GOBI ARTS & SCIENCE COLLEGE (AUTONOMOUS) : GOBICHETTIPALAYAM

SCHEME OF EXAMINATIONS - B.Sc. BOTANY (15 BATCH)

No.	Code	Subject Title	Hrs	CIA	EOSE	Total	Credit
SEMESTER : 1							
1	15U1TM01	PART I : TAMIL - I	3	25	75	100	3.0
2	13U2EN01	PART II : ENGLISH - I	3	25	75	100	3.0
3	14UABO01	PART III : MAJOR CORE : PLANT DIVERSITY - I ALGAE,FUNGI,LICHENS AND PLANT PATHOLOGY	3	25	75	100	5.0
4	14UBZO01	PART III : ALLIED CORE : ZOOLOGY PAPER - I INVERTEBRATA AND CHORDATA	3	25	75	100	3.0
5	15U4HE01	PART-IV: i)HUMAN EXCELLENCE:PAPER-I BASICS OF YOGIC LIFE	3	25	75	100	1.0
6	14U4EN01	ii)FOUNDATION SUBJECT-A REMEDIAL ENGLISH-I	3	25	75	100	1.0
SEMESTER : 2							
7	15U1TM02	PART I : TAMIL - II	3	25	75	100	3.0
8	13U2EN02	PART II : ENGLISH - II	3	25	75	100	3.0
9	14UABO02	PART III : MAJOR CORE : PLANT DIVERSITY - II BRYOPHYTES,PTERIDOPHYTES, GYMNOSPERMS AND PALAEOBOTANY	3	25	75	100	5.0
10	12UBZO02	PART III : ALLIED CORE : ZOOLOGY PAPER - II : GENERAL PRINCIPLES OF ZOOLOGY	3	25	75	100	3.0
11	14UABOP1	MAJOR CORE PRACTICAL - I (COVERING SEMESTER I & II PAPERS)	3	25	75	100	5.0
12	14UBZOP1	ALLIED CORE ZOOLOGY PRACTICAL	3	25	75	100	4.0
13	15U4HE02	PART-IV : i)HUMAN EXCELLENCE:PAPER-II SUBLIMATION AND SOCIAL WELFARE	3	25	75	100	1.0
14	13U4HEP1	PRACTICAL – I: YOGA PRACTICE-I		100		100	1.0
15	14U4EN02	ii)FOUNDATION SUBJECT-A REMEDIAL ENGLISH - II	3	25	75	100	1.0
16	12U4FN01	GENERAL AWARENESS	1.5		100	100	1.0
SEMESTER : 3							
17	15U1TM03	PART I : TAMIL - III	3	25	75	100	3.0
18	13U2EN03	PART II : ENGLISH - III	3	25	75	100	3.0
19	14UABO03	PART III : MAJOR CORE : CELL BIOLOGY, ANATOMY AND EMBRYOLOGY	3	25	75	100	5.0
20	14UBCH04	PART III : ALLIED CORE : CHEMISTRY	3	25	75	100	3.0
21	14U4HE03	PART-IV : i)HUMAN EXCELLENCE: PAPER-III MENTAL PROSPERITY AND HUMAN EXCELLENCE	3	25	75	100	1.0
22		ii)FOUNDATION SUBJECT-B	3		100	100	2.0

Contd....

SEMESTER : 4

23	15U1TM04	PART I : TAMIL - IV	3	25	75	100	3.0
24	13U2EN04	PART II : ENGLISH - IV	3	25	75	100	3.0
25	14UABO04	PART III : MAJOR CORE : MICROBIOLOGY	3	25	75	100	5.0
26		PART III : ALLIED OPTIONAL	3	25	75	100	5.0
27	14UABOP2	MAJOR CORE PRACTICAL-II (COVERING SEMESTER III & IV PAPERS)	3	25	75	100	5.0
28	08UBCHP1	ALLIED CORE CHEMISTRY PRACTICAL	3	25	75	100	2.0
29	14U4HE04	PART-IV : i)HUMAN EXCELLENCE: PAPER-IV SCIENCE OF DIVINITY AND REALIZATION OF SELF	3	25	75	100	1.0
30	13U4HEP2	PRACTICAL – II: YOGA PRACTICE-II		100		100	1.0
31		ii)FOUNDATION SUBJECT-B	3		100	100	2.0
32		PART V : CO-CURRICULAR ACTIVITIES					1.0

SEMESTER : 5

33	14UABO05	PART III : MAJOR CORE : TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY	3	25	75	100	4.0
34	14UABO06	GENETICS AND PLANT BREEDING	3	25	75	100	4.0
35	14UABO07	ELECTIVE: BIOLOGICAL TECHNIQUES	3	25	75	100	4.0
36	14UABO08	ELECTIVE:HORTICULTURE AND SEED TECHNOLOGY	3	25	75	100	4.0
37		PART-III : MAJOR OPTIONAL	3	25	75	100	4.0

SEMESTER : 6

38	14UABO09	PART III : MAJOR CORE : ENVIRONMENTAL BOTANY, FORESTRY AND PHYTOGEOGRAPHY	3	25	75	100	4.0
39	14UABO10	PLANT PHYSIOLOGY	3	25	75	100	4.0
40	14UABO11	ELECTIVE: BASICS OF BIOTECHNOLOGY	3	25	75	100	4.0
41	14UABO12	ELECTIVE: APPLIED BIOTECHNOLOGY	3	25	75	100	4.0
42	14UEBO01	MAJOR SKILL BASED PAPER : MEDICINAL BOTANY	3	25	75	100	4.0
43	14UABOP3	MAJOR CORE PRACTICAL-III (COVERING ALL THE V SEMESTER PAPERS)	3	25	75	100	7.0
44	14UABOP4	MAJOR CORE PRACTICAL-IV (COVERING ALL THE VI SEMESTER PAPERS EXCEPT SKILL BASED)	3	25	75	100	7.0
45	14UEBOP1	MAJOR SKILL BASED PRACTICAL: MEDICINAL BOTANY	3	25	75	100	4.0

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CREDIT:

PART I : 12 PART II : 12 PART III MAJOR : 88
ALLIED : 20
---> 108
PART IV :13 PART V : 1 TOTAL : 146

SEMESTER – I

PAPER –I PLANT DIVERSITY-I
ALGAE, FUNGI, LICHENS AND PLANT PATHOLOGY

Instructional hrs: **105**

Objectives: 1. To study the morphology and diversity of Algae
2. to understand the structural components and Reproduction of Fungi
3. To study the basis of plant diseases of crop varities

UNIT – I **21 h**

Algae: – Classification (Smith,1955), General characters, study of the structure, reproduction and life cycle of *Nostoc*,***Chlamydomonas,*** and ***Caulerpa***.

