1991 The fungi Rastogi and Co Meerut

Dubey H.C.1990An Introduction to Fungi Vikas Publishing House Pvt Ltd
 Dehli Clifton, A 1958 Introduction to Bacteria McGraw Hill and Co New York

Basu A.N.1993 Essentials of plant viruses, vectors plant diseases New Age International New Delhi.
 Chopra G.L. A text book of algae Rastogi and co Meerut

Rangaswami G 1998 Diseases of crop plants in India. Prentice Hall of India New Delhi.
 Sunderrajan S 1997 College Botany Vol 1. S. Chand and Co Ltd New Dehli
 Alexopoulos, 1992 An Introduction to Mycology. New Age International. New Dehli
 Vashista B.R. 1978 Fungi. S. Chand and co. Ltd. New Delhi

B.Sc. III Semester Botany Practical Examination

Time: 4 Hours

Max Marks: 40

- | | |
|--|----------|
| Q1: Identify and classify specimens A, B, C giving reasons. | 09 marks |
| Q2: Identify and explain the internal structures of specimen D and E with the neat labelled diagrams
(Show the preparation to the examiner) | 10 marks |
| Q 3: Identify & describe the salient features in the slides/ specimens E, F, G, H, I and J | 12 marks |
| Q4: Identify & describe the salient features in the fossil specimen K. | 03 marks |
| Journal | 04 marks |
| Field visit report | 03 marks |





Group – II

OPTIONAL / COMPULSORY SUBJECT FOR THE DEGREE IN SCIENCE SUBJECTS

RANI CHANNAMMA UNIVERSITY, BELAGAVI.

B.Sc. IV Semester (w.e.f: 2018 – 19) and onwards.

Subject: BOTANY (optional)

Paper: Diversity of Angiosperms and their systematics, Economic botany and Medicinal botany

52 hrs.

Unit I: Morphology of Angiosperms:

07 hrs.

Study of stems and its modifications, Leaf- types, stipules, Phyllotaxy and their modifications. Study of Inflorescences, flowers (Floral formula and Floral diagram to be included) and fruits.

Unit II: Angiosperm systematics:

10 hrs.

Botanical nomenclature- principles and rules, taxonomic ranks, type concept and principle of priority. Botanical survey of India. Classification of Angiosperms: Systems proposed by Bentham and Hooker, Engler Prantl. Their salient features, merits and demerits. Brief account of APG classification.

Contributions of Cytology (Cytotaxonomy), Phytochemistry (Chemotaxonomy) and Taximetrics (Numerical taxonomy) to taxonomy.

Unit III: Diversity of flowering plants as illustrated by members of the following families:

20hrs

Annonaceae, Brassicaceae, Malvaceae, Rutaceae, Rhamnaceae, Fabaceae, Myrtaceae, Combretaceae, Cucurbitaceae, Apiceae, Rubiaceae, Asteraceae, Apocyanaceae, Asclepiadaceae, Convolvulaceae, Solanaceae, Acanthaceae, Verbenaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Orchidaceae, Liliaceae, Arecaceae and Poaceae.

Unit IV: Economic Botany:

10 hrs

Origin & Distribution, Family, Botanical name and utility of following plants-

Food plants: Rice, Wheat, Maize, Pulses (Bengal gram, Pigeon pea) and Sugarcane

Fibres: Cotton, Jute.

Oil yielding plants: Ground nut, Sunflower, Palm oil, Sandalwood and Citronella oils

Paper & pulp: Bamboo & Eucalyptus

Spices: Ginger, Clove, Cinnamon, Asafoetida and Cardamom

Beverages: Tea & Coffee

Rubber: Hevea sp.

Unit V: Medicinal botany:

05hrs

Common medicinal plants in primary health care: -

Tippateega (*Tinosporacordifolia*), Tulsi (*Oscimumsanctum*) Kalabanda (*Aloe-vera*)

Turmeric (*Curcuma longa*) Ashwagandha (*Withaniasomnifera*) and Sarpagandha (*Rauwolfiaserpentina*)



**Practicals:-**

1. Morphology of Root, Stem, Leaf and their modifications.
2. Study of Inflorescence and its types.
3. Study of Flower-I- Descriptive terms, Thalamus, Calyx, Corolla and aestivation.
4. Study of Flower-II –Androecium and Gynoecium. Floral formula and Floral diagram.
5. Study of Fruit types.
6. Study of any 18 families representing from polypetalae, gamopetalae, apatalae and monocots available in the locality.
8. Economic botany and Study of Medicinal Plants (as per syllabus) available in the locality.
9. Study Tour for minimum Two days to study the Flora (Taxonomy).

Suggested readings:

1. Davis, P.H. and Heywood, V.H. 1963. Principles of angiosperm taxonomy. Oliver and Boyd, London.
2. Heywood, V.H. and Moore, D.M. (eds) 1984. Current concepts in plant taxonomy academic press, London
3. Jeffery, C. 1982. An introduction to plant taxonomy. Cambridge university press, Cambridge, London.
4. Jones, S.B. Jr and Luchsinger, A.E. 1986. Plant systematics (2nd edition). McGraw Hill book co, New York.
5. Radford, A.E. 1986. Fundamentals of plant systematics. Harper and Row, New York.
6. Singh, G. 1999. Plant systematics; theory and practice. Oxford and IBH, New Delhi.
7. Atace, C.A. 1989. Plant taxonomy and bio systematics (2nd edition). Edward Arnold, London.
8. Dutta, S.C. 1988. Systematic botany. Walleyeastern, New Delhi.
9. Jaques, H.E. 1999. Plant families- how to know them. IBS, New Delhi.
10. Lawrence, G.H.M. 1951. Taxonomy of vascular plants. Macmillan, New Delhi.
11. Stewart, W.M. 1983. Paleobotany and the evolution of plants, Cambridge university press, Cambridge.
12. Joshi S.G. Medicinal plants Oxford and IBH New Delhi.
13. Kokate and Gokeale _pharmacognacy. Nerali publication, New Delhi.
14. Lad v Ayurveda- the science of self-healing- motilal banarasidas, New Delhi.
15. Lewis W.H. and M.P.F Elwin Lewis 1976, Medical Botany plants affecting human health. A Wiley interscience publication, John Wiley and sons New York.
16. College botany vol 1 by Gangulee, Das and Datta. New central book agency, Calcutta.
17. Systematic botany by R.N Sutaria.
18. Taxonomy of Angiosperms by B.P. Pandey.
19. Kocchar, S.L. 1998. Economic Botany in Tropics. 2nd edition, Macmillan Ltd, New Delhi.
20. Sambamurthy, A.V.S.S and Subramanyam, N.S. 1989. A Text Book of Economic Botany, Wiley Eastern Ltd. New Delhi.
21. Sharma, O.P. 1996. Hill's Economic Botany. Tata McGraw Hill Co., Ltd., New Delhi.
22. Simpson, B.B. and Conner-Ogorzaly, M. 1986. Economic Botany-plants in our world. McGraw Hill, New York.
23. Hill, A.F. 1989. Economic Botany. Tata McGraw-Hill, New York.
24. Herbs Cultivation and Medicinal Uses- H. Panda – NIIR Publication, New Delhi.
25. Chopra R.N., Badhuvar R.L. & Ghosh G. (1965) - Poisons Plant of India.





17/8

B.Sc. V Semester
(w.e.f : 2016 – 17)
Botany Paper – I
Paper-I: Plant Breeding, Tissue Culture & Horticultural Practices. 50 Hrs

Objectives: This paper includes some topics in horticulture like- Nursery, Green House Technology, Harvest and Weed Management. These will be of much help to the students residing in rural and urban areas to generate employment.

Unit 1: Plant Breeding: History and objectives. Introduction, Selection (Pure line, Mass election), Hybridization- inter specific and inter generic. Mutational & Polyploidy breeding. Germ plasm and its maintenance. Pollen Bank, Quarantine method. **10 Hrs.**

Unit 2: Plant Tissue Culture: Scope and Significance. Basic Aspects and Cellular totipotency (Shoot tip, Embryo and Haploid culture techniques). Differentiation and morphogenesis. **10 Hrs.**

Unit 3: Introduction to Horticulture, Nursery management and importance.
Methods of propagation – vegetative – rhizome, bulb, corm and sucker (natural).
Artificial- Cutting, layering, grafting and budding. Bonsai – methods and importance.
Nursery management: Introduction, types of nurseries and cultural practices. Seed (propagule) collection, storage and treatment. Manures, fertilizers and pesticides. Methods of irrigation – drip, sprinkler and flood. **12 Hrs.**

Unit 4: Green House Technology – Introduction, advantages and limitations.
Types of Green Houses- Green House structure, principle
Green house technology as applied to ornamental, vegetable and fruit plants. **08 Hrs.**

Unit 5: Harvest Technology and Weed Management:
Harvest Technology: Flower and fruit plants management. Artificial ripening, maturity indices, methods of picking. Post-harvest technology and management of fruits: grading, processing, storage and packing.
Weed Management: Introduction and significance. Invasive weeds – concept and causes of their dominance. Weed control – physical, chemical and biological methods. **10 Hrs.**

Practicals :

1. Study of methods of propagation with help of tubers, bulbs rhizomes, corms, suckers, runner and offset.
2. Study of propagation by cutting, layering, grafting and budding.
3. Methods of emasculation and bagging for cross-pollination.
4. Morphology and anatomy of dry and wet stigma.
5. Morphology and anatomy of solid and hollow styles.
6. Study of pollination types.
7. Demonstration of tissue culture techniques.
8. Visit to nursery - poly house /Green house and tissue culture lab.
9. Preparation of MS media for culture.
10. Bonsai techniques.





Semester V

(w.e.f 2016-17)

Botany Paper – II

Paper-II: Ecology, Environmental Biology and Phytogeography

50 hrs

Objectives:- This paper has topics on pollution, pollution control and forestry. Considering the present scenario with respect to environment these topics are most valuable.

Unit 1: Plant and environment: Atmosphere (gaseous composition), water (properties of water cycle), light (global radiation, photo synthetically active radiation), temperature, soil (development, soil profiles, physico-chemical properties), and biota.

Morphological, anatomical and physiological responses of plants to water (hydrophytes, xerophytes and epiphytes), temperature (thermoperiodicity and vernalization), light (photoperiodism, heliophytes and sciophytes) and salinity.

12 Hrs.

Unit 2: Population ecology and Ecosystems: Growth curves; ecotypes; ecads, Ecological succession-hydrach and xerarch. Structure of Ecosystems (Pond and Forest): abiotic and biotic components; food chain, food web, ecological pyramids, energy flow.

10 Hrs.

Unit 3: Phytogeography: Botanical regions of world, Vegetation types of Karnataka and India.

06 Hrs.

Unit 4: Conservation of Natural resources: Different types of natural resources and their conservation.

Forest and Forest Management: Forest and its ecological significance, deforestation, forest management and social forestry. Natural depletion of vegetation endangered and threatened economic plants of India and red data book. Wild life management in India, Indian board of wild life, national park and sanctuary.





Energy resources: conventional and non conventional sources of energy.

Biodiversity: significance, types, depletion, conservation of biodiversity.

12 Hrs.

Unit 5: Pollution: Introduction, causes, effects and control measures of Water pollution, Air pollution, Soil pollution, Acid rain, Global warming, and Ozone depletion.

Sewage water and waste water types. Methods of effluent treatment of industrial waste water, sludge disposal and its care related to environment.

10 Hrs.

Practical:

1. Study of frequency and density of herbaceous plants by quadrat method.
2. To determine moisture content and water holding capacity of different types of soils.
3. To estimate the alkalinity of water samples.
4. Ecological instruments.
5. Morphology and anatomical adaptations in three hydrophytes.
6. Morphology and anatomical adaptations in xerophytes: One succulent and one non-succulent, one epiphyte and one halophyte.
7. Waste water analysis, physical chemical parameter, pH, turbidity, TDS, BOD, COD, temperature and any other inorganic elements.
8. Visit to effluent treatment plant to study recycling of waste water near by industry and study the effect of industrial pollution nearby water bodies (Biomagnification & Eutrophication).
9. Assignment of Project related to practical number eight.



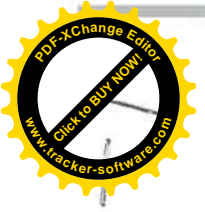


10. Study Tour of minimum two days to study forest types and ecological groups.

Books for Reference:

1. Sharma P.D. (1993)-Ecology and Environment – Rastogi Publication, New Delhi.
2. Mishra R. -- Ecology Work Book- Oxford and IBH, New Delhi.
3. Agarwal K.C. (1993)- Environmental Biology- Agro Botanical Publishers, Jodhapur.
4. Mishra K.C. (1992)- Manual of Plant Ecology – Oxford & IBH Publication, New delhi.
5. Kochar P.L. (1980) – Plant Ecology – S. Nagin & Co., Jalandhar.
6. Karmandi E.J. (1984)- concept of Ecology- Printice Hall Ind., New Delhi.
7. Asthana R.K. (1998) – Environmental Problems and Solution- S.Chand & Co. Pvt. Ltd., New Delhi.
8. Verma P.S., V.K. Agarwal (1983) – Environmental Biology - S.Chand & Co. Pvt. Ltd., New Delhi.
9. Subramanyam N.S. A.V.S.S. Samburthy (2000)- Ecology- Narosa Publishing House, New Delhi.
10. Sharma O.P. (1993) – Ecology & Environmental Biology- Rastogi Publication, Meerut.
11. Nebel B.J. (1990) – Environmental Science – Printice Hall Indu. Pvt. Ltd. New Delhi.
12. Trivedi R.K. Etal (1987) – Practical Ecology – Anmol Publication, Jodhapur.
13. Rao K.S. (1971) - Fundamentals of Ecology – W.B. Saunders co. Philadelphia.
14. Shukla R.S. & Chandel P.S. (2000) – Plant Ecology – S.Chand & Co. Pvt. Ltd., New delhi.
15. Odum, E.P 1983. Basic Ecology, Saunders, Philadelphia.





Q. III Descriptive Answers

21. From Unit 1: Cell Biology: 01 sub question. 1 X 10 = 10
OR
From Unit 2: Morphology of Chromosomes-01 sub question.
22. From Unit 3: Cell division: 01 sub question. 1 X 10 = 10
OR
From Unit 4: Genetics: 01 sub question.
23. From Unit 4: Genetics: 01 sub questions. 1 X 10 = 10
OR
From Unit 5: Evolution: 01 sub question.

B.Sc VI semester
(w.e.f 2016 -17)
Botany paper -II
(Molecular Biology, Biotechnology & Immunology)

50 hrs

Objectives: - Molecular Biology, Biotechnology and Immunology has some recent trends in the concern fields. This will help students to pursue research in concerned fields.

Unit 1: Nucleic Acids: DNA & RNA, occurrence, types and chemical compositions,

Experimental evidences for DNA as genetic material. Structure of DNA, Replication, semiconservative method, RNA and types, post transcription changes.

10 Hrs.

Unit 2: Gene Expression: Gene concept, Genetic code & protein synthesis. Regulation of gene expression in prokaryotes & eukaryotes.

08Hrs.





Unit 3: Recombinant DNA technology and Bioinformatics:

Enzyme, vector (plasmid PBR 322), marker gene, Steps of cloning technique, PCR and its application, Genomic DNA and cDNA library. Brief concept on Genomics and proteomics.

08 Hrs.

Unit 4: Biotechnology and Genetic engineering of plants:

Basic concepts, principles and scope. Aims, strategies for development of transgenic plants (with suitable example). Agrobacterium-The natural genetic engineer. T-DNA and transposon mediated Gene tagging, intellectual. Property rights, possible ecological risks and ethical concerns.

12Hrs.