UNIT – II **21 h**

Structure, reproduction and life cycle of Diatoms, ***Dictyota***,and ***Polysiphonia*** **.** Economic importance of Algae.

UNIT –III **21 h**

Fungi: - Classification (**Alexopoulos,** 1962); General characters, structure and reproduction of ***Albugo, Saccharomyces*** and ***Penicillium.***

UNIT – IV **21 h**

Structure and reproduction of ***Puccinia, Agaricus*** and ***Colletotrichium.*** Economic importance of Fungi.

Lichens: Occurrence, types, structure and economic importance.

UNIT – V **21 h**

Plant Pathology: Definitions; Major terms; Causative organisms, Symptoms, Disease cycle and control measures of the following diseases:- Late blight of Potato; Whip smut of Sugarcane; Little leaf of Brinjal, Citrus Canker.

Practical I **(Instructional Hours : 30)**

A detailed study of the Genera and Diseases included in the syllabus.

Text books:

1. Pandey, B.P. **Algae**. S. Chand & Company Ltd, New Delhi.
2. Vashishta B.R. **Algae**. . S. Chand & Company Ltd, New Delhi
3. Vashishta, B.R. **The Fungi**. S. Chand & Company Ltd, New Delhi
4. Alexopoulos C.J. **Introductory mycology**. Toppam Company Ltd., Tokyo
5. Pandey, B.P. **Plant pathology.** S. Chand & Company Ltd, New Delhi
6. Mehrotra, R.S**. Plant Pathology**. Tata Mcrew Hill, New Delhi
7. Annie and Kumaresan, Mycology and Lichenology, Saras Publications, Nagarcoil
8. Mehrotra, R.S**.** & K.R. Aneja**. An Introduction to Mycology**. New Age International,

ALLIED SUBJECT: SEMESTER – I PAPER – I INVERTEBRATA AND CHORDATA

Classification is excluded for all the Units.

Instructional Hours: 105 Max. Marks: 75

Objectives: 1. To understand systemic and functional morphology of various groups of Invertebrates & Chordates.

2. To understand the various physiological processes in animals.

PHYLUM	TYPE STUDY
UNIT – I	24Hrs.
PROTOZOA	PARAMECIUM
PORIFERA	LEUCOSOLENIA
COELENTERATA	OBELIA
UNIT – II	24Hrs.
PLATYHELMINTHES	TAENIASOLIUM
ANNELIDA	EARTH WORM
ARTHROPODA	COCKROACH
UNIT – III	16 Hrs.
MOLLUSCA	FRESH WATER MUSSEL
ECHINODERMATA	STAR FISH

A Comparative study of the systems (Digestive, Respiratory, Heart, Brain and urino genital systems) to be made for the types included under Unit IV and V.

UNIT – IV	17 Hrs.
CHORDATA	SHARK AND FROG
UNIT – V	24 Hrs.
CHORDATA	CALOTES, PIGEON AND RABBIT.

Text books:

1. Out lines of Zoology Vol.I & II by Ekambaranatha Ayyar. M and Ananthakrishnan, T.N., S. Viswanathan and Co., Madras.
2. Invertebrata & Chordata by Dr. N. Arumugam, Saras Publication, Nagercoil.

References:

1. Jordan, E.L. and P.S. Verma, 1993: Invertebrate Zoology, 12th Edition, S. Chand and Co.Ltd., New Delhi.
2. Jordan, E.L. and P.S. Verma 1995: Chordate Zoology and elements of Animal Physiology. S. Chand and Co., Ltd., New Delhi.
3. Kotpal, R.L. 1992: Vertebrata, Rastogi publications, Meerut.

QUESTION PAPER PATTERN

(Effective from 2012 – 2013 Onwards)

Section – A (10 x 1 = 10)

Very short Answers type questions. Answers should be in one or two sentences only. Two questions from each of the five units. (without choice) (Q.No.:1-10)

Section – B (5 x 4 = 20)

Short Answers type questions. Each Answer should not exceed 200 words. One "EITHER OR" type questions from each of the five units. (Q.No.: 11-15)

Section – C (5 x 9 = 45)

Long Answers type questions. Each Answer should not exceed 600 words. One "EITHER OR" type questions from each of the five units. (Q.No.: 16-20)

SEMESTER – II

PAPER –II PLANT DIVERSITY – II
BRYOPHYTES, PTERIDOPHYTES, GYMNOSPERMS AND PALAEOBOTANY

Instructional hrs: **105**

Objectives: 1. To know the evolutionary pathway for higher plants
2. To acquire knowledge on Non-flowering plants
3. To know about the fossil studies

UNIT – I **21 h**

Bryophytes : Classification of Bryophytes (Sporne, 1966); General characters, Occurrence, Habit, Reproduction and Alternation of generation in the following genera: - ***Riccia, Porella, Anthoceros*** and ***Pogonatum***

UNIT – II **21 h**

Pteridophytes: Classification (Sporne, 1966); Detailed study of the following genera:- ***Lycopodium, Selaginella*** and ***Equisetum.***

UNIT – III **21 h**

Ophioglossum, Gleichenia and ***Marsilea.*** Stelar evolution , Heterospory and seed habit.

UNIT – IV **21 h**

Gymnosperms: Classsification (Sporne, 1966); Morphology, Structure and Reproduction of the following genera:- ***Cycas*** and ***Gnetum***

UNIT – V **21 h**

Palaeobotany: Introduction; Types of Fossils; Geological Time scale; Radio Carbon Dating method. Study of the following fossils ***Lepidodendron*** and ***Calamites*** (Pteridophytic fossils); ***Williamsonia*** (Gymnospermic fossil).

(Developmental studies are not included for all the above said genera)

Practical I (Instructional Hours : 30)

A detailed study of the genera included in theory

Text books:

1. Vashishta, B. R. **Bryophytes.** S. Chand & Company Ltd, New Delhi.
2. Vashishta, P.C**. Pteridophytes** S. Chand & Company Ltd, New Delhi
3. Morphology of Pteridophytes by Sporne, K.R.
4. Gymnosperms by Vashishta, P.C.
5. Morphology of Gymnosperms by Sporne, K.R.
6. Arnold. **An introduction to Palaeobotany** Agrobios, Jodhpur
7. Essentials of Palaeobotany by Shukla and Mishra
8. Lily Bora, Principles of Paleobotany, International Scientific Publishing Academy

Allied Subject: Semester – II
PAPER – II: GENERAL PRINCIPLES OF ZOOLOGY
(Effective from 2012 & 2013 Onwards)

Instructional Hrs: 105

Objective: To acquire a basic knowledge about the General principles of Zoology.

Unit – I 20 Hrs

Cell Biology: Structure of an animal cell. Cell division – mitosis and meiosis. Genetics: Cytoplasmic inheritance, syndromes and inborn errors of metabolism.

Unit – II 25 Hrs

Developmental Biology: Types of vertebrate eggs, cleavage pattern, blastulation and gastrulation in frog. Immunology: Immunity – innate and acquired immunity.

Unit – III 20 Hrs

Physiology: Physiological adaptation (osmo-ionic regulation) in animals of different habitat (sea, freshwater and terrestrial).

Unit – IV 20 Hrs

Endocrinology: Ultra structure and functions of endocrine glands – Pituitary, Thyroid, Parathyroid, Adrenal, Islets of langerhans, Thymus, Ovary and Testis.

Unit – V 20 Hrs

Medical Microbiology: Bacterial diseases – Tuberculosis, Typhoid fever, Streptococcal pharyngitis, Dysentery and Leprosy. Viral diseases – Aids, Poliomyelitis, Hepatitis A, B, C. and Rabies, Economic Zoology: A brief study of Sericulture and Apiculture.

Text books:

1. Out lines of Zoology Vol.I & II by Ekambaranatha Ayyar, M and Ananthakrishnan, T.N., S. Viswanathan and Co., Madras.
2. Cell biology by N. Arumugam, Saras publication, Nagercoil – 2
3. Genetics by Dr. R. P. Meyyan, Saras publication, Nagercoil -2
4. A Text Book of Embryology by N. Arumugam, Saras publication, Nagercoil – 2
5. Immunology by Dulsy Fatima Dr. N. Arumugam, Saras publication, Nagercoil – 2
6. Animal Physiology by A. Mariakuttikan and N. Arumugam, Saras publication, Nagercoil -2.
7. Mani, A., Selvaraj, A.M. Narayanan, L.M. & Arumugam, N., 1996: Microbiology-Saras Publications, Nager Coil – India.
8. Economic Zoology by KKC, Vishwapremi, Anmol publication, Pvt, Ltd, New Delhi.

References:
1. Verma, P.S. and V.K. Agarwal, 1995: Cell and Molecular biology, 8th Edition, S. Chand & Co., New Delhi-567P.
2. Verma, P.S. and V.K. Agarwal, 1995: Genetics, 8th Edition, S Chand & Co., New Delhi-580PP.
3. Verma, P.S. and V.K. Agarwal, 1991: Chordate embryology, S. Chand & Co. New Delhi.
4. Roitt, I.M. 2000: Essential Immunology, Blackwell Scientific publishers.
5. Berry A.K., 1997: A Text Book of Animal Physiology, Emkay publications, Delhi.
6. Shukla, G.S. and V.B. Upadhyay, 2000: Economic Zoology, Rastogi publications., Meerut.

QUESTION PAPER PATTERN

(Effective from 2012 – 2013 Onwards)

Section – A (10 x 1 = 10)

Very short Answers type questions. Answers should be in one or two sentences only. Two questions from each of the five units. (without choice) (Q.No.:1-10)

Section – B (5 x 4 = 20)

Short Answers type questions. Each Answer should not exceed 200 words. One "EITHER OR" type questions from each of the five units. (Q.No.: 11-15)

Section – C (5 x 9 = 45)

Long Answers type questions. Each Answer should not exceed 600 words. One "EITHER OR" type questions from each of the five units. (Q.No.: 16-20)

DEPARTMENT OF ZOOLOGY
ALLIED ZOOLOGY PRACTICAL

Instructional Hrs: 60
Objective: To obtain knowledge about the Anatomy of Animals.

Live Dissection practicals are completely dispended as per the UGC regulations. Hence, Virtual dissections using Computer aided programmes are introduced.

1. DISSECTIONS: 42Hrs.

   EARTH WORM: Digestive system and Nervous system.
   FROG: Digestive, Urino – Genital systems and Spinal nerves.

2. MOUNTING: 6 Hrs.

   Mounting of Body setae in Earth Worm. Mouth Parts of Cockroach and Brain of Frog.

3. SPOTTERS: 12 Hrs.

   Paramecium (entire and conjugation) Leucosolenia, obelia colony, obelia Medusa, Taeniasolium, Earthworm, Cockroach, Fresh Water Mussel, Sea Urchin, Shark entire, (Male and female Sharks), Frog, Calotes, Pigeon and Rabbit.

   Frog Embryology:

   I. Frog's egg.

   II. Stages of Cleavage.
      1. Early Cleavage
      2. Late Cleavage

   III. Blastulation – Blastula.
      1. Early Blastula
      2. Late Blastula

   IV. Gastrulation:
      1. Yolk plug(WM)
      2. Gastrula with yolk plug T.S.

References:

1. Verma, P.S. 2011: A Manual of Practical Zoology-INVERTEBRATES, S. Chand & Co., Ltd. Ram Nagar, New Delhi.
2. Verma, P.S. 2011: A Manual of Practical Zoology CHORDATES, S. Chand & Co., Ltd., Ram Nagar., New Delhi.

SEMESTER – III

PAPER –III CELL BIOLOGY, ANATOMY AND EMBRYOLOGY

Instructional hrs: **105**

Objectives: 1. To study the Cellular structure of plants and their functions
2. To study about the tissues and anatomical characters of higher plants
3. To know the embryological characters of Angiosperms

UNIT – I **21 h**

Cell Biology : Ultra structure and functions of Cell wall; Plasma membrane (fluid mosaic model), Mitochondria, Ribosomes, Chloroplast, Nucleus, Chromosomes; Cell cycle; Cell division – Mitosis and Meiosis.

UNIT – II **21 h**

Anatomy : Tissues:- Structure, Types and functions of Simple tissues (Parenchyma, Collenchyma, Sclerenchyma); Complex tissues (xylem and phloem). Meristems, Shoot apex (apical cell theory, Tunica Corpus theory); Root apex (apical cell theory, Korper-Kappe theory). Primary structure of the Root, Stem and leaf (Dicot and Monocot).

UNIT – III **21 h**

Normal secondary growth in Dicot stem and root; Monocot ***(Dracaena*)**. Anomalous secondary growth:- Cortical bundles (**Nyctanthes)**; Medullary bundles and successive cambium (***Boerhaavia)***, Intra xylary phloem (***Leptadenia)*** and Inter xylary phloem (***Achyranthes)*.**

UNIT –IV **21 h**

Embryology : Microsporangium:- structure and development; Microsporogenesis; Tetrad types; pollen development. Megasporangium:- structure and development. Types of ovules; Development of embryo sac; Classification of embryo sacs ***(Polygonum, Allium*, *Peperomia)*.**

UNIT –V **21 h**

Endosperm : Types and development; Endospermal haustoria. Embryo: Structure and development of dicot embryo (***Capsella bursapastoris***) and monocot embryo (***Luzula***) Polembryony; Parthenocarpy.