Unit 5: Microbial genetic manipulation and Immunology:

Microbial genetic manipulation: Bacterial transformation, selection of recombinant and transformants, genetic improvement of industrial microbes, nitrogen fixers & fermentation technology.

Immunology: Immuno-systems, Immunotechniques in Agriculture, ELISA method to detect Plant diseases & Monoclonal antibodies.

12 Hrs.

Practicals:

1. DNA estimation by DPA diphenyl amine method.
2. RNA estimation by orcinol method.
3. Extraction and estimation of protein from plant source.
1) Salt precipitation method 2) solvent method
4. Culturing of Rhizobium-YEMA media.
5. Culturing of Azotobacteria-ASHBY'S media.
6. Demonstration of Electrophoresis technique
7. Agarose gel electrophoresis.
8. Demonstration and comparison of GM Plants with Non GM Plants (BT- Cotton, BT-Brinjal, BT Tomato).
9. Visit to Biotechnology Research Laboratory.





Suggested Reading:

1. Cell & Molecular Biology -- By E.D.F. De Robertis -- ISE Publication
2. Basic Biotechnology -- Colin Rateledge & Bjorn Kristiansen -- Cambridge Uni. Press.
3. A Text Book of Biotechnology - R.C. Dubey - S. Chand Publication
4. Cell Biology, Genetics Molecular Biology, Evolution & Ecology -- P.S. Verma & V. K. Agarwal
5. Casida L.E. (1984)- Industrial Microbiology, Wiley Easterbs, New Delhi.
6. Roitt- Immunology
7. Kubey - Immunology.
8. Fatima - Immunology

B.Sc. VI Semester

Practical Paper-II

(Molecular Biology, Biotechnology & Immunology)

Time: 4 Hours

Max Marks: 40

- | | |
|---|----------|
| Q.1. Estimation of DNA/RNA from the given sample A. | 10 Marks |
| Q.2. Estimation of Protein from the unknown sample B. | 10 Marks |
| Q.3. Identify and comment C and D. | 5 Marks |

Project report submission and Viva voce.	10 Marks.
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Journal.	05 Marks
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12. ZOOLOGY (Optional)

BSc II Semester Scheme (CBSC - Pattern) Zoology (Optional) Syllabus(Revised) 2017 -18 Onwards

Semesters	Syllabus	Total Hours	Theory & Practical/ Week
II	BIOLOGY OF CHORDATES	50hrs.	4 hrs.
	PRACTICAL	12	4 hrs.

NOTE:

THEORY MARKS			PRACTICAL MARKS		
Internal	Annual	Total Marks	Internal	Annual	Total Marks
20	80	100 marks	10	40	50 marks

Question paper pattern for THEORY examination

Que.No.	Marks	Solve	Total Marks
I	02	10	20
II	04	05	20
III	10	04	40
			TOTAL --- 80 MARKS

PRACTICAL pattern for examination

Que.No.	Solve	Total Marks
I	Dissection (Explain any one system)	08
II	Mounting	04
III	Comparative Anatomy	06
IV	Identification / Spotting (Six)	12
V	Project Report	05
VI	Journal	05
		TOTAL --- 40 MARKS





B.Sc II Semester Syllabus

ZOOLOGY (Optional) 2017-18 Onwards

Total Marks-80

Total Teaching-50hrs.

Biology of Chordates

UNIT-I

Chordates: General characters and classification. **8 hrs**

1. Sub-phylum:Hemichordata-External Characters & Digestive system of Balanoglossus.
2. Sub-phylum:Urochordata- External Characters & Retrogressive metamorphosis in Herdmania.
3. Subphylum:Cephalochordata-ExternalCharacters & feeding mechanism in Branchiostoma.
4. Cyclostomata: External Characters & general organisation of Petromyzon & Myxine(Hagfish/Slime).

UNIT-II

Pisces: General characters & Classification of Pisces up to orders **5hrs** with examples. General characters of Chondrichthyes and Osteichthyes.Type study **Scoliodon**-Externals Characters, Digestive system, Reproductive system and Fish migration.

Amphibia: General characters & classification up to orders with **5hrs** Examples. Type study **Frog**- Externals characters, Digestive system, Circulatory & Reproductive system. Axolotl larva & its significance.

UNIT-III

Reptilia: General characters & classification up to orders with **5hrs** Examples. Type study **Calotes**-Externals characters, Digestive system, Circulatory & Reproductive system. Indian poisonous & non-poisonous snakes.

Aves - General characters & Classification up to orders with. **10hrs** Examples Type study **Pigeon**-Externals characters, Digestive System, Respiratory & Reproductive system. Bird migration, Flight adaptations, Flightless birds, Beak & Feet modification.





UNIT-IV

Mammalia: General characters & classification up to orders with 5hrs
Examples Type study **Rat**-Externals characters, Digestive System. Circulatory, Nervous, Excretory & Reproductive Systems.

Comparative Anatomy:
Origin, development & structure of Heart, Brain 12 hrs
and integument in Fishes, Amphibians, Reptiles, Aves and Mammals.

PRACTICALS

- | | | Total Practicals -12 |
|----|---|-----------------------------|
| 1. | Classification of Urochordata, Cephalochordata, Cyclostomes
<u>Examples:</u> Balanoglossus, Herdmania, Branchiostoma.
Peteromyzon. | 01 |
| 2. | Classification of Fishes -
<u>Examples:</u> Scoliodon, Pristis, Sphyrna, Catla catla,
Labeo rohita, Hippocampus, Eel, Exocoetus
& Synaptura. | 01 |
| 3. | Classification of Amphibia -
<u>Examples:</u> Frog, Toad, Ichthyophis, Ambystoma, Axolotl
Larva & Rhacophorous. | 01 |
| 4. | Classification of Reptilia -
<u>Examples:</u> Calotes, Hemidactylus, Chaemaleon, Mabuya
Draco, Naja naja, Python, Viper, Turtle and
Crocodile. | 01 |
| 5. | Classification of Aves -
<u>Examples:</u> Psittacula, Owl, Woodpecker, Pigeon and
Passer domesticus. | 01 |
| 6. | Classification of Mammalia -
<u>Examples:</u> Sorex, Bat, Loris, Pangolin, Hystrix, Herpetes
& Funambulus. | 01 |
| 7. | Study of Comparative Anatomy:
Heart and Brain in Fishes, Amphibians, Reptiles,
Aves and Mammals | 02 |
| 8. | Explanation & Demonstration in Bony fish/Shark.
a). External characters
b). Digestive system
c). Reproductive system
d). Mounting of Brain | 04 |





NOTE:

1. With the help of Charts/Models/Diagrams/Printouts & Xerox Sheets are used in practical's demonstration.
2. As per UGC guidelines **Only one** species to be demonstrated by Faculty & students should not do any dissection.
3. Students are supposed to draw neat labelled diagrams & write The explanation in their journal.
4. In practical examination question no I & II are put Charts/ Models/ Diagrams/ Printouts & Xerox Sheets of the system- Students has to identify& write the explanation in their Examination paper.
5. Compulsory Study Tour/ Field visit to study Animal diversity. (Submission of project report carries- 5 marks).

REFERENCE BOOKS

1. Modern Text Book of Zoology Vertebrate-R.L.Kotpal.
2. Chordata – Dhami & Dhami.
3. Vertebrate- Majapuria.
4. Functional Organization of Vertebrate-- H Nigam & R.Sobti- Shoban Lal Nagin Chand & Co.
5. A manual of Zoology Vertebrates- M.Ekambarnath Ayyar & Swaminathan Ayyar S. Vishwanath Publisher.
6. The Vertebrates Pisces to Mammalia, Hyman L.H. McGraw Hill Co
7. The Vertebrates – Hyman et al.
8. Text Book of Zoology – Parker T.J. & Haswell W.A. Macmillan Co. London.
9. Biology of Chordates by Dr Harish .C. Nigam.Vishal Publication Lucknow.





11.ZOOLOGY (Optional)

**_BSc IV Semester Scheme (CBSC - Pattern)
Zooology (Optional) Syllabus(Revised)
2018 -19 Onwards**

Semesters	Syllabus	Total Hours	Theory & Practical/ Week
IV	Cell Biology, Histology & Animal Behaviors	50hrs.	4 hrs.
	PRACTICAL	12	4 hrs.

NOTE:

THEORY MARKS			PRACTICAL MARKS		
Internal	Annual	Total Marks	Internal	Annual	Total Marks
20	80	100 marks	10	40	50 marks

Question paper pattern for THEORY examination

Que.No.	Marks	Solve	Total Marks
I	02	10	20
II	04	05	20
III	10	04	40
TOTAL -- 80 MARKS			

PRACTICAL pattern for examination

Que.No.	Solve	Total Marks
I	Make a temporary preparation of Histology slide.	10
II	Make a temporary squash preparation of Onion root tip/Grasshopper Testis/Onion flower bud	08
III	Identification (6X2)	12
IV	Field study report & viva	05
V	Journal	05
TOTAL -- 40 MARKS		

**B.Sc IV Semester Syllabus Revised (2018-19) Onwards
ZOOLOGY (Optional)**

Total Marks--80

Total Teaching--50hrs.

Cell Biology, Histology & Animal Behaviors





UNIT-I Cell Biology

Cell Biology: Ultra structure of animal cell, Cell theory & cell cycle. **1hr**
Ultra Structure & function of cell organelles: Plasma membrane, Endoplasmic reticulum, Ribosome's, Golgi-complex, Lysosomes, Mitochondria and Nucleus. **8hrs**

UNIT-II Cell Biology

Chromosomes: Structure & types of chromosomes. Ultra structure of chromosome. **2hrs**
Cell division: Types- mitosis & meiosis. **2hrs**
Cellular Aging & Cell Death: Concept of Aging theories, Effect of Aging on Cell organelles. Apoptosis, Necrosis-Definition & significance. **2hrs**
Cancer Biology: Introduction, Characteristics of cancer cells. Carcinogens, cause & prevention. **3hrs**

UNIT-III Histology

Histo chemical Techniques: Cytoplasmic & Nuclear stains. **3hrs**
 Preparation of histological slides.
A). Study of histological structure and functions of the following Mammalian organs. **8hrs**

a). Tongue	b). Salivary glands
c). Stomach	d). Intestine
e). Liver	f). Kidney

UNIT-IV Histology

B). Study of histological structure and Endocrine functions of the following Mammalian organs **9hrs**

a) Pituitary	b) Pancreas	c) Adrenal	d) Thyroid
e) Parathyroid	f) Thymus	g) Testes	h) Ovary

UNIT-V Ethology (Animal Behaviour)

Ethology: Introduction Definition, Scope of ethology. Brief Contributions of Konard Lorenz, Niko Tinbergen and Karl Von Frisch. **2hrs**

Types of Animal Behaviour: **7hrs**

- 1). **Innate Behaviour:** Taxes, Reflexes, Instincts & Motivation.
- 2). **Learned Behaviour:** Habituation, Imprinting, Conditioned, Reflexes and Insight learning.
- 3). **Social behaviour:** Types of animal society & Colony in Honey Bees and Monkey troops.
- 4). **Territoriality & Courtship Behaviour** in Scorpion, Stickle Back Fish & Peacock.
- 5). **Study of nesting** behavior and mimicry in animal.
- 6). **Biological clock,** Circadian rhythm and Chronobiology.

Animal Communication: Chemical, visual and Audio. Function of





Signals odours, sounds and light. 2hrs
 Parental care: Concepts, Fishes, Amphibians and Birds. 3hrs

PRACTICALS

	Total Practicals-12 hr
1) Study of permanent cytology slides of Mitosis & Meiosis.	2hrs
2) Study of temporary preparation of Mitotic stages from onion Root tip cells.	2hrs
3) Study of temporary preparation of Meiotic stages from onion Flower bud/Grass Hooper testis.	2hrs
4) Preparation and observation of permanent histological slides Stomach, Intestine, Liver, Pancreas, Kidney, Adrenal Thyroid, Testis &Ovary.	4hrs
5) Study of mimicry in leaf insect, Chameleon, Butterflies, Stick Insect, Ants, Wasps and Spiders.	1hr
6) Study of Nest and nesting material.	1hr
7) Internal Practical Test	1hr

NOTE:

1. With the help of Charts/Models/Diagrams/Printouts & Xerox Sheets are used in practical demonstration
2. Compulsory field visit to study Mimicry, Habitats and Community.
3. Submission of field visit report carries 5 marks.

REFERENCE BOOKS

1. Introduction to Histology. Gauba R.K. Tata Mc Graw Hill New Delhi.
2. Cells and Tissues: Introduction to Histology ND Cells :Rogers:A.W. AcademicPress .
3. Basic medical Histology :Biology of cells & tissues & organs Kessel R.G. oupNew York.
4. Text Book of Histology :Bloom and Fawcett.Saunders Publ.Philadelphia.
5. Bailey's Text Book of Histology.Bailee Baltimore,Willims andWilkins.
6. Text Book of Ecology : Odum.
7. Introduction to animal behavior:Aubrey Manning and Marian.S.DawkinsCambridge Uni Press.
- 8.Essentials of organizational behavior:Stephan Robbins,Prentice Hall of IndiaNew Delhi.
9. Animal Behaviour :McFarland D ELBS with Longman.
10. Ethology " Barnett.
11. An introduction to Behavioural Ecology J.R. Krebs & N.B. Davies Black wellScientific Publ.
12. Text Book of Animal Behaviour: Fatik Baran mandal. PHI Learning Pvt Ltd newDelhi.
13. Animal Behaviour :Reena Mathur,Rastogi and Coimpani.
14. Cell Biology -Chennarayappa - Unniversity Press





B Sc V Semester (S.1)
 Paper-I
 ZOOLOGY (optional)
(Ecology, Evolution, Paleontology, Zoogeography, Wild life Conservation)

Total-hours,50
Marks-80

Ecology.

- Earth as Living-Planet. Sub divisions_ of ecology, Scope of ecology, Biosphere 1 hr
- Abiotic factors _____
 Light, Temperature (Effect on Animals and Plants) 2hr
- Biotic Factor
 Mutualism, Commensalism, Amensalism, Parasitism, Predation 2hrs
- , Competition, Parasitism.
- Habitats 4hrs
- Freshwater habitat — Lotic and Lentic systems
 Zonation of Sea, Marine Biota, Estuarine ecology. & Mangrooves
 Terrestrial habitat — A brief account of Biomes.
- Ecological Adaptations — Freshwater, Marine and Terrestrial.
- Biogeochemical Cycles - Principles and concepts of Water, Nitrogen, Carbon, 2hrs
- Oxygen cycles
- Community Ecology-Community structure, Ecological niches, Edge effect, Stratification, Ecoton. 2hrs
- Population Ecology: Density, natality, mortality. Age distribution
- Population growth, types and curves. 2hrs





Evolution.

The Solar System		
Origin of Earth , Origin of Life and its theories	03hrs	
The geological time scale	03hrs	
Fossils: Definition and Kinds of fossils, How fossils are formed, Methods of Preservation. Connecting links and Living fossils. The importance of fossils	02hrs	
Theories of Organic Evolution :	06hrs	
Lamarckism, Darwinism, Mutation Theory And the Modern Synthesis Theory;(population gene Pool, Gene Frequency . Variations — gene mutation, chromosomal mutation; Isolation and recombination.Genetic drift,Hardiwienberg equilibrium)		
Modes of Evolution : Microevolution, Macroevolution and Mega-evolution.	02 hrs	
Evolution of Man and Horse		04 hrs
Paleontology Mesozoic reptiles with a note on Dinosaurs.	03 hrs	
Zoogeography: Zoogeographical realms of world , A brief account of Wallace's line	03 hrs	
Wildlife Conservation :		09hrs
Wildlife in India,Causes for the depletion of wildlife. Wild Life Conservation Techniques', methods'and measures Brief account of ; IUCN, WWF,Bombay Natural History Society, Indian Board for Wild Life, Red Data Book. Wild Life Act 1972 and its amendments in India,CITES. Project Tiger and Biosphere Reserve.		