Practical II (Instructional hours : 30)

Study of plant cell organelles include in theory of photographs and book diagrams etc.
Study of mitosis by Squash techniques, Study of Tissues, Study of normal dicot stem (*Tridax / Helianthus*); root (*Tridax / Helianthus*); leaf (*Mangifera*) and Normal Monocot stem, Root, Leaf (Sorghum/Maize).

Normal Secondary Growth : Dicot stem (*Hibiscus*), and root(Bean)
Anomalous Secondary Growth : Anomalous structure as mentioned in the theory.

Embryology: T.S. of Anther - various stages or development, pollengrains, female Gametophyte, Endosperm to be studied from permanent slides. Embryo mounting (*Tridax)*.

Text books:

1. Power, C.B**. Cell biology.**
2. Verma, P.S. and V.K. Agarwal, **Cytology.**
3. Pandey, B.P. **Plant anatom y**. S. Chand & Company Ltd, New Delhi
4. Easu K**. Plant anatomy**. Wiley Eastern , New Delhi
5. Bhojwani S.S. and S.P. Bhatnagar. **The embryology of Angiosperms**. Vikas Publishing House, New Delhi

6. Vashista**, Plant Anatomy, S. Nagin & Co, New Delhi**

SEMESTER – III
ALLIED CORE CHEMISTRY FOR BOTONY

UNIT-I (18 hours)

General survey of chemicals used in everyday life.

Cosmetics: Talcum powder, tooth pastes, shampoos, nail polish, perfumes, - possible Hazards of cosmetics use.

Soaps: Raw materials – definition of soap – manufacture by continuous hot process – cleaning action of soap.

Detergents: Introduction – classification with one example each (manufacture not necessary) – Difference between soaps and detergents.

Plastics, polythene, pvc, bakelite, polyesters, resins, and their applications.

Natural rubber-Synthetic rubbers.

Vulcanization - definition and its applications.

UNIT-II (18 hours)

Colour chemicals used in food - soft drinks and its health hazards.

Food preservatives-Definition-examples-methods of preservation-low and high temperature.

Sugar - Structure and properties.

Nutritive value - Sugar composition in different food items. Artificial sweeteners - example - advantages and disadvantages.

Adulterants in milk, ghee, oil, coffee powder, tea, asafetida, chili powder, pulses and turmeric powder - identification.

UNIT – III (18 hours)

Soil Chemistry: Introduction - characteristics of water - alkalinity - hardness - expressing hardness - equivalents of calcium carbonate- Determination of hardness of water - complexometric method using EDTA only.

Introduction: Classification of soil and properties of soil - soil acidity - causes of acidity - soil alkalinity - determination of soil pH - buffering of soils - amending the soil - reclamation of acid soil - liming agents.

Soil Fertility and Productivity: Organic manures - Farmyard manure - compost - oil cakes - bone meal - meat meal - fish meal - blood meal and green manures.

Fertilizers - Classification of fertilizers - requisites of a good fertilizers - nitrogenous fertilizers(urea only) - phosphatic fertilizers(super phosphate of lime - Triple super phosphate) - potassic fertilizers (white & red potash)- calcium ammonium nitrate (CAN), ill effects of fertilizers - effect of fertilizers on soil pH - Micronutrients - role of micronutrients

UNIT – IV (18 hours)

Metal complexes - Structure and functions of hemoglobin and myoglobin(structural difference-pH dependence-Bohr effect, effect of oxygenation of heme group, mechanism of interactions of hemoglobin-sequencial and concerted models). chlorophyll (Structure & functions, photo synthesis, photo system I & II.), photosynthetic pigments and their functions, cytochrome (structure & functions only), sodium-potassium pumps-function-resting potential-transport-functioning as signal transducer-mechanism.

UNIT – V (18 hours)

Beer-Lambert's law (problem). colorimetric principle - estimation of iron by colorimetric. Flame photometry – principle – instrumentation (block diagram only) – estimation of sodium by flame photometry. Atomic absorption spectroscopy – principles – instrumentation (block diagram only) – estimation of nickel by atomic absorption spectroscopy.

References

1. Text book of "Principles of Inorganic Chemistry" – Puri & Sharma
2. Text book of "Fundamentals of Bio-Chemistry" – J.L. Jain
3. Text book of allied chemistry – Dr V.Veraiyan
4. Biochemistry --- U.Sathyanarayana

QUESTION PAPER PATTERN
(MAJOR AND ALLIED CHEMISTRY)

Effective from 2006- 2007 and thereafter

SECTION - A

Questions for answer not exceeds one or two sentences with no choice
10. Questions – 2 each from every unit (10 x 1 = 10)

SECTION - B

Short answer questions of either / or type
5 question – one each from every unit
(Answer – about 60 words) (5 x 4 = 20)

SECTION - C

Essay – type or sub – division type questions of either / or type
5 questions – one each from every unit
(Answer – about 200 words) (5 x 9 = 45)

Total = 75

SEMESTER – IV

PAPER –IV MICROBIOLOGY

Instructional hrs: **105**

Objectives: 1. To study the basic structure of microbes and their Classification
2. To study the applications of microbes in the Industries
3. To know the impact of microbes on environment

UNIT – I **21 h**

Bacteria : Structure, nutrition, reproduction and economic importance. Gram staining.
Viruses :General characters;Structure and multiplication of plant Virus (TMV) and Animal virus (T_4 – Bacteriophage); Virus transmissions.
AIDS: Structure of HIV, disease symptoms, infection and control.

UNIT –II **21 h**

Media preparation: PDA, Czapek's Dox and Nutrient medium (agar & broth). Sterilization process (Moist heat, Dry heat & membrane filtration methods). Culturing techniques: Agar slant, deep, serial dilution, pour plate (Streak and Spread) and enrichment culture. Isolation methods of pure culture. Growth curve.

UNIT-III **21 h**

Industrial Microbiology: Fermenter; Fermentation:- Techniques and Types employed in Industrial processes; Importance of microbial enzymes in industries (Invertase, Lactase, Pectinase, zymase and proteases): Production of vinegar: - Quick generator method and Vitamin B_{12}

UNIT-IV **21 h**

Food Microbiology: Microbial food spoilage - Factors affecting the kinds and amount of microorganisms and General chemical change caused by microorganism. Kinds and source of microorganisms in Milk, pasteurization of milk, Dairy products (Butter and Cheese), Beverages (Beer and Wine). Methods of food preservation.

UNIT –V **21 h**

Water microbiology: - types of water (atmospheric, surface, stored water); Water microorganisms (Marine & Fresh water); Microbial analysis of water (Sanitary test for coliforms); Purification of water. Air microbiology:- Air borne pathogens (fungi and bacteria).

Practical II (Instructional hrs: 30)

a) Media preparations (Fungal and Bacterial); Agar slant and stab culture; Serial dilutions; Streak and pour plate methods of isolation of microbes.
b) Isolation and identification of common microorganisms involved in the spoilage of fruits and vegetables/environment
c) Gram staining d)Hanging drop method (demo only)
e) Colony counter (demo only)
d) Bacteria, TMV, Bacteriophage (photographs and book diagrams).

Text books:

1. Pelczar M.J, R.D..Reid and E.C.S. Chan, Microbiology.
2. Dubey R.C. and Maheshwari, D.K. A text book of microbiology.
3. Power C.B. and H.F. Daginawala, General microbiology vol-I and II
4. Reed G.Prescott and Dunns, Industrial microbiology
5. Schiesel, H.B. General microbiology
6. Casida L.E. Industrial microbiology
7. Frazier W.C. and Westhoff D.C. Food microbiology.

ALLIED CHEMISTRY PRACTICALS

Instructional Hrs: 90

Objectives:
1. To learn about the basic concepts of co-ordination compounds.
2. Understanding the basic knowledge in organic chemistry.
3. To understand the concepts of electron chemistry.

I VOLUMETRIC ANALYSIS (STANDARD SOLUTION IS TO BE GIVEN)

1. Acidimetry:

   a. Estimation of sodium carbonate.
   b. Estimation of bicarbonate and carbonate in a mixture using two indicators.

2. Permangonometry:

   a. Estimation of Ferrous iron

3. Dichrometry:

   a. Estimation of Ferrous iron using internal indicator.

4. Complexometry:

   a. Estimation of Zn
   b. Estimation of Mg

II Organic Chemistry

1. Detection of elements (N, S and Halogens)

2. To distinguish between aliphatic and aromatic saturated and unsaturated compounds.

3. Functional group tests for phenols, aromatic amines, acids, amides and carbohydrates.

SEMESTER – V

PAPER –V -TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY

Instructional hrs**: 60**

Objectives: 1. To study the Nomenclatural Principles and the various systems of Classification
2. To study the general characters of selected families
3. To study about the economic importance of selected plants

UNIT – I **15 h**

Nomenclature: Binomial system of Nomenclature; Principles of ICBN; Typification; Effective and valid publications; Author Citations. Objectives of Plant Taxonomy; Systems of classification:- Natural (Bentham and Hooker); Phylogenetic (Engler and Prantl); Herbarium techniques; Guidelines of identification of Angiospermic plants.

UNIT – II **12 h**

General characters and Economic importance of the following families:- Annonaceae, Capparidaceae, Rutaceae, Anacardiaceae, Ceasalpiniaceae, Mimosaceae, Myrtaceae, Cucurbitaceae.

UNIT – III **10 h**

Rubiaceae, Asclepiadaceae, Convolvulaceae, Scrophulariaceae, Acanthaceae, Verbenaceae Lamiaceae

UNIT – IV **10 h**

Amaranthaceae, Euphorbiaceae, Orchidaceae, Liliaceae, Araceae and Poaceae

UNIT – V **13 h**

A detailed study with reference to distribution, method of cultivation and the extraction method of following economically important products. Food (Paddy); Pulses (Soy-bean); Nuts (Peanut); Sugar (Sugarcane); Fibre (Cotton); Spices (Cardamom); Timber (Teak); Medicine *auwolfia*); Fumitories and Masticatories (Tobacco).

Practical III (Instructional hrs 30)

Taxonomic study of the plants belong to the families mentioned in the theory. Economic uses of the plants mentioned in the Unit V.

Student shall undertake a field visit to nearby places to study the flora and ecology of the plants. They should submit 20 herbarium sheets (local weeds) with field notes at the time of practical examinations certified by the teacher concerned.

Text books:

1. Vasishta, P.C. **Taxonomy of Angiosperms**. R. Chand & Co., New Delhi.
2. Venkateswarlu, V. and A. Ramasamy, **A text book of taxonomy** S. Chand & Co., New Delhi.
3. Pandey, B. P.. Taxonomy of Angiosperms K. Nath & Co. Meerut
4. Pandey, B. P., Economic Botany S. Chand & Co., New Delhi.
5. Sambamurthy, A.V.S.S. and N.S. Subrahmanyam, A text book of Economic Botany
6. Subramaniyam, N.S. **Modern plant Taxonomy** Vikas Publishing House Pvt. Ltd

SEMESTER – V
PAPER –VI GENETICS AND PLANT BREEDING
Instructional hrs**: 60**

Objectives: 1. To understand the heredity and variation among the related organisms
2. To study about the crop improvement through breeding

UNIT – I **12 h**

Laws of Mendel; Interaction of genes - Duplicate, Inhibitory, Polymeric, Cumulative and Lethal genes. Multiple alleles in human beings - ABO Blood group.

UNIT – II **10 h**

Linkage and Crossing over; Sex determination in plants; Sex linked inheritance (colour blindness); Cyto plasmic inheritance in plants (Plastid inheritance in 4 O' Clock plant).

UNIT – III **13 h**

Nucleic acids - Structure of DNA (Watson and Crick Model); DNA replication in prokaryotes and eukaryotes (Semi conservative model); Regulation of gene expression in prokaryotes (Lac operon model). RNA- types and structure; Genetic code.

UNIT – IV **13 h**
Chromosomal variations - Numerical aberrations (Euploidy and Aneuploidy) and Structural aberrations; Mutation – types; gene mutation and mutagens.

UNIT – V **12 h**

Methods of crop improvement - Selection, Hybridization, Introduction and Acclimatization. Heterosis, Mutation breeding, Achievements in rice and sugarcane by plant breeding.

Practical V **(**Instructional hrs:30)

Simple problems on gene interactions. Photographs, book diagrams, photoslides etc.. depicting plant breeding experiments.

Text books

1. Gupta, P. K., Genetics
2. Meyyan, R.P., Genetics
3. Singh, B.D., Plant breeding
4. Chaudhari,H.K., Elementary principles of plant breeding
5. Strickberger, M.W., Genetics

SEMESTER – V

PAPER –I ELECTIVE :- BIOLOGICAL TECHNIQUES

Instructional hrs:**75**

Objectives: 1. To study the biophysical characters and principles of instrumentations
2. To study the basics of computers and its application in biology
3. To study the methods of analyzing the data

UNIT – I **15 h**

Biophysics: Photobiology- properties of light; Fluorescence, phosphorescence. **Bioluminescence**: definition, biochemistry and physical characteristics, Bioluminescence in bacteria and firefly and its significance. Bioenergetics: definition, Laws of thermodynamics, Gibbs free energy.