2019-18 V semester

Total -11 Practicals

- 1; Study of fossils (vertebrate(3) and invertebrate(3)).
1hrs
2. Mesozoic reptiles (Ichthyosaur, tyrannosaur, brontosaur, triceratops, archaeopteryx).
1hr
3. Evolution of man (Homo-erectus. Hemo-habills. Homo-neandertalences)
1hr
4. Evolution of Horse
1hr
- 5 ;Connecting links and living fossils (Neopilina, Peripatus, Limulus, Latimaria; Archaeopteryx and Duckbill platypus)
1hr
- 6 Study of threatened Animals of India (Tiger,Lion,singal horned rhinoceros Musk deer,gaur,Golden langur,Loin tailed monkey.Python)
1hr
- 7 ;Estimation of CO₂ from different water samples
1hr
- 8; Estimation of dissolved oxygen
1hr
- 9; Estimation of Total hardness
1hr
- 10;Study of Ecological Adaptations and Morphological peculiarities,;ex-Hermit crab, 1hr
Draco,Stick insect,puffer fish,Exocoetus,Phrynosoma,chamaeleon and Bat.
- 11;Visit to nearby water body to study Ecosystem
1hr

REFERENCE BOOKS:-

Evolution : Odum

Organic Evolution: N.Arumugam
Evolution, Dobzhansky, Ayala,Stebbins & Valantine
Environmental Biology.Rastogi and Company,Meerut
Evolution of the Vertebrates, Colbert E.H. John Wiley and Sons, New York
Ecology;Principles and Application.chapman,Cambridge university press
Environmental Biology P.R.Trivedi and gurudeep Raj.
Recent Advances in Environmental Biology -Diwan and D.K.Arora
Environmental Science;Eldon.D.Enger andBradly.F,Smith





Zoology

Rani Channamma University, Belagavi
B.Sc VI Semester 6.1
Paper I

Total hours - 50
Marks - 80
Theory 4 hrs/week

APPLIED ZOOLOGY (optional)

- Sericulture : Mulberry Silkworm and Life History of Bombyx mori Rearing of Silkworm: Grainage management, Emergence of moth and fertilization, egg laying, hatching and moulting of-silkworm, spinning of cocoons. Cocoon processing, stiffling and spinning silk. Filature. Non mulberry silkwarm, types. in brief & Silkworm diseases- Muscardine, Grasserie, Flacherie & Pebrine. 07 hrs
- Apiculture: Species of Honey Bees, their Social organization, Life History 05 hrs
Methods of Bee Keeping, products of Bees, & their Economic importance
- Insect Pest Management : Natural control and Applied control of pests 05 hrs
Applied Control ___ Mechanical, Physical, Cultural, Legal, Chemical control
- Vermiculture: Eerthworm species used in vermiculture,vermiculture technique,and Importance of vermiculture. 04 hrs
- Aquaculture : 10 hrs
Prawn Fisheries, Species of Prawns, Culture of freshwater and marine
Prawns. Preservation and processing of Prawns.
- Pearl Culture Pearl producing molluscans, Peail formation. Pearl producing Sites in India. Quality and composition of Pearl.
Pearl Industry Artificial Insertion of nucleus
- Brief technique of Fish culture, Preservation of fishes and their Byproducts
- Poultry Breeds of fowl, Diseases of poultry, Poultry maintenance and By-products, and CoMposition and Nutritive value of Egg 06 hrs
- Animal Husbandary: Maintenance, Breeds Diseases, Products and By Products of the following 10 hrs
Sheep and Goats, Cow and Buffalos, Composition and Nutritive value of Milk
- Lac culture: Classification of Lac insect (Techaridia lacca, Life history of Lac Insect. Host plants, Cultivation of Lac Composition and properties & Economic importance. 3 hrs





2017-18 VI Sem P. I

Practicals - 6.1

Total -11 Practicals

1 Project on any of the applied branch studied in theory	1
2 Study of mulberry silkworm and Life cycle	1
3 Types of non mulberry silkworms in brief and Silkworm diseases (Pebrine, Muscardine and Grasserie & Flaturie)	1
4 Species and castes of honeybees	1
5 Agricultural pests and domestic pests (total 8 varieties)	1
6 Study of fisheries __ Molluscs (three), Crustaceans (three) And Pisces (six)	1
7 Study of Varieties of sheep and goat (from chart/photographs)	1
8 Study of varieties of Cow & Buffalos (from chart/photographs)	1
9 Vermiculture __ Study of types of Earthworm species	1
10 Study of poultry breeds	1
11 Study of Lac insect (Life cycle)	1

Scheme for practicals 6.1 APPLIED ZOOLOGY

Q No. I Sericulture	03 marks
Q No. II Apiculture	03 marks
Q No. III Pest management	03 marks
Q No. IV Pisciculture	03 marks
Q No. V Vermiculture	03 marks
Q No. VI Animal Husbandry	06 marks
Q No. VII Prawn & Pearl culture	04 marks
Q No. VIII Project report & Viva	10 marks
Q No. IX Journal	05 marks

Total 40 marks

Note 1 Examiners can alter the Scheme of marks for practical in consultation With the staff of the host college.





17-18



Rani Channamma University, Belagavi
 B.Sc VI Semester _ 6.2

Paper II
 (Microbiology, Nanotechnology, Bioinformatics and Methods in Biology)

Total hours – 50
 Marks _ 80
 Theory 4 hrs/week

Microbiology

- | | |
|--|-----------------|
| 1. Microscopy : Compound Microscope and its functions
Dark field microscope. Fluorescent Microscope
Phase Contrast Microscope and Electron Microscope and their uses | 03 hrs |
| 2. Sterilization and other Techniques _ Physical and Chemical methods
Bacteria: Classification based on shapes, structure (anatomy) Bacterial reproduction and growth. | 01 hr
02 hrs |
| 3. Virus _ Morphology, chemical properties, classification and nomenclature
DNA and RNA viruses. | 02 hrs |
| 4. Fungi: Structure, classification and reproduction, Yeasts | 02hrs |
| 5. Fermentation: Types of Fermentor and basic functions
Methods of preservations and criteria for the selection of microorganisms | 03hrs |
| 6. Production of antibodies Penicillin, Streptomycin, Enzyme protease, Riboflavin. | 02hr |
| 7. Ormal microbial flora of the human body | 01hr |
| 8. Role of microbes in environment | 01hr |

Nanotechnology

4hrs

Introduction : History Name Tools and Techniques in Nanotechnology.

Nanobiology; application of Nano in biology- Nano drug Administration Diagnostic & Therapeutic applications. Lotus effect, Gold & Silve Nanotechnology. Curcumin phytochemicals, Cinnamon in green nano technology.





Bioinformatics

1 Introduction: Definition, Goal of Bioinformatics, Sequencing Sequences analysis and Structure analysis Applications of Bioinformatics. 02hrs

2. Classification of Biological Data Bases. Characteristics of FASTA (Fast Alignment) BLAST (Basic Local Alignment Search Tool). 02hrs

3. Aims and goals of Human Genome Project: Main findings of human genome Project., Prediction and tools for gene prediction. Comparative genomics. 02hrs

4. Proteomics: Two dimensional Gel Electrophoresis Mass spectrometry, SDS __ PAGE Structure of protein __ Primary, Secondary, Tertiary and Quarternary. 02hrs

Protein structure prediction 01hr
Application of Proteome analysis 01hr
The future of Proteomics

Methods in Biology

Techniques of Cell fraction and Centrifugation. Homogenization and cell tissue disruption Gentrifugation, Ultra centrifugation. 02hrs

DNA Sequencing, __ In situ Hybridization, DNA microchips 02hrs

Genetic Engineering in animals- Transgenic Mouse, Transgenic sheep, Genetically Altered Fish, Mosquito and Drosophila. 02hrs

Gene therapy in Humans 02hr

Histochemical and Immunization Techniques _ ELISA, RIA, Flow Cytometry 02hrs





Nucleic Acid Blotting and their applications _ Southern Blotting, Northern Blotting, Western Blotting	02hrs
Biophysical Methods _ Brief note of NMR, ESR, Spectroscope and their uses	02hrs
Radioisotopes Techniques in Biochemistry - Types of radioactive decay- Alpha, Beta emission & Gamma rays	01 hr
Geigar-Mullar counter, Liquid Scintillator	01hr
Biological applications of Radioisotopes	01hr
A brief note on the use of ECG, PET, MRI, CAT. Single Neuron recorder in Electro Physiological methods	02hrs





2017-18 VI sem p-II

B.Sc VI SEMESTER 6.2

PRACTICAL DETAILS

ZOOLOGY Pract-II

TOTAL 11 PRACTICALS

Measurement of micro organisms (Micrometry)

Preparation of liquid medium (Broth)

Preparation of solid media (PDA medium and PDA plates)

Preparation of agar slants.

Bacterial cell counting using haemocytometer.

Simple and Gram's staining differentiation of bacteria.

Isolation, Identification and enumeration of Bacteria/Protozoa from moist soil or sewage water

Practical application of Bioinformatics: Tool BLAST And FASTA to find out sequence of nucleotides in Desired gene/Amino acid in desired protein

Study of Microbiological Lab Equipments—
Microscope, Centrifuge, Autoclave, Pressure cooker, Laminar air flow, Streak Plate, Inoculation needle etc

Visit to Diagnostic center to study practical application of ECG, PET, MRI, CAT



18-19

Department of Mathematics



RANI CHANNAMMA  **UNIVERSITY, BELAGAVI**

Department of Mathematics

Syllabus

for

Master of Science in Mathematics

I to II Semester

(with effect from 2017 – 18)





Choice based credit system (CBCS)

Course structure

Sl. No.	Paper & Title	Credit	No of Hrs/week Theory/ Practical	Duration of exam in Hrs Theory/ Practical	IA Marks Theory/ Practical	Marks at the Exams	Total Marks
I Semester							
1.1	Algebra -I	4	4	3 Hrs	20	80	100
1.2	Topology	4	4	3 Hrs	20	80	100
1.3	Real Analysis	4	4	3 Hrs	20	80	100
1.4	Linear Algebra	4	4	3 Hrs	20	80	100
1.5	Ordinary Differential Equations	4	4	3 Hrs	20	80	100
1.6	Discrete Mathematical Structures	4	4	3 Hrs	20	80	100
II Semester							
2.1	Algebra – II	4	4	3 Hrs	20	80	100
2.2	Complex Analysis	4	4	3 Hrs	20	80	100
2.3	Partial Differential Equations	4	4	3 Hrs	20	80	100
2.4	Functions of Several Variables	4	4	3 Hrs	20	80	100
2.5	Classical Mechanics	4	4	3 Hrs	20	80	100
2.6	Open Elective Course I. Set Theory (Arts & Commerce stream)	4	4	3 Hrs	20	80	100
	II. Integral Transforms (Science stream)						





Department of Mathematics

III Semester							
3.1	Measure Theory & Lebesgue Integration	4	4	3 Hrs	20	80	100
3.2	Differential Geometry	4	4	3 Hrs	20	80	100
3.3	Numerical Analysis	4	4	3 Hrs	20	80	100
3.4	Elective- I	4	4	3 Hrs	20	80	100
	I. Mathematical Finance						
	II. Fluid Mechanics						
	III. Commutative Algebra						
3.5	Elective- II	4	4	3 Hrs	20	80	100
	I. Algebraic Topology						
	II. Number Theory and Cryptology						
	III. Fourier Analysis						
3.6	Open Elective Course	4	4	3 Hrs	20	80	100
	I. Statistics (Arts & Commerce stream) II. Computational Methods (Science stream)						
IV Semester							
4.1	Functional Analysis	4	4	3 Hrs	20	80	100
4.2	Mathematical Methods	4	4	3 Hrs	20	80	100
4.3	Probability Theory	4	4	3 Hrs	20	80	100
4.4	Elective-I	4	4	3 Hrs	20	80	100
	I. Riemannian Geometry						
	II. Advance Graph Theory						
	III. Mathematical modeling						
4.5	Elective-II	4	4	3 Hrs	20	80	100
	I. Advanced Numerical Methods						
	II. Banach Algebra						
	III. Operations Research						
4.6	Project	4	The candidate shall submit a dissertation carrying 80 marks and appear for viva-voce carrying 20 marks				100
Total		96				2400	





18-19



RANI CHANNAMMA UNIVERSITY, BELAGAVI.

Department of Post Graduate Studies and Research in Commerce



Syllabus of Master of Commerce

(With effect from Academic Year 2017-18)

IV Semester





M.Com Course Structure

Sem	Paper Code	Course	IA Marks	Sem End Marks	Total	Hrs/Week	Credits	
III	3.1	Business Research Methods	20	80	100	04	04	
	3.2	International Financial Management	20	80	100	04	04	
	Group- A : Accounting and Finance							
	3.3 A	Financial Markets and Institutions	20	80	100	04	04	
	3.4 A	Corporate Accounting	20	80	100	04	04	
	3.5 A	Accounting for Specialised Institutions	20	80	100	04	04	
	Group- B: Cost Accounting							
	3.3 B	Production and Operation Management	20	80	100	04	04	
	3.4 B	Cost Management	20	80	100	04	04	
	3.5 B	Cost Accounting Standards	20	80	100	04	04	
	Group - C: Banking							
	3.3 C	Bank Marketing	20	80	100	04	04	
	3.4 C	Banking in India	20	80	100	04	04	
	3.5 C	Management Accounting for Bankers	20	80	100	04	04	
	Open Elective Course							
	3.6	To be chosen from the other Department	20	80	100	04	04	
		Open Elective Course meant for other Departments - Personal Financial Planning	20	80	100	04	04	
	Total Marks/Credits			120	480	600	24	24
IV	4.1	E-Commerce	20	80	100	04	04	
	4.2	International Business	20	80	100	04	04	
	4.3	Project Report	50	50	100	04	04	
	Group A: Accounting and Finance							
	4.4 A	Security Analysis and Portfolio Management	20	80	100	04	04	
	4.5 A	Innovations in Accounting	20	80	100	04	04	
	4.6 A	Mutual Funds	20	80	100	04	04	
	Group- B: Cost Accounting							
	4.4 B	Techniques of Costing	20	80	100	04	04	
	4.5 B	Strategic Cost Management	20	80	100	04	04	
	4.6 B	Recent Developments in Cost Accounting	20	80	100	04	04	
	Group - C: Banking							
	4.4 C	Foreign Exchange and Risk Management	20	80	100	04	04	
	4.5 C	Financial Management in Commercial Banks	20	80	100	04	04	
4.6 C	Fund Management in Commercial Banks	20	80	100	04	04		
Total Marks/Credits			150	450	600	24	24	





**OPTIONAL / COMPULSORY SUBJECT FOR THE DEGREE IN SCIENCE
SUBJECTS**

**Science Subjects: (any three subject of equal importance to be chosen as per
the grouping given by Rani Channamma University, Belagavi)**

DETAILED SYLLABUS OF FOLLOWING PAPERS WITH PRACTICALS

1. BOTANY (optional)

B.Sc. III Semester

Subject: BOTANY (optional)

Paper:- Diversity of Cryptogams (Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms) 52 Hrs

Unit I: Algae 10 hrs.

General characters, Pigmentation, Classification by Fritsch (up to class level). Distribution, thallus structure, reproduction and life cycle of Nostoc, Volvox, Oedogonium, Sargassum and Batrachospermum. Economic importance.

Unit II: Fungi 08 hrs.

General characters, Classification (Alexopoulos's system). Distribution, Structure, Reproduction and life cycle of Albugo, Rhizopus, Penicillium and Puccinia. Economic importance of fungi. General account of lichens.

Unit III: Plant Pathology 06 hrs.

General account of Bacteria and Viruses. Introduction and general symptoms of plant diseases. Symptoms, Pathogens and control measures of Late blight of potato, White rust of crucifers, Tikka disease of ground nut.

Unit IV: Bryophytes 06 hrs.

General characters, Classification (Smith). Structure, reproduction and schematic life cycle of Riccia, Anthoceros and Funaria. (Developmental details are not expected). Evolution of sporophytes.

Unit V: Pteridophytes 10 hrs.

General characters and classification. Distribution, Structure (External and Internal) and Reproduction of Psilotum, Selaginella, Equisetum and Nephrolepis (Developmental details are not expected). Stelar evolution. Heterospory and seed habit

Unit VI: Gymnosperms 08 hrs.

General characters and classification. Distribution, Structure (External and Internal) and Reproduction of Cycas, Pinus and Gnetum (Developmental details are not expected).





Unit VII: Paleobotany

04 hrs.

Geological time scale, fossilization-molds, Impression, Petrification and cast.

Study of fossils - Calamitis, Lepidodendron, Lygenopteris

B.Sc. III Semester PRACTICALS

Total number of hours per week: 04, Internal Assessment=10 Marks, Max Marks: 40

1. Vegetative and reproductive structures of Nostoc, Volvox and Oedogonium.
2. Vegetative and reproductive structures of Sargassum and Batrachospermum
3. Vegetative, reproductive structures and disease symptoms of Albugo, Rhizopus and Penicillium.
4. Vegetative, reproductive structures and disease symptoms of Puccinia. Lichens
5. Study of Vegetative and Reproductive structures of Riccia, Anthoceros and Funeria.
6. Study of Vegetative and Reproductive structures of Psilotum and Selaginella.
7. Study of Vegetative and Reproductive structures of Equisetum and Nephrolepis.
8. Study of Vegetative and Reproductive structures of Cycas, Pinus and Gnetum.
9. Disease symptoms and control measures of Late blight of potato, Black rust of Wheat, Tikka disease of ground nut.
10. Paleobotany- Study of fossils Lepidodendron, Calamitis, Lygenopteris.
11. Field visits.

B.Sc. III Semester

Botany Practical Examination

Time: 4 Hours Max Marks: 40

Q1: Identify and classify specimens A, B, C giving reasons. 09 marks

Q2: Identify and explain the internal structures of specimen D and E with the neat labelled diagrams (Show the preparation to the examiner) 10 marks

Q 3: Identify & describe the salient features in the slides/ specimens E, F, G, H, I and J 12 marks

Q4: Identify & describe the salient features in the fossil specimen K. 03 marks

Journal 04 marks

Field visit report 03 marks





Group – II
OPTIONAL / COMPULSORY SUBJECT FOR THE DEGREE IN SCIENCE
SUBJECTS

Science Subjects: (any three subject of equal importance to be chosen as per the grouping given by Rani Channamma University, Belagavi)

DETAILED SYLLABUS OF FOLLOWING PAPERS WITH PRACTICALS

1. BOTANY (optional)

SEMESTER-IV

I DIVERSITY OF ANGIOSPERMS AND THEIR SYSTEMATICS 60 hrs

Section – I

Morphology and Taxonomy

- Unit 1: Angiosperms: origin and evolution. 2 hrs.
- Unit 2: Morphology of Angiosperms – Study of roots, stems, leaves and their modifications.
Study of Inflorescence, flower and fruits 10 hrs.
- Unit 3: Angiosperm taxonomy: Brief history, botanical nomenclature, principles and rules, taxonomic ranks, type concept and principle of priority. 4 hrs.
- Unit 4: Classification of Angiosperms : systems proposed by Bentham and Hooker and Engler prantl. Their salient features, merits and demerits. Major contributions of cytology (cytotaxonomy), phytochemistry (chemotaxonomy) and taximetrics (numerical taxonomy) to taxonomy 6 hrs.
- Unit 5: Diversity of flowering plants as illustrated by members of the following families:
Magnoliaceae ,Annonaceae, Brassicaceae, Malvaceae, Rutaceae, Rhamnaceae,
Anacardiaceae, Fabaceae Myrtaceae, Combretaceae, Cucurbitaceae, Apiceae, Rubiaceae,
Asteraceae, Sapotaceae, Apocyanaceae Asclepiadaceae, Convolvulaceae, Solanaceae,
Acanthaceae, Verbenaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Urticaceae,
Orchidaceae, Amaryllidaceae, Liliaceae, Arecaceae and Poaceae. 24 hrs

Section – II

Economic Botany and Medicinal botany

Economic Botany:

Food plants: Rice, Wheat, Maize, Pulses, Potato and Sugarcane

Fibres: Cotton, Jute, Agave and Deccan hemp

Vegetable oils: Ground nut, Sunflower, Coconut, Palm oil and Castor

General account and sources of Timber: Teak and Sissoo

Paper & pulp: Bamboo & Eucalyptus

Spices: Ginger, Cinnamom and Cardamom

Beverages: Tea & Coffee

Rubber: Hevea sp.

10 hrs.





Medicinal botany:

Plants in primary health care: common medicinal plants- Tippateega (*Tinospora cordifolia*), Tulsi (*Oscimumsanctum*) Kalabanda (*Aloe-vera*) Turmeric (*Curcuma longa*) Ashwagandha (*Withania somnifera*) and Sarpagandha (*Rauwolfia serpentina*) 4 hrs

Practicals:-

1. Morphology of Root , Stem and their modifications.
2. Morphology of Leaf and its modifications.
3. Study of Inflorescence and its types.
4. Study of Flower- Descriptive terms, Thalamus, Calyx, Corolla and Aestivation.
5. Study of Flower –Androecium and Gynoecium.
6. Study of Fruit types.
7. Study of any 20 families representing from polypetalae, gamopetalae, apatalae and monocots available in the locality.
8. Economic botany
9. Study of Medicinal Plants available in the locality.
10. Study Tour for minimum Two days to study the Flora (Taxonomy).

Suggested readings:

1. Davis, P.H. and Heywood, V.H. 1963. principles of angiosperm taxonomy. Oliver and boyd, London.
2. Heywood, V.H. and moore, D.M. (EDS) 1984. current concepts in plant taxonomy academic ress, London
3. Jeffery, C. 1982. An introduction to plant taxonomy. Cambridge university press, cambridge , London.
4. Jones, S.B. Jr and luchsinger, A.E. 1986. plant systematics (2nd edition). McGraw Hill book co, newyork.
5. Radford, A.E. 1986. fundamentals of plant systematics. Harper and Row, newyork.
6. Singh, G. 1999. plant systematics; theory and practice. Oxford and IBH, newdelhi.
7. Atace, C.A. 1989. plant taxonomy and bio systematics (2nd edition). Edward Arnold, London.
8. Dutta, S.C. 1988. systematic botany. walley eastern, newdelhi.
9. Jaques, H.E. 1999. plant families- how to know them. IBS, newdelhi.
10. Lawrence, G.H.M. 1951. taxonomy of vascular plants. Macmillan, newdelhi.
11. Stewart, W.M 1983. Paleobotony and the evolution of plants, cambridge university press, cambridge.
12. Joshi S.G .medicinal plants oxford and IBH newdelhi.
13. Kokate and Gokeale _pharmacognacy. Nerali publication , newdelhi.
14. Lad v Ayurveda- the scince of self healing- motilal banarasidas, newdelhi.
15. Lewis W.H. and M.P, F Elwin Lewis 1976, medical botony plants affecting maris health. A wiley interscience publication, Jhon willey and sons newyork.
16. College botany vol 1 by Gangulee, Das and Datta. New central book agency, Calcutta.





17. Systematic botany by R.N Sutaria.
18. Taxonomy of Angiosperms by B.P.Pandey.
- 19 . Kocchar, S.L. 1998. Economic Botany in Tropics. 2nd edition, Macmillian Ltd, New Delhi .
20. Sambamurthy, A.V.S.S and subramanyam, N.S. 1989. A Text Book of Economic Botany, Wiley Eastern Ltd. New Delhi .
21. Sharma, O.P. 1996. Hill's Economic Botany. Tata McGraw Hill Co., Ltd., New Delhi.
22. Simpson, B.B. and Conner-Ogorzaly, M. 1986. Economic Botany-plants in our world. McGraw Hill, New York.
23. Hill. A.F. 1989. Economic Botany. Tata McGraw-Hill, New York.
24. Herbs Cultivation and Medicinal Uses- H. Panda – NIIR Publication, New Delhi.
25. Chopra R.N., Badhuvar R.L. & Ghosh G. (1965)- Poisons Plant of India.
26. Jain S.K. – Medicinal Plant.

**B.SC. IV SEMESTER
PRACTICAL EXAMINATION**

Time : 4 Hours Max Marks: 40 Marks

- | | |
|---|-----------|
| Q1. Assign the specimens A,B,C&D to the respective families giving diagnostic features and their classifications. | 10 Marks |
| Q2. Draw the floral diagram and write the floral formula of specimen "E" | 03 Marks |
| Q3. Explain the morphological peculiarities observed in the specimens F, G, H & I | 10 Marks |
| Q4. Identify giving botanical name and family of specimens J, K, L & M. Mention the parts used & their uses. | 08 Marks |
| Journal | 05 Marks. |
| Study tour report | 04 Marks |



Semester V
(w.e.f 2016-17)
Botany Paper - II

Paper-II: Ecology, Environmental Biology and Phytogeography

50 hrs

Objectives:-This paper has topics on pollution, pollution control and forestry. Considering the present scenario with respect to environment these topics are most valuable.

Unit 1: Plant and environment: Atmosphere (gaseous composition), water (properties of water cycle), light (global radiation, photo synthetically active radiation), temperature, soil (development, soil profiles, physico-chemical properties), and biota.

Morphological, anatomical and physiological responses of plants to water (hydrophytes, xerophytes and epiphytes), temperature (thermoperiodicity and vernalization), light (photoperiodism, heliophytes and sciophytes) and salinity.

12 Hrs.

Unit 2: Population ecology and Ecosystems: Growth curves; ecotypes; ecads, Ecological succession-hydrach and xerarch. Structure of Ecosystems (Pond and Forest): abiotic and biotic components; food chain, food web, ecological pyramids, energy flow.

10 Hrs.

Unit 3: Phytogeography: Botanical regions of world, Vegetation types of Karnataka and India.

06 Hrs.

Unit 4: Conservation of Natural resources: Different types of natural resources and their conservation,

Forest and Forest Management: Forest and its ecological significance, deforestation, forest management and social forestry. Natural depletion of vegetation endangered and threatened economic plants of India and red data book. Wild life management in India, Indian board of wild life, national park and sanctuary.





Energy resources: conventional and non conventional sources of energy.

Biodiversity: significance, types, depletion, conservation of biodiversity.

12 Hrs.

Unit 5: Pollution: Introduction, causes, effects and control measures of Water pollution, Air pollution, Soil pollution, Acid rain, Global warming, and Ozone depletion.

Sewage water and waste water types, Methods of effluent treatment of industrial waste water, sludge disposal and its care related to environment.

10 Hrs.

Practical:

1. Study of frequency and density of herbaceous plants by quadrat method.
2. To determine moisture content and water holding capacity of different types of soils.
3. To estimate the alkalinity of water samples.
4. Ecological instruments.
5. Morphology and anatomical adaptations in three hydrophytes.
6. Morphology and anatomical adaptations in xerophytes: One succulent and one non-succulent, one epiphyte and one halophyte.
7. Waste water analysis, physical chemical parameter, pH, turbidity, TDS, BOD, COD, temperature and any other inorganic elements.
8. Visit to effluent treatment plant to study recycling of waste water near by industry and study the effect of industrial pollution nearby water bodies (Biomagnification & Eutrophication).
9. Assignment of Project related to practical number eight.





10. Study Tour of minimum two days to study forest types and ecological groups.

Books for Reference:

1. Sharma P.D. (1993)-Ecology and Environment – Rastogi Publication, New Delhi.
2. Mishra R. . . - Ecology Work Book- Oxford and IBH, New Delhi.
3. Agarwal K.C. (1993)- Environmental Biology- Agro Botanical Publishers, Jodhapur.
4. Mishra K.C. (1992)- Manual of Plant Ecology – Oxford & IBH Publication, New delhi.
5. Kochar P.L. (1980) – Plant Ecology – S. Nagin & Co., Jallandhar.
6. Kormandi E.J. (1984)- concept of Ecology- Printice Hall Ind., New Delhi.
7. Asthana R.K. (1998) – Environmental Problems and Solution- S.Chand & Co. Pvt. Ltd., New Delhi.
8. Verma P.S., V.K. Agarwal (1983) – Environmental Biology - S.Chand & Co. Pvt. Ltd., New Delhi.
9. Subramanyam N.S. A.V.S.S. Samburthy (2000)- Ecology- Narosa Publishing House, New Delhi.
10. Sharma D.P. (1993) – Ecology & Environmental Biology- Rastogi Publication, Meerut.
11. Nebel B.J. (1990) – Environmental Science – Printice Hall Indu. Pvt. Ltd. New Delhi.
12. Trivedi R.K. Etal (1987) – Practical Ecology – Anmol Publication, Jodhapur.
13. Rao K.S. (1971) - Fundamentals of Ecology – W.B. Saunders co. Philadelphia.
14. Shukla R.S. & Chandel P.S. (2000) – Plant Ecology – S.Chand & Co. Pvt. Ltd., New delhi.
15. Odum, E.P 1983. Basic Ecology, Saunders, Philadelphia.





17-18 - 20

Q. III Descriptive Answers

21. From Unit 1: Cell Biology: 01 sub question. 1 X 10 = 10
 OR
 From Unit 2: Morphology of Chromosomes-01 sub question.
22. From Unit 3: Cell division: 01 sub question. 1 X 10 = 10
 OR
 From Unit 4: Genetics: 01 sub question.
23. From Unit 4: Genetics: 01 sub questions. 1 X 10 = 10
 OR
 From Unit 5: Evolution: 01 sub question.

B.Sc VI semester

(w.e.f 2016 -17)

Botany paper -II

(Molecular Biology, Biotechnology & Immunology)

50 hrs

Objectives: - Molecular Biology, Biotechnology and Immunology has some recent trends in the concern fields. This will help students to pursue research in concerned fields.

Unit 1: Nucleic Acids: DNA & RNA, occurrence, types and chemical compositions.

Experimental evidences for DNA as genetic material. Structure of DNA, Replication, semiconservative method, RNA and types, post transcription changes.

10 Hrs.

Unit 2: Gene Expression: Gene concept, Genetic code & protein synthesis. Regulation of gene expression in prokaryotes & eukaryotes.

08Hrs.





Unit 3: Recombinant DNA technology and Bioinformatics:

Enzyme, vector (plasmid pBR 322), marker gene, Steps of cloning technique, PCR and its application, Genomic DNA and cDNA library. Brief concept on Genomics and proteomics.

08 Hrs.

Unit 4: Biotechnology and Genetic engineering of plants:

Basic concepts, principles and scope. Aims, strategies for development of transgenic plants (with suitable example). Agrobacterium-The natural genetic engineer. T-DNA and transposon mediated Gene tagging, intellectual Property rights, possible ecological risks and ethical concerns.

12Hrs.

Unit 5: Microbial genetic manipulation and Immunology:

Microbial genetic manipulation: Bacterial transformation, selection of recombinant and transformants, genetic improvement of industrial microbes, nitrogen fixers & fermentation technology.

Immunology: Immuno-systems, Immunotechniques in Agriculture, ELISA method to detect Plant diseases & Monoclonal antibodies.