UNIT –II **15 h**

Bioinformatics: Introduction to computer (Hard ware & Software); classification and anatomy of digital computer systems, computer architecture, number system, memory units, auxiliary storage devices, input and output devices. Internet, e-mail uses. Application of computer in biology. DNA and protein data bases (EMBL and PIR).

UNIT-III **15 h**

Biostatistics: Collection, classification, tabulation, graphic and diagrammatic presentation of data. Measures of central tendency (mean, median and mode). Measures of dispersion (deviation, standard deviation and standard error).

UNIT –IV **15h**

Instrumentation: Ocular and Stage scale, Camera lucida, pH meter, Beer's Lambert Law; SpectrophotometerVisible); Chromatography:- Thin layer and Column chromatography; Centrifugation (basic principles only).

UNIT –V **15 h**

Microtechnique: Killing and fixation, Dehydration and clearing, Infiltration and Embedding, Sectioning, staining and mounting (Rotary microtome and paraffin method only).

Practical III (Instructional hrs:30)

1. Use of F.A.A. in killing and fixation.
2. Dehydration and clearing agents.
3. Xylol, liquid paraffin and paraffin.
4. Rotary microtome. (Demo only)
5. Demonstration on Use of micrometer, b) pH meter c) Centrifugation d) Chromatography (thin layer) e)Spectrophotometer (demo only)
6. Simple problems in Biostatistics.
7. Working knowledge in windows, Internet and e-mail.

Text books:

1. Basandra, et al. Computer today.
2. Alexisleon and Mathews Leon, Fundamentals of information technology.
3. Prasad and Prasad, Outlines of microtechnique.
4. Patki L.R. et al. An introduction to microtechnique.
5. Thiravia Raj S, Biophysics.
6. Palanichamy,S, Principles of Biophysics.
7. Ramakrishnan, P. Biostatistics.
8. Jayaram, J. et al. Techniques in biology.
9. Gupta, P.K. Cytology, Genetics, Biotechnology and Biostatistics.

SEMESTER – V

PAPER –II ELECTIVE
HORTICULTURE AND SEED TECHNOLOGY
Instructional hrs: **75**

Objectives: 1. To know about various concepts of seed and their post harvest technology
2. To study about the techniques in Horticultural crops

UNIT – I **15 h**

Horticulture:- Definition, Scope and divisions; propagation of horticultural crops:- Vegetative methods (cutting, grafting and layering); Media; manures- Organic(Panchakavya, vermicompost, FYM); inorganic nutrients and irrigation.

UNIT – II **15h**

Pomology:- Cultivation of Mango and Papaya; Olericulture- (bhindi, tomato); Floriculture: - Jasmine and Rose; Gardening: - Lawn making, Indoor gardening; Kitchen garden, Bonsai; Flower arrangements.

UNIT – III **15 h**

Preservation of fruits and vegetables. Role of growth regulators in horticulture. Protection of horticultural plants against diseases. Preparation of Jasmine concrete and papain.

UNIT – IV **15 h**

Seed technology: Scope and significance; Seed germinations; **Seed testing for seed viability**:- Purity test, Germination test by paper cone, TZ test, seed vigor test, moisture content.

UNIT – V **15h**

Dormancy of seeds:- causes, breaking of dormancy; significance of dormancy.
Seed storage; Seed treatment methods; significance of seed treatment; seed packaging.

Practical III (Instructional hrs:**30**)

Identification and description of the crops studied in theory. Experiments on grafting cutting, and layering. Experimental set up on plant growth regulators. Study of equipments used in seed testing. Purity analysis using any one cereal seed. Germination tests of different seeds. Tetrazolium test for seed viability.

Text books

1. Kumar, N. Introduction to Horticulture
2. Agarwal, R. L. Seed technology
3. Copeland, L. O., Principles of seed science and technology
4. Mayer, A. M., and Poljakoff-Maybwer, A. The germination of seeds
5. Edmond, J.B., *et al*.., Funtamentals of Horticulture
6. Kumaresan, V. 2009.Horticulture and Plant Breeding. Saras publishing, Nagercoil.

SEMESTER – VI

PAPER –VII -ENVIRONMENTAL BOTANY, FORESTRY AND PHYTOGEOGRAPHY

Instructional hrs: **60**

Objectives: 1. To study and understand the functions of Ecosystems
2. To acquire knowledge on environmental challenges
3. To study about the forests and geographical regions

UNIT – I **10 h**

Ecology: Scope, sub-divisions, **Environmental factors** - climatic, edaphic and biotc; **Autecology** - ecological life cycle.

UNIT –II **12 h**

Synecology: Characteristics of community, Units of vegetations (Clementsian); and methods of studying vegetation (line transect and quadrat). **Plant Succession** – Hydrosere and Xrosere. Morphological and anatomical adaptations of Hydrophytes, Xerophytes and Halophytes.

UNIT-III **12 h**

Ecosystem: Components; types (forest and pond); Functions (food-chain, food-wed, ecological pyramids, energy flow, biogeochemical cycles (Nitrogen and Water). Air and water pollutions and their control measures.

UNIT-IV **12 h**

Forestry: Importance of forests; Deforestation; Afforestation ; Conservation of forests – methods and managements; Social forestry; Conservation movements – Chipko; Appiko and Silent Valley; Utilisation of forests.

UNIT-V **14 h**

Phyto Geography: Phytogeographical regions of India. Vegetations of Tamil Nadu; Endemism; **Biodiversity** - Importance; Causses of loss of biodiversity; IUCN Red list categories; Conservation of biodiversity.

Practical III (Instructional hrs 30)

Demonstration of the methods of vegetational study: Quadrat and Line transect. Determination of soil and water pH. morphological and anatomical features in Hydrophytes, Xerophytes and Halophytes.

Text books:

1. Kumaresan,V. Plant ecology and Phytogeography.
2. Sharma,P.D. Ecology and environment
3. Shukla, R.S. Chandal,P.S. Plant ecology
4. Odum, E.P. Fundamentals of ecology
5. Ambasht, R.S. A Text book of plant ecology
6. Subbarayalu, S. and Velmurugan, S. Endangered plant species of Tamil Nadu.
7. Barucha, Fundamentals of Phytogeography

SEMESTER – VI

PAPER –VIII PLANT PHYSIOLOGY

Instructional hrs: **75**

Objectives: 1. To study the basic principles of plant functions
2. To get knowledge on biochemical metabolism

UNIT – I **15 h**

Water relations:- Osmosis ; water potential and its components; active and passive absorption of water; Mechanism of ion uptake; theories of ascent of sap. Mineral nutrition - role of elements and their deficiency symptoms.