12 Hrs.

Practicals:

1. DNA estimation by DPA diphenyl amine method.
2. RNA estimation by orcinol method.
3. Extraction and estimation of protein from plant source.
1) Salt precipitation method 2) solvent method
4. Culturing of Rhizobium-YEMA media.
5. Culturing of Azotobacteria-ASHBY'S media.
6. Demonstration of Electrophoresis technique
7. Agarose gel electrophoresis.
8. Demonstration and comparison of GM Plants with Non GM Plants (BT- Cotton, BT-Brinjal, BT Tomato).
9. Visit to Biotechnology Research Laboratory.





Suggested Reading:

1. Cell & Molecular Biology -- By E.D.F. De Robertis -- ISE Publication
2. Basic Biotechnology -- Colin Ratledge
& Bjorn Kristiansen -- Cambridge Uni. Press.
3. A Text Book of Biotechnology -- R.C. Dubey -- S. Chand Publication
4. Cell Biology, Genetics Molecular Biology, Evolution & Ecology -- P.S. Verma & V. K. Agarwal
5. Casida L.E. (1984)- Industrial Microbiology, Wiley Easterns, New Delhi.
6. Roitt- Immunology
7. Kubey - Immunology.
8. Fatima - Immunology

B.Sc. VI Semester

Practical Paper-II

(Molecular Biology, Biotechnology & Immunology)

Time: 4 Hours

Max Marks: 40

- | | |
|---|-----------|
| Q.1. Estimation of DNA/RNA from the given sample A. | 10 Marks |
| Q.2. Estimation of Protein from the unknown sample B. | 10 Marks |
| Q.3. Identify and comment C and D. | 5 Marks |
| Project report submission and Viva voce. | 10 Marks. |
| Journal. | 05 Marks |



18-19



B.Sc II Semester Syllabus

ZOOLOGY (Optional) 2017-18 Onwards

Total Marks-80

Total Teaching-50hrs.

Biology of Chordates

UNIT-I

Chordates: General characters and classification.

8 hrs

1. Sub-phylum: Hemichordata-External Characters & Digestive system of Balanoglossus.
2. Sub-phylum: Urochordata- External Characters & Retrogressive metamorphosis in Herdmania.
3. Subphylum: Cephalochordata-External Characters & feeding mechanism in Branchiostoma.
4. Cyclostomata: External Characters & general organisation of Petromyzon & Myxine (Hagfish/Slime).

UNIT-II

Pisces: General characters & Classification of Pisces up to orders with examples. General characters of Chondrichthyes and Osteichthyes. Type study *Scoliodon*-Externals Characters, Digestive system, Reproductive system and Fish migration.

Amphibia: General characters & classification up to orders with Examples. Type study *Frog*- Externals characters, Digestive system, Circulatory & Reproductive system. Axolotl larva & its significance.

5hrs

UNIT-III

Reptilia: General characters & classification up to orders with Examples. Type study *Calotes*-Externals characters, Digestive system, Circulatory & Reproductive system. Indian poisonous & non-poisonous snakes.

5hrs

Aves - General characters & Classification up to orders with Examples Type study *Pigeon*-Externals characters, Digestive System, Respiratory & Reproductive system. Bird migration, Flight adaptations, Flightless birds, Beak & Feet modification.

10hrs





UNIT-IV

Mammalia: General characters & classification up to orders with 5hrs
Examples Type study Rat-Externals characters, Digestive System. Circulatory, Nervous, Excretory & Reproductive Systems.

Comparative Anatomy:
Origin, development & structure of Heart, Brain 12 hrs
and integument in Fishes, Amphibians, Reptiles, Aves and Mammals.

PRACTICALS

		Total Practicals -12
1.	Classification of Urochordata, Cephalochordata, Cyclostomes <u>Examples:</u> Balanoglossus, Herdmania, Branchiostoma, Peteromyzon.	01
2.	Classification of Fishes - <u>Examples:</u> Scoliodon, Pristis, Sphyrna, Catla catla, Labeo rohita, Hippocampus, Eel, Exocoetus & Synaptura.	01
3.	Classification of Amphibia - <u>Examples:</u> Frog, Toad, Ichthyophis, Ambystoma, Axolott Larva & Rhacophorous.	01
4.	Classification of Reptilia- <u>Examples:</u> Calotes, Hemidactylus, Chaemaleon, Mabuya Draco, Naja naja, Python, Viper, Turtle and Crocodile.	01
5.	Classification of Aves - <u>Examples:</u> Psittacula, Owl, Woodpecker, Pigeon and Passer domesticus..	01
6.	Classification of Mammalia - <u>Examples:</u> Sorex, Bat, Loris, Pangolin, Hystrix, Herpetes & Funambulus.	01
7.	Study of Comparative Anatomy: Heart and Brain in Fishes, Amphibians, Reptiles, Aves and Mammals	02
8.	Explanation & Demonstration in Bony fish/Shark. a). External characters b). Digestive system c). Reproductive system d). Mounting of Brain	04





2011-20 II SEM

NOTE:

1. With the help of Charts/Models/Diagrams/Printouts & Xerox Sheets are used in practical's demonstration.
2. As per UGC guidelines **Only one** species to be demonstrated by Faculty & students should not do any dissection.
3. Students are supposed to draw neat labelled diagrams & write The explanation in their journal.
4. In practical examination question no I & II are put Charts/ Models/ Diagrams/ Printouts & Xerox Sheets of the system- Students has to identify & write the explanation in their Examination paper.
5. Compulsory Study Tour/ Field visit to study Animal diversity. (Submission of project report carries- 5 marks).

REFERENCE BOOKS

1. Modern Text Book of Zoology Vertebrate-R.L.Kotpal.
2. Chordata – Dhami & Dhami.
3. Vertebrate- Majapuria.
4. Functional Organization of Vertebrate-- H Nigam & R.Sobti- Shoban Lal Nagin Chand & Co.
5. A manual of Zoology Vertebrates- M.Ekambarnath Ayyar & Swaminathan Ayyar S. Vishwanath Publisher.
6. The Vertebrates Pisces to Mammalia, Hyman L.H. McGraw Hill Co
7. The Vertebrates – Hyman et al.
8. Text Book of Zoology – Parker T.J. & Haswell W.A. Macmillan Co. London.
9. Biology of Chordates by Dr Harish .C. Nigam.Vishal Publication Lucknow.





17-18 IV

13. ZOOLOGY (Optional)

B.Sc.4th Semester Scheme(CBSC – Pattern)

Zoology (Optional) Revised syllabus
2015-16 onwards

Cell Biology, Histology and Animal Behaviour

Total Teaching hours-50
Total Marks-80
Theory 4hrs/week

UNIT - I

Cell Biology

<u>Cell Biology</u> - Ultra structure of animal cell. Cell theory & cell cycle	1 hr 54
Ultrastructure & function of cell organelles - Plasma membrane, Endoplasmic reticulum, Ribosomes, Golgi-complex, Lysosomes, Mitochondria & Nucleus.	8 hrs 21
<u>Chromosomes</u> - Structure & types of chromosomes. Ultra structure of chromosome	2 hrs 14

UNIT - II

<u>Cell division</u> -Types- mitosis & meiosis.	3 hrs 51
<u>Cellular Aging and Cell Death:</u> Concept of Aging theories: Intracellular changes, free radicals, somatic nutrition, immunological, clonal selection and errors in DNA and RNA functions. Extracellular changes, Cell Death: Apoptosis, Necrosis, definition and significance	3 hrs 18
<u>Cancer Cell:</u> Characteristics: Theories/Hypothesis regarding causes of cancer. Extrinsic factors, Physical, Chemical and Biological. Intrinsic factors, somatic mutations and oncogenes and aging related phenomenon.	3 hrs 18





UNIT-III

Histology

A brief account of Histo chemical techniques

Stains. Cytoplasmic and nuclear stains

Preparation of histochemical slides

3hrs H

Study of histological structure and functions of the following Mammalian organ sections.

8hrs H

- a. Tongue
- b. Salivary glands
- c. Stomach
- d. Intestine
- e. Liver
- f. Pancreas
- g. Kidney
- h. Adrenal

UNIT-IV

- i. Pituitary
- j. Ovary
- k. Testis
- l. Thyroid

4hrs H

Ethology (Animal Behaviour) Introduction

Definition, Scope of Ethology. Brief contributions of Konard Lorenz, Niko Tinbergen and Karl Von Frisch.

2hrs V

Animal Communication- Chemical ,Visual & Audio.Functions of signals, Odours,sounds & light.

2hrs V

UNIT-V

Types of Animal Behaviour --

8hrs

- 1. Innate behavior, Taxes, Reflexes, Instincts, motivation
- 2. Learned behavior, Habituation, Imprinting, Condition reflexes, Insight learning
- 3. Social behavior, Types of Animal society, .
Colony in Honey bees, Monkey troops, .
- 4. Territoriality and Courtship behaviour
- 5. Biological clock, Circadian Rhythm

Application of Ethological techniques(Ethogram) to human behavior

1hr V

Parental care – Concepts, Fishes, Amphibians and Birds.

2hrs V

55





2017-18 IV Semester

Zoology Practical's from 2015-16 onwards

1. Study of permanent histological slides of Mitosis and Meiosis - 2
2. Study of temporary preparation of different mitotic stages from onion root tip cells. - 1
3. Study of temporary preparation of different meiotic stages from Grasshopper / Onion flower bud. - 1
4. Preparation and observation of histology slides as mentioned Stomach, Intestine, Liver, Kidney, Adrenal, Thyroid, Ovary, Testis, - 3
5. Study of mimicry in Leaf Insect, Chameleon, Butterflies, Stick insects, Ants, Spiders and wasps) - 1
6. Study of different nests and nesting materials. - 1
7. Compulsory field visit to study mimicry habitats & community - 1
8. Internal Practical Test. - 1





17-18

B Sc V Semester (S. 1)
Paper-I
ZOOLOGY (optional)

(Ecology, Evolution, Paleontology, Zoogeography, Wild life Conservation)

Total-hours, 50
Marks-80

Ecology.

Earth as Living-Planet: Sub divisions of ecology, Scope of ecology, Biosphere	1 hr
Abiotic factors Light, Temperature (Effect on Animals and Plants)	2hr
Biotic Factor Mutualism, Commensalism, Amensalism, Parasitism, Predation	2hrs
Competition, Parasitism	
Habitats	4hrs
Freshwater habitat — Lotic and Lentic systems Zonation of Sea, Marine Biota, Estuarine ecology, & Mangrooves Terrestrial habitat — A brief account of Biomes.	
Ecological Adaptations — Freshwater, Marine and Terrestrial.	
Biogeochemical Cycles - Principles and concepts of Water, Nitrogen, Carbon	2hrs
Oxygen cycles	
Community Ecology-Community structure, Ecological niches, Edge effect, Stratification, Ecoton.	2hrs
Population Ecology: Density, natality, mortality, Age distribution	
Population growth, types and curves.	2hrs





Evolution.

The Solar System

Origin of Earth , Origin of Life and its theories

03hrs

The geological time scale

03hrs

Fossils: Definition and Kinds of fossils. How fossils are formed. Methods of Preservation. Connecting links and Living fossils. The importance of fossils.

02hrs

Theories of Organic Evolution :

06hrs

Lamarckism, Darwinism, Mutation Theory And the Modern Synthesis Theory;(population gene Pool, Gene Frequency . Variations — gene mutation, chromosomal mutation; Isolation and recombination.Genetic drift,Hardiwienberg equilibrium)

Modes of Evolution : Microevolution, Macroevolution and Mega-evolution.

02 hrs

Evolution of Man and Horse

04 hrs

Paleontology

Mesozoic reptiles with a note on Dinosaurs.

03 hrs

Zoogeography: Zoogeographical realms of world , A brief account of Wallace's line

03 hrs

Wildlife Conservation :

09hrs

Wildlife in India,Causes for the depletion of wildlife. Wild Life Conservation Techniques', methods'and measures Brief account of : IUCN, WWF, Bombay Natural History Society, Indian Board for Wild Life, Red Data Book, Wild Life Act 1972 and its amendrnents in India,CITES. Project Tiger and Biosphere Reserve.





2019-18 Semester

Total -11 Practicals

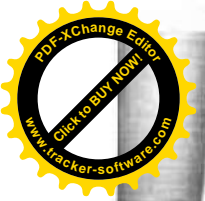
- 1; Study of fossils (vertebrate(3) and invertebrate(3).
1hrs
2. Mesozoic reptiles (Ichthyosaur, tyrannosaur, brontosaur, triceratops, archaeopteryx.
1hr
3. Evolution of man (Homo-erectus. Hemo-habills. Homo-neandertalences)
1hr
4. Evolution of Horse
1hr
- 5 ,Connecting links and living fossils (Neopilina, Peripatus, Limulus, Latimaria; Archaeopteryx and Duckbill platypus)
1hr
- 6 Study of threatened Animals of India (Tiger,Lion,singal horned rhinoceros
1hr
Musk deer,gaur,Golden langur,Loin tailed monkey,Python)
- 7 ;Estimation of co₂ from different water samples
1hr
- 8; Estimation of dissolved oxygen
1hr
- 9; Estimation of Total hardness
1hr
- 10;Study of Ecological Adaptations and Morphological peculiarities.,:ex-Hermit crab, 1hr
Draco,Stick insect,puffer fish,Exocoetus,Phrynosoma,chamaeleon and Bat.
- 11:Visit to nearby water body to study Ecosystem
1hr

REFERENCE BOOKS:-

Evolution : Odum

Organic Evolution: N.Arumugam
Evolution, Dobzhansky, Ayala, Stebbins & Valentine
Environmental Biology. Rastogi and Company, Meerut
Evolution of the Vertebrates, Colbert E. H. John Wiley and Sons, New York
Ecology; Principles and Application. chapman, Cambridge un.versity press
Environmental Biology P.R.Trivedi and gurudeep Raj.
Recent Advances in Environmental Biology -Diwan and D.K.Arora
Environmental Science; Eldon.D.Enger andBradly.F.Smith





Zoology



Rani Channamma University, Belagavi
B.Sc VI Semester _ 6.1

Paper I

Total hours – 50
Marks _ 80
Theory 4 hrs/week

APPLIED ZOOLOGY (optional)

- Sericulture : Mulberry Silkworm and Life History of Bombyx mori 07 hrs HH
Rearing of Silkworm: Grainage management, Emergence of moth and fertilization, egg laying, hatching and moulting of-silkworm, spinning of cocoons, Cocoon processing, stiffling and spinning silk. Filature. Non mulberry silkwarm, types. in brief & Silkworm diseases- Muscardine, Grasserie, Flacherie & Pebrine.
- Apiculture: Species of Honey Bees, their Social organization, Life History 05 hrs ✓
Methods of Bee Keeping, products of Bees, & their Economic importance
- Insect Pest Management : Natural control and Applied control of pests 05 hrs ✓
Applied Control __ Mechanical, Physical, Cultural, Legal, Chemical control
- Vermiculture: Eerthworm species used in vermiculture, vermiculture technique, and Importance of vermiculture. 04 hrs HH
- Aquaculture : 10 hrs SH
Prawn Fisheries, Species of Prawns, Culture of freshwater and marine
Prawns, Preservation and processing of Prawns.
- Pearl Culture : Pearl producing molluscans, Pearl formation, Pearl producing Sites in India. Quality and composition of Pearl.
- Pearl Industry: Artificial Insertion of nucleus
- Brief technique of Fish culture, Preservation of fishes and their Byproducts
- Poultry : Breeds of fowl, Diseases of poultry, Poultry maintenance and By-products, and CoMposition and Nutritive value of Egg. 06 hrs =H
- Animal Husbandary: Maintenance, Breeds Diseases, Products and By Products of the following 10 hrs TK
Sheep and Goats, Cow and Buffalos, Composition and Nutritive value of Milk
- Lac culture: Classification of Lac insect (Techardia lacca, Life history of Lac Insect. Host plants, Cultivation of Lac. Composition and properties & Economic importance 3 hrs. TK



2017-18 VI sem P-I

Practicals – 6.1

Total -11 Practicals

- | | |
|--|---|
| 1. Project on any of the applied branch studied in theory | 1 |
| 2. Study of mulberry silkworm and Life cycle | 1 |
| 3. Types of non mulberry silkworms in brief and Silkworm diseases (Pebrine, Muscardine and Grasserie & Flaturie) | 1 |
| 4. Species and castes of honeybees | 1 |
| 5. Agricultural pests and domestic pests (total 8 varieties) | 1 |
| 6. Study of fisheries __ Molluscs (three), Crustaceans (three) And Pisces (six) | 1 |
| 7. Study of Varieties of sheep and goat (from chart/photographs) | 1 |
| 8. Study of varieties of Cow & Buffalos(from chart/photographs) | 1 |
| 9. Vermiculture __ Study of types of Earthworm species | 1 |
| 10 Study of poultry breeds | 1 |
| 11 Study of Lac insect (Life cycle) | 1 |

Scheme for practicals 6.1 APPLIED ZOOLOGY

Q No. I	Sericulture	03 marks
Q No. II	Apiculture	03 marks
Q No. III	Pest management	03 marks
Q No. IV	Pisciculture	03 marks
Q No. V	Vermiculture	03 marks
Q No. VI	Animal Husbandry	06 marks
Q No. VII	Prawn & Pearl culture	04 marks
Q No. VIII	Project report & Viva	10 marks
Q No. IX	Journal	05 marks

Total 40 marks

Note 1 :Examiners can alter the Scheme of marks for practical in consultation With the staff of the host college.



Rani Channamma University, Belagavi
B.Sc VI Semester 6.2

Paper II
(Microbiology, Nanotechnology, Bioinformatics and Methods in Biology)

Total hours – 50
Marks _ 80
Theory 4 hrs/week

Microbiology

- | | |
|---|-----------------|
| 1. Microscopy : Compound Microscope and its functions
Dark field microscope, Fluorescent Microscope
Phase Contrast Microscope and Electron Microscope and
their uses | 03 hrs |
| 2. Sterilization and other Techniques _ Physical and Chemical methods
Bacteria: Classification based on shapes, structure (anatomy) Bacterial
reproduction and growth. | 01 hr
02 hrs |
| 3. Virus _ Morphology, chemical properties, classification and nomenclature
DNA and RNA viruses. | 02 hrs |
| 4. Fungi: Structure, classification and reproduction, Yeasts | 02hrs |
| 5. Fermentation: Types of Fermentor and basic functions
Methods of preservations and criteria for the selection of microorganisms | 03hrs |
| 6. Production of antibodies Penicillin, Streptomycin, Enzyme protease,
Riboflavin. | 02hr |
| 7. Ormal microbial flora of the human body | 01hr |
| 8. Role of microbes in environment | 01hr |

Nanotechnology

4hrs

Introduction History Name Tools and Techniques in Nanotechnology.

Nanobiology: application of Nano in biology- Nano drug Administration Diagnostic & Therapeutic applications. Lotus effect, Gold & Silve Nanotechnology. Curcumin phytochemicals, Cinnamon in green nano technology.





Bioinformatics

1. Introduction: Definition, Goal of Bioinformatics, Sequencing Sequences analysis and Structure analysis Applications of Bioinformatics. 02hrs
2. Classification of Biological Data Bases. Characteristics of FASTA (Fast Alignment) BLAST (Basic Local Alignment Search Tool). 02hrs
3. Aims and goals of Human Genome Project: Main findings of human genome Project., Prediction and tools for gene prediction. Comparative genomics. 02hrs
4. Proteomics: Two dimensional Gel Electrophoresis Mass spectrometry, SDS __ PAGE Structure of protein __ Primary, Secondary, Tertiary and Quarternary. 02hrs
 - Protein structure prediction 01hr
 - Application of Proteome analysis 01hr
 - The future of Proteomics 01hr

Methods in Biology

- Techniques of Cell fraction and Centrifugation. Homogenization and cell tissue disruption Centrifugation. Ultra centrifugation. 02hrs
- DNA Sequencing. __ In situ Hybridization, DNA microchips 02hrs
- Genetic Engineering in animals- Transgenic Mouse, Transgenic sheep. Genetically Altered Fish Mosquito and Drosophila. 02hrs
- Gene therapy in Humans 02hr
- Histochemical and Immunization Techniques _ ELISA, RIA, Flow Cytometry 02hrs





Nucleic Acid Blotting and their applications _ Southern Blotting, Northern Blotting, Western Blotting	02hrs
Biophysical Methods _ Brief note of NMR, ESR, Spectroscope and their uses	02hrs
Radioisotopes Techniques in Biochemistry - Types of radioactive decay- Alpha, Beta emission & Gamma rays	01 hr
Geiger-Muller counter, Liquid Scintillator	01hr
Biological applications of Radioisotopes	01hr
A brief note on the use of ECG, PET, MRI, CAT. Single Neuron recorder in Electro Physiological methods	02hrs





2017-18 VI Sem p-11

B.Sc VI SEMESTER 6.2

PRACTICAL DETAILS

ZOOLOGY Pract-II

TOTAL 11 PRACTICALS

Measurement of micro organisms (Micrometry)

Preparation of liquid medium (Broth)

Preparation of solid media (PDA medium and PDA plates)

Preparation of agar slants.

Bacterial cell counting using haemocytometer.

Simple and Gram's staining differentiation of bacteria.

Isolation, Identification and enumeration of Bacteria/Protozoa from moist soil or sewage water

Practical application of Bioinformatics: Tool BLAST And FASTA to find out sequence of nucleotides in Desired gene/Amino acid in desired protein

Study of Microbiological Lab Equipments—
Microscope, Centrifuge, Autoclave, Pressure cooker, Laminar air flow, Streak Plate Inoculation needle etc.


Visit to Diagnostic center to study practical application of ECG, PET, MRI, CAT





2017-18




RAJ CHANNAMMA UNIVERSITY, BELAGAVI
Department of Mathematics

Syllabus
for
Master of Science in Mathematics
III & IV Semester
(with effect from 2014 – 15)





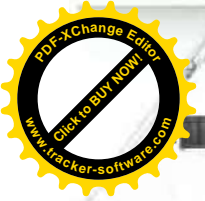
Mathematics

Choice based credit system (CBCS)

Course structure

S. No.	Paper & Title	Credit	No. of Hrs/week Theory/Practical	Duration of exam in Hrs Theory/Practical	IA Marks Theory/Practical	Marks at the Exams	Total Marks
III Semester							
3.1	Measure Theory and Integration	4	4	3 Hrs	20	80	100
3.2	Discrete Mathematical Structures	4	4	3 Hrs	20	80	100
3.3	Differentiable Geometry	4	4	3 Hrs	20	80	100
3.4	Numerical Analysis	4	4	3 Hrs	20	80	100
3.5	Algebraic Topology	4	4	3 Hrs	20	80	100
3.6	Open Elective Course – II	4	4	3 Hrs	20	80	100
	a. Statistics & Quantitative Techniques						
	b. Optimization Techniques						
IV Semester							
4.1	Functional Analysis	4	4	3 Hrs	20	80	100
4.2	Probability Theory	4	4	3 Hrs	20	80	100
4.3	Differential Manifolds	4	4	3 Hrs	20	80	100
4.4	Optional / Specialization	4	4	3 Hrs	20	80	100
	I. Fluid Mechanics						
	II. Number Theory and Cryptology						
	III. Commutative Algebra						
	IV. Mathematical Physics						
	V. Galois Theory						
	VI. Computational Complexity Theory						





4.5	Optional / Specialization I. Mathematical Finance II. Operations Research III. Graph Theory IV. Fourier Analysis V. Banach Algebra VI. Mathematical Modeling	4	4	3 Hrs	20	80	100
4.6	Project	4	The candidate shall submit a dissertation carrying 80 marks and appear for viva-voce carrying 20 marks				100
Total		96					2400





17-18



RANI CHANNAMMA UNIVERSITY, BELAGAVI.
Department of Post Graduate Studies and Research in Commerce



Syllabus of Master of Commerce
(With effect from Academic Year 2017-18)

IV Semester





M.Com Course Structure

Sem	Paper Code	Course	IA Marks	Sem End Marks	Total	Hrs/Week	Credits	
III	3.1	Business Research Methods	20	80	100	04	04	
	3.2	International Financial Management	20	80	100	04	04	
	Group- A : Accounting and Finance							
	3.3 A	Financial Markets and Institutions	20	80	100	04	04	
	3.4 A	Corporate Accounting	20	80	100	04	04	
	3.5 A	Accounting for Specialised Institutions	20	80	100	04	04	
	Group- B: Cost Accounting							
	3.3 B	Production and Operation Management	20	80	100	04	04	
	3.4 B	Cost Management	20	80	100	04	04	
	3.5 B	Cost Accounting Standards	20	80	100	04	04	
	Group – C: Banking							
	3.3 C	Bank Marketing	20	80	100	04	04	
	3.4 C	Banking in India	20	80	100	04	04	
	3.5 C	Management Accounting for Bankers	20	80	100	04	04	
	Open Elective Course							
	3.6	To be chosen from the other Department		20	80	100	04	04
		Open Elective Course meant for other Departments - Personal Financial Planning		20	80	100	04	04
	Total Marks/Credits			120	480	600	24	24
IV	4.1	E-Commerce	20	80	100	04	04	
	4.2	International Business	20	80	100	04	04	
	4.3	Project Report	50	50	100	04	04	
	Group A: Accounting and Finance							
	4.4 A	Security Analysis and Portfolio Management	20	80	100	04	04	
	4.5 A	Innovations in Accounting	20	80	100	04	04	
	4.6 A	Mutual Funds	20	80	100	04	04	
	Group- B: Cost Accounting							
	4.4 B	Techniques of Costing	20	80	100	04	04	
	4.5 B	Strategic Cost Management	20	80	100	04	04	
	4.6 B	Recent Developments in Cost Accounting	20	80	100	04	04	
	Group – C: Banking							
	4.4 C	Foreign Exchange and Risk Management	20	80	100	04	04	
	4.5 C	Financial Management in Commercial Banks	20	80	100	04	04	
	4.6 C	Fund Management in Commercial Banks	20	80	100	04	04	
Total Marks/Credits			150	450	600	24	24	





**OPTIONAL / COMPULSORY SUBJECT FOR THE DEGREE IN SCIENCE
SUBJECTS**

**Science Subjects: (any three subject of equal importance to be chosen as per
the grouping given by Rani Channamma University, Belagavi)**

DETAILED SYLLABUS OF FOLLOWING PAPERS WITH PRACTICALS

1. BOTANY (optional)

B.Sc. III Semester

Subject: BOTANY (optional)

Paper-: Diversity of Cryptogams (Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms) 52 Hrs

Unit I: Algae 10 hrs.

General characters, Pigmentation, Classification by Fritsch (up to class level). Distribution, thallus structure, reproduction and life cycle of Nostoc, Volvox, Oedogonium, Sargassum and Batrachospermum. Economic importance.

Unit II: Fungi 08 hrs.

General characters, Classification (Alexopoulos's system). Distribution, Structure, Reproduction and life cycle of Albugo, Rhizopus, Penicillium and Puccinia. Economic importance of fungi. General account of lichens.

Unit III: Plant Pathology 06 hrs.

General account of Bacteria and Viruses. Introduction and general symptoms of plant diseases. Symptoms, Pathogens and control measures of Late blight of potato, White rust of crucifers, Tikka disease of ground nut.

Unit IV: Bryophytes 06 hrs.

General characters, Classification (Smith). Structure, reproduction and schematic life cycle of Riccia, Anthoceros and Funaria. (Developmental details are not expected). Evolution of sporophytes.

Unit V: Pteridophytes 10 hrs.

General characters and classification. Distribution, Structure (External and Internal) and Reproduction of Psilotum, Selaginella, Equisetum and Nephrolepis (Developmental details are not expected). Stellar evolution. Heterospory and seed habit

Unit VI: Gymnosperms 08 hrs.

General characters and classification. Distribution, Structure (External and Internal) and Reproduction of Cycas, Pinus and Gnetum (Developmental details are not expected).





Unit VII: Paleobotany

04 hrs.

Geological time scale, fossilization-molds, Impression, Petrification and cast.

Study of fossils - Calamitis, Lepidodendron, Lygenopteris

B.Sc. III Semester PRACTICALS

Total number of hours per week: 04, Internal Assessment=10 Marks, Max Marks: 40

1. Vegetative and reproductive structures of Nostoc, Volvox and Oedogonium.
2. Vegetative and reproductive structures of Sargassum and Batrachospermum
3. Vegetative, reproductive structures and disease symptoms of Albugo, Rhizopus and Penicillium.
4. Vegetative, reproductive structures and disease symptoms of Puccinia. Lichens
5. Study of Vegetative and Reproductive structures of Riccia, Anthoceros and Funeria.
6. Study of Vegetative and Reproductive structures of Psilotum and Selaginella.
7. Study of Vegetative and Reproductive structures of Equisetum and Nephrolepis.
8. Study of Vegetative and Reproductive structures of Cycas, Pinus and Gnetum.
9. Disease symptoms and control measures of Late blight of potato, Black rust of Wheat, Tikka disease of ground nut.
10. Paleobotany- Study of fossils Lepidodendron, Calamitis, Lygenopteris.
11. Field visits.

B.Sc. III Semester

Botany Practical Examination

Time: 4 Hours Max Marks: 40

Q1: Identify and classify specimens A, B, C giving reasons. 09 marks

Q2: Identify and explain the internal structures of specimen D and E with the neat labelled diagrams (Show the preparation to the examiner) 10 marks

Q 3: Identify & describe the salient features in the slides/ specimens E, F, G, H, I and J 12 marks

Q4: Identify & describe the salient features in the fossil specimen K. 03 marks

Journal 04 marks

Field visit report 03 marks





Group – II
OPTIONAL / COMPULSORY SUBJECT FOR THE DEGREE IN SCIENCE
SUBJECTS

Science Subjects: (any three subject of equal importance to be chosen as per the grouping given by Rani Channamma University, Belagavi)

DETAILED SYLLABUS OF FOLLOWING PAPERS WITH PRACTICALS

1. BOTANY (optional)

SEMESTER-IV

I DIVERSITY OF ANGIOSPERMS AND THEIR SYSTEMATICS

60 hrs

Section – I

Morphology and Taxonomy

- Unit 1: Angiosperms: origin and evolution. 2 hrs.
- Unit 2: Morphology of Angiosperms – Study of roots, stems, leaves and their modifications.
Study of Inflorescence, flower and fruits 10 hrs.
- Unit 3: Angiosperm taxonomy: Brief history, botanical nomenclature, principles and rules, taxonomic ranks, type concept and principle of priority. 4 hrs.
- Unit 4: Classification of Angiosperms : systems proposed by Bentham and Hooker and Engler prantl. Their salient features, merits and demerits. Major contributions of cytology (cytotaxonomy), phytochemistry (chemotaxonomy) and taximetrics (numerical taxonomy) to taxonomy 6 hrs.
- Unit 5: Diversity of flowering plants as illustrated by members of the following families:
Magnoliaceae ,Annonaceae, Brassicaceae, Malvaceae, Rutaceae, Rhamnaceae,
Anacardiaceae, Fabaceae Myrtaceae, Combretaceae, Cucurbitaceae, Apiceae, Rubiaceae,
Asteraceae, Sapotaceae, Apocyanaceae Asclepiadaceae, Convolvulaceae, Solanaceae,
Acanthaceae, Verbenaceae, Lamiaceae, Amaranthaceae, Euphorbiaceae, Urticaceae,
Orchidaceae, Amaryllidaceae, Liliaceae, Arecaceae and Poaceae. 24 hrs

Section – II

Economic Botany and Medicinal botany

Economic Botany:

Food plants: Rice, Wheat, Maize, Pulses, Potato and Sugarcane

Fibres: Cotton, Jute, Agave and Deccan hemp

Vegetable oils: Ground nut, Sunflower, Coconut, Palm oil and Castor

General account and sources of Timber: Teak and Sissoo

Paper & pulp: Bamboo & Eucalyptus

Spices: Ginger, Cinnamom and Cardamom

Beverages: Tea & Coffee

Rubber: Hevea sp.