UNIT – II **15 h**

Transpiration:- kinds, significance and physiology of stomatal movement.

Enzymes:- Structure, Nomenclature, classification, properties, factors affecting enzymatic actions and mode of action.

UNIT – III **15 h**

Photosynthesis:- Pigment systems; Light and dark reactions, C_3 and C_4 pathways, photorespiration, factors affecting photosynthesis**;** CAM pathway.

UNIT – IV **15 h**

Respiration:- Aerobic and anaerobic; respiratory substrates; respiratory quiescent; Glycolysis and Kreb's cycle; Electron transport system and oxidative phosphorylation; factors affecting respiration.

UNIT – V **15 h**

Nitrogen metabolism:- Bilogical Nitrogen fixation; biosynthesis of amino acids; Protein synthesis; Growth regulators - Auxins, cytokines, gibberellins, ethylene and ABA. Physiology of flowering - photoperiodism.

Practical IV (Instructional hrs: **30**)

A. Demonstration experimens

1. Determination of water potential by constant volume method
2. Determination of respiratory rate using simple respirometer
3. Enzyme activity (amylase)

B. Individual experiments

1. Measurement of O.P. by leaf peel method
2. Demonstration of osmosis with help of plant membrane
3. Determination of water absorption and transpiration ratio
4. Separation of plant pigments by thin layer (paper) chromatography
5. Rate of photosynthesis under varying CO_2 concentrations in water plants
6. Effect of intensity of light on oxygen evolution during photosynthesis

Text books

1. Jain, V.K. Plant physiology
2. Salisbury and Ross. Plant physiology
3. Noggle and Fritz., Introduction to plant physiology
4. Devlin, Plant physiology

SEMESTER – VI

PAPER – III ELECTIVE: BASICS OF BIOTECHNOLOGY

Instructional hrs: **75**

Objectives: 1. To study the impact of biotechnology on human welfare
2. To know the basics of genetic engineering
3. To study the applications of biotechnology in environment

UNIT – I **15 h**

Definitions; Scope; Areas of Biotechnology; Biotechnology-Interdisciplinary area; **Impact of Biotechnology on Human Welfare** (Healthcare and Agriculture); Biotechnology in India and Global Scenerio. **Healthcare products**:- Insulin; Interferons; Interleukins;Somatotrophin; Somatostatin and Vaccines

UNIT- II **15 h**

Genetic Engineering: Restriction enzymes, **Cloning vectors**: Plasmid vectors- pBR322; pUC vectors), bacteriophage vectors; Cosmids; Phagemids; YAC; BAC. **Gene Amplification:**- PCR procedure and its applications.

UNIT – III **15 h**

Gene cloning procedure in prokaryotes (Bacteria) and Higher plants –***Agrobacterium*** mediated. Achievements of genetic engineering; Direct gene transfer methods (Microinjection; biolistics).

UNIT – IV **15 h**

Environmental Biotechnology: Waste water treatment- aerobic and anaerobic digestion; open pond oxidation system. **Xenobiotics**- biodegradation of fungicides, herbicides and hydrocarbons. **Bioremediation**- types of bioremediation. **Biomining**:- Bioleaching process, recovery of copper and uranium.

UNIT – V **15 h**

Biosafety: - Possible risks of Genetically Engineered Organisms; Biosafety guidelines; Containments; Implementation of biosafety guidelines. **Intellectual Property Rights(IPR) and Protection (IPP)** - Patents; Patenting of Biotechnological products; Copy rights; Trade Secretes; Trade Marks; GATT; TRIPs; Significance of Patents in India.

Text books

1. Dubey, R.C. A Text book of biotechnology,
2. Kumaresan, V. Biotechnology
3. Reinert, J and Bajaj Y.P.S. Plant cell tissue and organ culture,
4. Singh, B.D. Biotechnology,
5. Razdan, M.K. An introduction to plant tissue culture.
6. Trevan, M.D. et al. Biotechnology,
7. Kumar, H.D. Modern concepts of biotechnology,
8. Purohit, Biotechnology Fundamentals and applications,

SEMESTER – VI

PAPER – IV ELECTIVE: APPLIED BIOTECHNOLOGY

Instructional hrs:**75**

Objectives: 1. To know about the applications of biotechnology to the human welfare
2. To understand about the plant tissue culture

UNIT – I **15 h**

Plant Tissue Culture: Laboratory Organisation – Requirements, Sterilization process of glassware and tools; **Growth media**: Preparation & Sterilization; Plant Growth Regulators; Explant preparation & Sterilization; **Culture techniques**: – Micropropagation; Callus Culture; Meristem culture.

UNIT – II **15 h**

Production of Haploids (Anther & Pollen Culture); Isolation of Protoplast; protoplast culture; somatic hybridization; Somatic embryogenesis; Synthetic Seeds; **Cryopreservation** - methods and uses.

UNIT – III **15 h**

Production and purification of industrial enzymes (∝- Amylase, Proteases and Cellulase); Immobilization of enzymes and its applications. Production of Primary metabolites (Citric acid) and Secondary metabolites (Penicillin). Biosensors, Biochips.

UNIT – IV **15 h**

Biomass: Types of biomass, Chemical Composition; **Single cell protein production (SCP)** - Algal, Bacterial, and yeast; Mushroom cultivation; **Bioenergy**- Petro plants; Biogas technology.

UNIT – V **15 h**

Biofertiliers: Advantages, Mass cultivation and application techniques of *Rhizobium*, *Azotobacter*, *Azospirilum*, Blue-Green algae, *Azolla*, Phospobacteria, and VAM,. Biocontrol agents (*Trichoderma, Bacillus thuringiensis)*

Practical IV (Biotechnology I and II) **Instructional hrs: 30**

1. Preparation of medium.
2. Sterilization and inoculation of explant.
3. Synthetic seed preparation.
4. Mushroom culture,
5. Demonstration of biofertilizer-specimens or slides or photographs.
6. Petroplants-specimens.
7. Transgenic plants (photographs)

Text books

1. Dubey, R.C. A Text book of biotechnology,
2. Kumaresan, V. Biotechnology
3. Reinert, J and Bajaj Y.P.S. Plant cell tissue and organ culture,
4. Singh, B.D. Biotechnology,
5. Razdan, M.K. An introduction to plant tissue culture.
6. Trevan, M.D. et al. Biotechnology,
7. Kumar, H.D. Modern concepts of biotechnology,
8. Purohit, Biotechnology Fundamentals and applications,

SEMESTER – VI

SKILL BASED : MEDICINAL BOTANY

Instructional hrs: **75**

Objectives: 1. To study about the Ancient systems of medicines
2. To study about the crude drugs of some medicinal plants
3. To study the cultivation and processing of medicinal plants

UNIT – I **15 h**

Pharmacognosy: Introduction, Ancient systems of medicines Practised in India (Siddha, Ayurveda ,Unani, Homeopathy and Aromatherapy). Drugs – definition; sources(plants, minerals). Classification of crude drugs.

UNIT –II **15 h**

Adulteration of drugs; drug evaluation and pharmacopoeial studies. Chemical nature of drugs from plants. Collection and processing of crude drugs(harvesting , drying, garbling, packing and storage) and marketing.

UNIT –III **15 h**

Description, cultivation, collection of drugs. Chemical constituents and uses of some medicinal plants: Bark **– *Cinchona*** and Neem*;* Leaves - ***Adathoda*** and ***Centella***; Flower - clove and saffron.

UNIT –IV **15 h**

Fruit: Pomegranate, Amla; Seeds- Poppy and coriander; under ground stem - Ginger and ***Acorus*;** Root - ***Rauwolfia***; Gum - *Acacia*; Resin -***Asafoetida***; Fixed oil - Castor oil.

UNIT-V **15 h**

A brief account of cardiovascular drugs (***Digitalis,*** Arjuna bark, ***Cinchona*** and ***Rauwolfia***). Drugs used in the disorders of gastrointestinal tract (Coriander, Fennel, Cardamom and Ginger). Diuretics (Small Gokhra and Punarnava). Indian Medicinal plants and trade.

Practical V (Instructional hrs: **30**)

Identification of plants mentioned in the theory. Identification by Anatomical characters, chemical constituents, chemical tests for the selected drugs. Submission of mini project work on local medicinal plants (group projects). Preparation of crude drugs from local medicinal plants.

Text books

1. Wallis, T.E. 1967. **Text book of Pharmacognosy**. Harcourt Brace Publishers
2. Arumugam, K.R., and N. Murugesh. 2004. **Text book of pharmacognosy.** Sathya Publishers, Madurai
3. Kokate, C. K., A.P. Purohit and S.B.Gokhale. 2009. **Pharmacognosy** Nirali Prakashan, Pune
4 Roseline, A. 2011**. Pharmacognosy**. MJP Publishers, Chennai
5. Shah, R. M. and R. T. Nayak. 2012. **Pharmacognosy.** Global Academic publishers & Distributors, New Delhi.

DEPARTMENT OF BOTANY

Question paper pattern

(Common for B.Sc., Botany, Allied Botany and Major Optional students with effect from 2012-2013 Batch and onwards)

Total Marks : 75 **Time :3 h**

Section A (10 x 1 = 10 marks)

Short Answer Questions. Answers should be in **one** or **two** sentences. Two questions from each unit.

(Question numbers from 1 to 10)

Section B (5 x 5 = 25 marks)

Answer **ANY FIVE** of the following. Answers not exceeding **two pages** (Open choice – **FIVE** out of **SEVEN** questions)

Questions should be distributed in all the units and not more than **TWO** questions from one unit

(Question numbers from 11 to 17)

Section C (5 x 8 = 40 marks)

Answer **ANY FIVE** of the following Answers not exceeding **two pages** (Open choice **– FIVE** out of **SEVEN** questions covering all the **FIVE** units and not more than **TWO** questions from one unit)

(Question numbers from 18 to 24)

SEMESTER – V

PART-III – PAPER: MAJOR OPTIONAL

BIOTECHNOLOGY AND HUMAN WELFARE

Instructional hrs: **90**

Objectives: 1. To create awareness on applications of Biotechnology for the human welfare
2. To study about the basics of Horticulture and its applications
3. To have knowledge on the medicinal plants and their uses

UNIT – I **20 h**

Biotechnology:– Definitions; Scope; Areas of Biotechnology; Biotechnology- Interdisciplinary area; **Impact of Biotechnology on Human Welfare** (Healthcare and Agriculture); Biotechnology in India and Global Scenerio. **Healthcare products**:- Insulin; Interferons; Interleukins;Somatotrophin and Vaccines

UNIT – II **15 h**

Mushroom technology – Edible mushrooms and its nutritional value; cultivation technique. Microbial protein – Preparation of SCP (***Spirulina***).

UNIT – III **15 h**

Biofertilizers – Importance, types, mass production and application of ***Rhizobium***, Blue-Green algae, Mycorrhiza and ***Azolla.***

UNIT – IV **20 h**

Horticulture:– Divisions, importance of horticulture. Vegetative propagation (cutting, grafting and layering). Media and containers for propagating nursery plants. Manures and irrigation.

UNIT – V **20 h**

Pharmacognosy: Introduction, Ancient systems of medicines Practised in India (Siddha, Ayurveda ,Unani, Homeopathy and Aromatherapy). Sources of Drugs (plants); Drug Adultration; Uses of some medicinal plants: Bark- Neem; Leaf- Centella; Underground stem- Ginger; Seeds- Cardamom).

Text books

1. Wallis, T.E. 1967. **Text book of Pharmacognosy**. Harcourt Brace Publishers
2. Arumugam, K.R., and N. Murugesh. **Text book of pharmacognosy.** Saras Publications, Nagercoil
3. Kokate, C. K., A.P. Purohit and S.B.Gokhale**. 2007. Pharmacognosy.** Nirali Prakashan, Pune
4. Roseline, A. 2011**. Pharmacognosy**. MJP Publishers, Chennai
5. Shah, R. M. and R. T. Nayak. 2012. **Pharmacognosy.** Global Academic publishers & Distributors, New Delhi.

Question paper pattern

(Common for B.Sc., Botany, Allied Botany and Major Optional students with effect from 2012-2013 Batch and onwards)

Total Marks : 75 **Time :3 h**

Section A (10 x 1 = 10 marks)

Short Answer Questions. Answers should be in **one** or **two** sentences. Two questions from each unit.

(Question numbers from 1 to 10)

Section B (5 x 5 = 25 marks)

Answer **ANY FIVE** of the following. Answers not exceeding **two pages** (Open choice – **FIVE** out of **SEVEN** questions)

Questions should be distributed in all the units and not more than **TWO** questions

from one unit

(Question numbers from 11 to 17)

Section C (5 x 8 = 40 marks)

Answer **ANY FIVE** of the following Answers not exceeding **two pages** (Open choice **– FIVE** out of **SEVEN** questions covering all the **FIVE** units and not more than **TWO** questions from one unit)

(Question numbers from 18 to 24)