10 hrs.





Medicinal botany:

Plants in primary health care: common medicinal plants- Tippateega (*Tinospora cordifolia*), Tulsi (*Oscimumsanctum*) Kalabanda (*Aloe-vera*) Turmeric (*Curcuma longa*) Ashwagandha (*Withania somnifera*) and Sarpagandha (*Rauwolfia serpentina*) **4 hrs**

Practicals:-

1. Morphology of Root , Stem and their modifications.
2. Morphology of Leaf and its modifications.
- 3 .Study of Inflorescence and its types.
4. Study of Flower- Descriptive terms, Thalamus, Calyx, Corolla and Aestivation.
5. Study of Flower –Androecium and Gynoecium.
6. Study of Fruit types.
7. Study of any 20 families representing from polypetalae, gamopetalae, apatalae and monocots available in the locality.
8. Economic botany
9. Study of Medicinal Plants available in the locality.
10. Study Tour for minimum Two days to study the Flora (Taxonomy).

Suggested readings:

1. Davis, P.H.and Heywood,V.H.1963.principles of angiosperm taxonomy. Oliver and boyd,London.
2. Heywood,V.H. and moore,D.M.(EDS)1984. current concepts in plant taxonomy academic ress,London
3. Jeffery,C.1982. An introduction to plant taxonomy. Cambridge university press, cambridge , London.
4. Jones,S.B.Jr and luchsinger,A.E. 1986. plant systematics(2nd edition). McGraw Hill book co, newyork.
5. Radford, A.E.1986. fundamentals of plant systematics. Harper and Row, newyork.
6. Singh,G.1999.plant systematics; theory and practice. Oxford and IBH, newdelhi.
7. Atace,C.A.1989. plant taxonomy and bio systematics(2nd edition). Edward Arnold, London.
8. Dutta.S.C.1988.systematic botany.walley eastern,newdelhi.
9. Jaques,H.E.1999,plant families- how to know them. IBS, newdelhi.
10. Lawrence,G.H.M.1951.taxonomy of vascular plants. Macmillan, newdelhi.
11. Stewart.W.M 1983.Paleobotony and the evolution of plants, cambridge university press,cambridge.
12. Joshi S.G .medicinal plants oxford and IBH newdelhi.
13. Kokate and Gokeale _pharmacognacy. Nerali publication , newdelhi.
14. Lad v Ayurveda- the scince of self healing- motilal banarasidas,newdelhi.
15. Lewis W.H.and M.P,F Elwin Lewis 1976, medical botony plants affecting maris health. A wiley interscience publication, Jhon wiley and sons newyork.
16. College botany vol 1 by Gangulee, Das and Datta.New central book agency,Calcutta.





17. Systematic botany by R.N Sutaria.
18. Taxonomy of Angiosperms by B.P.Pandey.
19. Kocchar, S.L. 1998. Economic Botany in Tropics. 2nd edition, Macmillian Ltd, New Delhi .
20. Sambamurthy, A.V.S.S and subramanyam, N.S. 1989. A Text Book of Economic Botany, Wiley Eastern Ltd. New Delhi .
21. Sharma, O.P.1996. Hill's Economic Botany. Tata McGraw Hill Co., Ltd., New Delhi.
22. Simpson, B.B. and Conner-Ogorzaly, M. 1986. Economic Botany-plants in our world. McGraw Hill, New York.
23. Hill. A.F. 1989. Economic Botany. Tata McGraw-Hill, New York.
24. Herbs Cultivation and Medicinal Uses- H. Panda – NIIR Publication, New Delhi.
25. Chopra R.N., Badhuvar R.L. & Ghosh G. (1965)- Poisons Plant of India.
26. Jain S.K. – Medicinal Plant.

**B.SC. IV SEMESTER
PRACTICAL EXAMINATION**

Time : 4 Hours Max Marks: 40 Marks

- | | |
|---|-----------|
| Q1. Assign the specimens A,B,C&D to the respective families giving diagnostic features and their classifications. | 10 Marks |
| Q2. Draw the floral diagram and write the floral formula of specimen "E" | 03 Marks |
| Q3. Explain the morphological peculiarities observed in the specimens F, G, H & I | 10 Marks |
| Q4. Identify giving botanical name and family of specimens J , K ,L & M. Mention the parts used & their uses. | 08 Marks |
| Journal | 05 Marks. |
| Study tour report | 04 Marks |





17/8

**B.Sc. V Semester
(w.e.f : 2016 – 17)
Botany Paper – I**

Paper-I: Plant Breeding, Tissue Culture & Horticultural Practices. 50 Hrs

Objectives: This paper includes some topics in horticulture like- Nursery, Green House Technology, Harvest and Weed Management. These will be of much help to the students residing in rural and urban areas to generate employment.

Unit 1: Plant Breeding: History and objectives. Introduction, Selection (Pure line, Mass election), Hybridization- inter specific and inter generic. Mutational & Polyploidy breeding. Germ plasm and its maintenance. Pollen Bank, Quarantine method. **10 Hrs.**

Unit 2: Plant Tissue Culture: Scope and Significance. Basic Aspects and Cellular totipotency (Shoot tip, Embryo and Haploid culture techniques). Differentiation and morphogenesis. **10 Hrs.**

Unit 3: Introduction to Horticulture, Nursery management and importance.
Methods of propagation – vegetative – rhizome, bulb, corm and sucker (natural).
Artificial- Cutting, layering, grafting and budding. Bonsai – methods and importance.
Nursery management: Introduction, types of nurseries and cultural practices. Seed (propagule) collection, storage and treatment. Manures, fertilizers and pesticides. Methods of irrigation – drip, sprinkler and flood. **12 Hrs.**

Unit 4: Green House Technology – Introduction, advantages and limitations.
Types of Green Houses- Green House structure, principle
Green house technology as applied to ornamental, vegetable and fruit plants. **08 Hrs.**

Unit 5: Harvest Technology and Weed Management:
Harvest Technology: Flower and fruit plants management. Artificial ripening, maturity indices, methods of picking. Post-harvest technology and management of fruits: grading, processing, storage and packing.
Weed Management: Introduction and significance. Invasive weeds – concept and causes of their dominance. Weed control – physical, chemical and biological methods. **10 Hrs.**

Practicals :

1. Study of methods of propagation with help of tubers, bulbs rhizomes, corms, suckers, runner and offset.
2. Study of propagation by cutting, layering, grafting and budding.
3. Methods of emasculation and bagging for cross-pollination.
4. Morphology and anatomy of dry and wet stigma.
5. Morphology and anatomy of solid and hollow styles.
6. Study of pollination types.
7. Demonstration of tissue culture techniques.
8. Visit to nursery - poly house /Green house and tissue culture lab.
9. Preparation of MS media for culture.
10. Bonsai techniques.





Semester V (w.e.f 2016-17)

Botany Paper – II Paper-II: Ecology, Environmental Biology and Phytogeography

50 hrs

Objectives:-This paper has topics on pollution, pollution control and forestry. Considering the present scenario with respect to environment these topics are most valuable.

Unit 1: Plant and environment: Atmosphere (gaseous composition), water (properties of water cycle), light (global radiation, photo synthetically active radiation), temperature, soil (development, soil profiles, physico-chemical properties), and biota. Morphological, anatomical and physiological responses of plants to water (hydrophytes, xerophytes and epiphytes), temperature (thermoperiodicity and vernalization), light (photoperiodism, heliophytes and sciophytes) and salinity. **12 Hrs.**

Unit 2: Population ecology and Ecosystems: Growth curves; ecotypes; ecads, Ecological succession- hydrach and xerarch. Structure of Ecosystems (Pond and Forest): abiotic and biotic components; food chain, food web, ecological pyramids, energy flow. **10 Hrs.**

Unit 3: Phytogeography: Botanical regions of world, Vegetation types of Karnataka and India. **06 Hrs.**

Unit 4: Conservation of Natural resources: Different types of natural resources and their conservation, Forest and Forest Management: Forest and its ecological significance, deforestation, forest management and social forestry. Natural depletion of vegetation endangered and threatened economic plants of India and red data book. Wild life management in India, Indian board of wild life, national park and sanctuary.

Energy resources: conventional and non conventional sources of energy.

Biodiversity: significance, types, depletion, conservation of biodiversity. **12 Hrs.**

Unit 5: Pollution: Introduction, causes, effects and control measures of Water pollution, Air pollution, Soil pollution, Acid rain, Global warming, and Ozone depletion. Sewage water and waste water types. Methods of effluent treatment of industrial waste water, sludge disposal and its care related to environment. **10 Hrs.**



Practical:

1. Study of frequency and density of herbaceous plants by quadrat method.
2. To determine moisture content and water holding capacity of different types of soils.
3. To estimate the alkalinity of water samples.
4. Ecological instruments.
5. Morphology and anatomical adaptations in three hydrophytes.
6. Morphology and anatomical adaptations in xerophytes: One succulent and one non-succulent, one epiphyte and one halophyte.
7. Waste water analysis, physical chemical parameter, pH, turbidity, TDS, BOD, COD, temperature and any other inorganic elements.
8. Visit to effluent treatment plant to study recycling of waste water nearby industry and study the effect of industrial pollution nearby water bodies (Biomagnification & Eutrophication).
9. Assignment of Project related to practical number eight.
10. Study Tour of minimum two days to study forest types and ecological groups.



Q. III Descriptive Answers

21. From Unit 1: Cell Biology: 01 sub question. 1 X 10 = 10

OR

From Unit 2: Morphology of Chromosomes-01 sub question.

22. From Unit 3: Cell division: 01 sub question. 1 X 10 = 10

OR

From Unit 4: Genetics: 01 sub question.

23. From Unit 4: Genetics: 01 sub questions. 1 X 10 = 10

OR

From Unit 5: Evolution: 01 sub question.

B.Sc VI semester

(w.e.f 2016 -17)

Botany paper -II

(Molecular Biology, Biotechnology & Immunology)

50 hrs

Objectives: - Molecular Biology, Biotechnology and Immunology has some recent trends in the concern fields. This will help students to pursue research in concerned fields.

Unit 1: Nucleic Acids: DNA & RNA, occurrence, types and chemical compositions.

Experimental evidences for DNA as genetic material. Structure of DNA, Replication, semiconservative method, RNA and types, post transcription changes.

10 Hrs.

Unit 2: Gene Expression: Gene concept, Genetic code & protein synthesis. Regulation of gene expression in prokaryotes & eukaryotes.

08Hrs.





Unit 3: Recombinant DNA technology and Bioinformatics:

Enzyme, vector (plasmid PBR 322), marker gene, Steps of cloning technique, PCR and its application, Genomic DNA and cDNA library. Brief concept on Genomics and proteomics.

08 Hrs.

Unit 4: Biotechnology and Genetic engineering of plants:

Basic concepts, principles and scope. Aims, strategies for development of transgenic plants (with suitable example). Agrobacterium-The natural genetic engineer. T-DNA and transposon mediated Gene tagging, intellectual. Property rights, possible ecological risks and ethical concerns.

12Hrs.

Unit 5: Microbial genetic manipulation and Immunology:

Microbial genetic manipulation: Bacterial transformation, selection of recombinant and transformants, genetic improvement of industrial microbes, nitrogen fixers & fermentation technology.

Immunology: Immuno-systems, Immunotechniques in Agriculture, ELISA method to detect Plant diseases & Monoclonal antibodies.

12 Hrs.

Practicals:

1. DNA estimation by DPA diphenyl amine method.
2. RNA estimation by orcinol method.
3. Extraction and estimation of protein from plant source.
1) Salt precipitation method 2) solvent method
4. Culturing of Rhizobium-YEMA media.
5. Culturing of Azotobacteria-ASHBY'S media.
6. Demonstration of Electrophoresis technique
7. Agarose gel electrophoresis.
8. Demonstration and comparison of GM Plants with Non GM Plants (BT- Cotton, BT-Brinjal, BT Tomato).
9. Visit to Biotechnology Research Laboratory.





Suggested Reading:

1. Cell & Molecular Biology -- By E.D.F. De Robertis -- ISE Publication
2. Basic Biotechnology -- Colin Roteledge & Bjorn Kristianses -- Cambridge Uni. Press.
3. A Text Book of Biotechnology – R.C. Dubey – S. Chand Publication
4. Cell Biology, Genetics Molecular Biology, Evolution & Ecology -- P.S. Verma & V. K. Agarwal
5. Casida L.E. (1984)- Industrial Microbiology, Wiley Easterns, New Delhi.
6. Roitt- Immunology
7. Kubey - Immunology.
8. Fatima - Immunology

B.Sc. VI Semester

Practical Paper-II

(Molecular Biology, Biotechnology & Immunology)

Time: 4 Hours

Max Marks: 40

Q.1.	Estimation of DNA/RNA from the given sample A.	10 Marks
Q.2.	Estimation of Protein from the unknown sample B.	10 Marks
Q.3.	Identify and comment C and D.	5 Marks
	Project report submission and Viva voce.	10 Marks.
	Journal.	05 Marks



Comparative Anatomy: Origin, development & structure of Heart, Brain and integument in Fishes, Amphibians, Reptiles, Aves and Mammals 12 hrs.

PRACTICALS

Total Practicals -12

1. Classification of Urochordata, Cephalochordata, Cyclostomes 01
Examples: Balanoglossus, Herdmania, Branchiostoma, Peteromyzon.
2. Classification of Fishes - 01 Examples: Scoliodon, Pristis, Sphyrna, Catla catla, Labeo rohita, Hippocampus, Eel, Exocoetus & Synaptura.
3. Classification of Amphibia – 01 Examples: Frog, Toad, Ichthyophis, Ambystoma, Axolotl Larva & Rhacophorous.
4. Classification of Reptilia- 01 Examples: Calotes, Hemidactylus, Chaemoleon, Mabuya Draco, Naja naja, Python, Viper, Turtle and Crocodile.
5. Classification of Aves – 01 Examples: Psittacula, Owl, Woodpecker, Pigeon and Passer domesticus.
6. Classification of Mammalia – 01 Examples: Sorex, Bat, Loris, Pangolin, Hystrix, Herpetes & Funambulus.
7. Study of Comparative Anatomy: Heart and Brain in Fishes, Amphibians, Reptiles, 02 Aves and Mammals

NOTE:

1. With the help of Charts/Models/Diagrams/Printouts & Xerox Sheets are used in practical's demonstration.
2. As per UGC guidelines Only one species to be demonstrated by Faculty & students should not do any dissection.
3. Students are supposed to draw neat labelled diagrams & write The explanation in their journal.
4. In practical examination question no I & II are put Charts/ Models/ Diagrams/ Printouts & Xerox Sheets of the system Students has to identify & write the explanation in their Examination paper.

5. Compulsory Study Tour/ Field visit to study Animal diversity.
(Submission of project report carries- 5 marks).





RANI CHANNAMMA UNIVERSITY, BELAGAVI

WEL-COME

**TO THE COURSE STRUCTRE AND SYLLABUS OF UNDERGRADUATE
PROGRAMMES – B.Sc**

IV Semester

w.e.f.

Academic Year 2015-16 and onwards





17-18 10

13. ZOOLOGY (Optional)

B.Sc.4th Semester Scheme(CBSC – Pattern)

Zoology (Optional) Revised syllabus 2015-16 onwards

Cell Biology, Histology and Animal Behaviour

Total Teaching hours-50
Total Marks-80
Theory 4hrs/week

UNIT - I

Cell Biology

Cell Biology- Ultra structure of animal cell. Cell theory & cell cycle
Ultrastructure & function of cell organelles - Plasma membrane, Endoplasmic
reticulum, Ribosomes, Golgi-complex
Lysosomes, Mitochondria & Nucleus. 1 hr 44

Chromosomes - Structure & types of chromosomes.
Ultra structure of chromosome 8 hrs 37

2 hrs 4

UNIT - II

Cell division-Types- mitosis & meiosis. 3 hrs 51

Cellular Aging and Cell Death:

Concept of Aging theories: 3 hrs 1K

Intracellular changes, free radicals, somatic nutrition, immunological, clonal
selection and errors in DNA and RNA functions.

Extracellular changes,

Cell Death: Apoptosis, Necrosis, definition and significance

Cancer Cell:

Characteristics:

Theories /Hypothesis regarding causes of cancer.

Extrinsic factors, Physical, Chemical and Biological.

Intrinsic factors, somatic mutations and oncogenes and aging related phenomenon.

3 hrs 1K





B Sc V Semester (5.1)
Paper-I
ZOOLOGY (optional)
(Ecology, Evolution, Paleontology, Zoogeography, Wild life Conservation)

Total-hours,50

Marks-80

Ecology.

Earth as_Living.-Planet. Sub divisions_of ecology, Scope of ecology, Biosphere	1 hr
Abiotic factors ____ Light, Temperature (Effect on Animals and Plants)	2hr
Biotic Factor	
Mutualism,Commensalism,Amensialism,Parasitism,Predation ,Competition,Parasitism.	2hrs
Habitats	4hrs
Freshwater habitat — Lotic and Lentic systems Zonation of Sea,Marine Biota, Esturine ecology, & Mangrooves Terrestrial habitat — A brief account of Biomes.	
Ecological Adaptations — Freshwater, Marine and Terrestrial.	
Biogeochemical Cycles - Principles and concepts of Water, Nitrogen, Carbon, Oxygen cycles	2hrs
Community Ecology-Community structure, Ecological niches, Edge effect, Stratification, Ecoton.	2hrs
Population <u>Ecology</u> : Density, natality, mortality.Age distribution	
Population growth, types and curves.	2hrs





Evolution.

The Solar System Origin of Earth , Origin of Life and its theories	03hrs
The geological time scale	03hrs
Fossils: Definition and Kinds of fossils, How fossils are formed, Methods of Preservation. Connecting links and Living fossils. The importance of fossils	02hrs
Theories of Organic Evolution : Lamarkism, Darwinism, Mutation Theory And the Modern Synthesis Theory;(population gene Pool, Gene Frequency . Variations — gene mutation, chromosomal mutation; Isolation and recombination.Genetic drift,Hardiwienberg equilibrium)	06hrs
Modes of Evolution : Microevolution, Macroevolution and Mega-evolution.	02 hrs
,Evolution of Man and Horse	04 hrs
Paleontology Mesozoic reptiles with a note on Dinosaurs.	03 hrs
Zoogeography: Zoogeographical realms of world , A brief account of Wallace's line	03 hrs
Wildlife Conservation : Wildlife in India,Causes for the depletion of wildlife. Wild Life Conservation Techniques', methods'and measures Brief account of ; IUCN, WWF,Bombay Natural History Society, Indian Board for Wild Life, Red Data Book. Wild Life Act 1972 and its amendments in India,CITES. Project Tiger and Biosphere Reserve.	09hrs





Total -11 Practicals

- 1; Study of fossils (vertebrate(3) and invertebrate(3).
1hrs
2. Mesozoic reptiles (Ichthyosaur, tyrannosaur, brontosaur, triceratops, archaeopteryx .
1hr
3. Evolution of man (Homo-erectus. Hemo-habills. Homo-neandertalences)
1hr
4. Evolution of Horse
1hr
- 5 ;Connecting links and living fossils (Neopilina, Peripatus, Limulus, Latimaria; Archaeopteryx and Duckbill platypus)
1hr
- 6 Study of threatened Animals of India (Tiger,Lion,singal horned rhinoceros
1hr
Musk deer,gaur,Golden langur,Loin tailed monkey.Python)
1hr
- 7 ;Estimation of CO_2 from different water samples
1hr
- 8; Estimation of dissolved oxygen
1hr
- 9; Estimation of Total hardness
1hr
- 10;Study of Ecological Adaptations and Morphological peculiarities,;ex-Hermit crab, 1hr
Draco,Stick insect,puffer fish,Exocoetus,Phrynosoma,chamaeleon and Bat.
- 11;Visit to nearby water body to study Ecosystem
1hr

REFERENCE BOOKS:-

Evolution : Odum

Organic Evolution: N.Arumugam

Evolution, Dobzhansky, Ayala,Stebbins & Valantine

Environmental Biology.Rastogi and Company,Meerut

Evolution of the Vertebrates, Colbert E.H. John Wiley and Sons, New York

Ecology;Principles and Application.chapman,Cambridge university press

Environmental Biology P.R.Trivedi and gurudeep Raj.

Recent Advances in Environmental Biology –Diwan and D.K.Arora

Environmental Science;Eldon.D.Enger andBradly.F,Smith





Suggestions for Practical Examination

SEM— V-5.I

Q. NO I) Estimation of Carbondioxide/O xgen/Total hardness	8marks
Q.NO II) Evolution (Two spottings)	4 marks
Q NO III) Fossils (Two spottings)	4 marks
Q NO IV) Identification (Zoogeography & Wild life)	4 marks
Q NO V) Project on Local Biodiversity	10 marks
Q NO. VI Viva	5 marks
Q NO. VII Journal	5 marks

Note 1 :- Examiners can alter the Scheme of marks for practical in consultation with the staff of the host college.

marks	Note :2	Theory	Internal	20
marks			Final	80
marks		Practical	Internal	10
marks			Final	40

Note 3: Question paper pattern for THEORY examination

	Q No. 1	02 marks = 20 marks	10* 02	
30 marks	Q No. II	05 marks	06* 05	=
10 marks	Q No. III	10 marks	01* 10	=
10 marks	Q No. IV	10 marks	01* 10	=



19-20

Zoology

Rani Channamma University, Belagavi
B.Sc VI Semester - 6.1

Paper I

Total hours - 50
Marks - 80
Theory 4 hrs/week

APPLIED ZOOLOGY (optional)

- Sericulture : Mulberry Silkworm and Life History of Bombyx mori Rearing of Silkworm: Grainage management, Emergence of moth and fertilization, egg laying, hatching and moulting of silkworm, spinning of cocoons. Cocoon processing, stiffling and spinning silk. Filature. Non mulberry silkwarm, types. in brief & Silkworm diseases- Muscardine, Grasserie, Flacherie & Pebrine. 07 hrs
- Apiculture: Species of Honey Bees, their Social organization, Life History Methods of Bee Keeping, products of Bees, & their Economic importance 05 hrs
- Insect Pest Management : Natural control and Applied control of pests Applied Control — Mechanical, Physical, Cultural, Legal, Chemical control 05 hrs
- Vermiculture: Earthworm species used in vermiculture, vermiculture technique, and importance of vermiculture. 04 hrs
- Aquaculture : Prawn Fisheries, Species of Prawns, Culture of freshwater and marine Prawns. Preservation and processing of Prawns. 10 hrs
- Pearl Culture : Pearl producing molluscans, Pearl formation, Pearl producing Sites in India. Quality and composition of Pearl. Pearl industry Artificial Insertion of nucleus 06 hrs
- Brief technique of Fish culture, Preservation of fishes and their Byproducts
- Poultry : Breeds of fowl, Diseases of poultry, Poultry maintenance and By-products, and Composition and Nutritive value of Egg. 10 hrs
- Animal Husbandary: Maintenance, Breeds Diseases, Products and By Products of the following Sheep and Goats, Cow and Buffalos, Composition and Nutritive value of Milk 3 hrs
- Lac culture: Classification of Lac insect (Techaridia lacca, Life history of Lac Insect. Host plants, Cultivation of Lac. Composition and properties & Economic importance





2017-18 VI sem P-I

Practicals - 6.1

Total -11 Practicals

1 Project on any of the applied branch studied in theory	1
2 Study of mulberry silkworm and Life cycle	1
3 Types of non mulberry silkworms in brief and Silkworm diseases (Pebrine, Muscardine and Grasserie & Flaturie)	1
4 Species and castes of honeybees	1
5 Agricultural pests and domestic pests (total 8 varieties)	1
6 Study of fisheries __ Molluscs (three), Crustaceans (three) And Pisces (six)	1
7 Study of Varieties of sheep and goat (from chart/photographs)	1
8 Study of varieties of Cow & Buffalos(from chart/photographs)	1
9 Vermiculture __ Study of types of Earthworm species	1
10 Study of poultry breeds	1
11 Study of Lac insect (Life cycle)	1

Scheme for practicals 6.1 APPLIED ZOOLOGY

Q No. I Sericulture	03 marks
Q No. II Apiculture	03 marks
Q No. III Pest management	03 marks
Q No. IV Pisciculture	03 marks
Q No. V Vermiculture	03 marks
Q No. VI Animal Husbandry	06 marks
Q No. VII Prawn & Pearl culture	04 marks
Q No. VIII Project report & Viva	10 marks
Q No. IX Journal	05 marks

Total 40 marks

Note 1: Examiners can alter the Scheme of marks for practical in consultation With the staff of the host college





Rani Channamma University, Belagavi
 B Sc VI Semester 6.2

Paper II
 (Microbiology, Nanotechnology, Bioinformatics and Methods in Biology)

Total hours – 50
 Marks _ 80
 Theory 4 hrs/week

Microbiology

- | | |
|--|-----------------|
| 1. Microscopy : Compound Microscope and its functions
Dark field microscope. Fluorescent Microscope
Phase Contrast Microscope and Electron Microscope and their uses | 03 hrs |
| 2. Sterilization and other Techniques _ Physical and Chemical methods
Bacteria Classification based on shapes, structure (anatomy) Bacterial reproduction and growth. | 01 hr
02 hrs |
| 3. Virus _ Morphology, chemical properties, classification and nomenclature
DNA and RNA viruses. | 02 hrs |
| 4. Fungi: Structure, classification and reproduction, Yeasts | 02hrs |
| 5. Fermentation: Types of Fermentor and basic functions
Methods of preservations and criteria for the selection of microorganisms | 03hrs |
| 6. Production of antibodies Penicillin, Streptomycin, Enzyme protease, Riboflavin. | 02hr |
| 7. Ormal microbial flora of the human body | 01hr |
| 8. Role of microbes in environment | 01hr |

Nanotechnology

4hrs

Introduction : History Name, Tools and Techniques in Nanotechnology.

Nanobiology; application of Nano in biology- Nano drug Administration Diagnostic & Therapeutic applications. Lotus effect, Gold & Silve Nanotechnology. Curcumin phytochemicals, Cinnamon in green nano technology.





Bioinformatics

- 1 Introduction: Definition, Goal of Bioinformatics, Sequencing, Sequences analysis and Structure analysis Applications of Bioinformatics. 02hrs
- 2. Classification of Biological Data Bases. Characteristics of FASTA (Fast Alignment) BLAST (Basic Local Alignment Search Tool). 02hrs
- 3. Aims and goals of Human Genome Project: Main findings of human genome Project., Prediction and tools for gene prediction. Comparative genomics. 02hrs
- 4. Proteomics: Two dimensional Gel Electrophoresis Mass spectrometry, SDS __ PAGE Structure of protein __ Primary, Secondary, Tertiary and Quarternary. 02hrs
- Protein structure prediction 01hr
- Application of Proteome analysis 01hr
- The future of Proteomics

Methods in Biology

- Techniques of Cell fraction and Centrifugation. Homogenization and cell tissue disruption Centrifugation, Ultra centrifugation. 02hrs
- DNA Sequencing, _ In situ Hybridization, DNA microchips 02hrs
- Genetic Engineering in animals- Transgenic Mouse, Transgenic sheep, Genetically Altered Fish, Mosquito and Drosophila. 02hrs
- Gene therapy in Humans 02hr
- Histochemical and Immunization Techniques _ ELISA, RIA, Flow Cytometry 02hrs





RANI CHANNAMMA  UNIVERSITY, BELAGAVI

Department of Mathematics

Syllabus

for

Master of Science in Mathematics

III & IV Semester

(with effect from 2014 – 15)





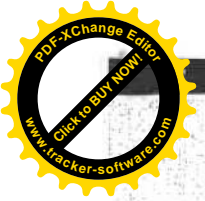
Mathematics

Choice based credit system (CBCS)

Course structure

S. No.	Paper & Title	Credit	No of Hrs/week Theory/ Prctical	Duration of exam in Hrs Theory/ Prctical	IA Marks Theory/ Prctical	Marks at the Exams	Total Marks
III Semester							
3.1	Measure Theory and Integration	4	4	3 Hrs	20	80	100
3.2	Discrete Mathematical Structures	4	4	3 Hrs	20	80	100
3.3	Differentiable Geometry	4	4	3 Hrs	20	80	100
3.4	Numerical Analysis	4	4	3 Hrs	20	80	100
3.5	Algebraic Topology	4	4	3 Hrs	20	80	100
3.6	Open Elective Course – II a. Statistics & Quantitative Techniques b. Optimization Techniques	4	4	3 Hrs	20	80	100
IV Semester							
4.1	Functional Analysis	4	4	3 Hrs	20	80	100
4.2	Probability Theory	4	4	3 Hrs	20	80	100
4.3	Differential Manifolds	4	4	3 Hrs	20	80	100
4.4	Optional / Specialization I. Fluid Mechanics II. Number Theory and Cryptology III. Commutative Algebra IV. Mathematical Physics V. Galois Theory VI. Computational Complexity Theory	4	4	3 Hrs	20	80	100





4.5	Optional / Specialization I. Mathematical Finance II. Operations Research III. Graph Theory IV. Fourier Analysis V. Banach Algebra VI. Mathematical Modeling	4	4	3 Hrs	20	80	100
4.6	Project	4	The candidate shall submit a dissertation carrying 80 marks and appear for viva-voce carrying 20 marks				100
Total		96					2400





RANI CHANNAMMA UNIVERSITY, BELGAUM



**Syllabus for
P.G. Department of Studies in COMMERCE
(I TO IV Semesters)**

**Under Choice Based Credit System From
2011 – 12 and Onwards**





SEMESTER	PAPER CODE	COURSE	MARKS			HRS/ WEEK	CREDITS
			IA	SEM END	TOTAL		
IV	COMPULSORY COURSES						
	4.1	CORPORATE GOVERNANCE	20	80	100	04	04
	4.2	INTERNET TECHNOLOGIES FOR BUSINESS	20	80	100	04	04
	4.3	INFRASTRUCTURE DEVELOPMENT AND FINANCE	20	80	100	04	04
	SPECILIZATION COURSES						
	GROUP A: ADVANCED COST ACCOUNTING						
	4.4	TECHNIQUES OF COSTING	20	80	100	04	04
	4.5	STRATEGIC COST MANAGEMENT	20	80	100	04	04
	4.6	PROJECT REPORT VIVA-VOCE	50	50	100	04	04
	GROUP B: BUSINESS FINANCE AND ACCOUNTING						
	4.4	FINANCIAL MARKETS AND INSTITUTIONS	20	80	100	04	04
	4.5	INNOVATIONS IN ACCOUNTING	20	80	100	04	04
	4.6	PROJECT REPORT VIVA-VOCE	50	50	100	04	04
	GROUP C: BANKING						
	4.4	FOREIGN EXCHANGE AND RISK MANAGEMENT	20	80	100	04	04

