

**Core course 1
M1BOT01CT01**

Biology and Diversity of Plants (Microbes, Algae and Fungi)

External :80 marks

Internal: 20 Marks

Lectures: 40 hrs

Tutorials: 10 hrs

Additional Contact Hours : 10 (Seminars, quiz, assignments, group, discussion etc)

S No.	Topic	Text/Reference*
1.	General characters of Archaeobacteria and Eubacteria and their distribution	Microbiology, Stanier Principles of Microbiology, Atlas
2.	Ultra structure of Archae bacteria and Eubacteria	Lecture Notes, Textbook of Microbiology; Kanika Sharma
3.	Nutrition of Archaeobacteria and Eubacteria	Lecture Notes, Textbook of Microbiology; Kanika Sharma
4.	Multiplication and Methods of genetic recombination of Archae bacteria and Eubacteria and their significance	Lecture Notes,
Tutorial 1	Isolation and culture of bacteria	Lecture Notes, Textbook of Microbiology; Kanika Sharma
Seminar 1	Identification of bacteria	
5.	Economic and evolutionary importance of Archaeobacteria and Eubacteria	Principles of Microbiology, Atlas Lecture Notes
6.	Viruses-Physical and Chemical characteristics	Lecture notes, Textbook of Microbiology; Kanika Sharma C L Mandhar Viswas and Viswas H.N.Verma L.Bose
7.	Viruses-Purification,Multiplication,transmission	General Microbiology, Stanier, pages 229- 233. Textbook of Microbiology; Kanika Sharma Pathogen and plant diseases, B P Pandey Introduction to plant viruses, C L

		Mandhar Viswas and Viswas H.N.Verma L.Bose
8.	Mycoplasma and Phytoplasma	Textbook of Microbiology; Kanika Sharma, Lecture Notes Maramorosch H.C.Dube
Tutorial 2	Economic importance of viruses	Lecture notes
Seminar 2	Plant virus transmission	
9.	Viroids Prions.L-forms and Rickettsia	Textbook of Microbiology; Kanika Sharma Maramorosch H.C.Dube
10.	General account and thallus organization of algae	The structure and reproduction of the algae volume I By F. E. Fritsch A textbook of Botany Singh Pandey Jain
11.	Cell structure, reproduction of algae	The structure and reproduction of the algae volume I By F. E. Fritsch A textbook of Botany Singh Pandey Jain
12.	Life cycle pattern of algae	The structure and reproduction of the algae volume I By F. E. Fritsch A textbook of Botany Singh Pandey Jain
Tutorial 3	Life cycle pattern of algae	Lecture notes
Seminar 3	Thallus organization of algae	
13.	Classification schemes of algae	A textbook of Botany B. P. Pandey, Phycology II edition By R. D Lee
14.	Salient features of Cyanophyceae,	The Algae By V. J. Chapman

		Phycology II edition By R. D Lee A textbook of Botany Singh Pandey Jain
15.	Salient features of Bacillariophyceae,	The structure and reproduction of the algae volume I By F. E. Fritsch Phycology II edition By R. D Lee A textbook of Botany By S. N. Pandey
16.	Salient features Chlorophyceae	The structure and reproduction of the algae volume I By F. E. Fritsch Chapter number- Phycology II edition By R. D Lee A textbook of Botany S. N. Pandey
Tutorial 4	Evolutionary importance of algae.	Lecture notes
Seminar 4	Economic importance of chlorophyceae	
17.	Salient features of Phaeophyceae	The structure and reproduction of the algae volume II By F. E. Fritsch Phycology II edition By R. D Lee
18.	Salient features of Rhodophyceae	The structure and reproduction of the algae volume II By F. E. Fritsch Phycology II edition By R. D Lee
19.	Salient features of Prochlorophyceae,	Phycology II edition By R. D Lee
20.	Salient features of Glaucophyceae, Eustigmatophyceae	Phycology II edition By R. D Lee
Tutorial 5	Reproduction of Phaeophyceae and Rhodophyceae	Lecture notes
Seminar 5	Economic importance of algae	

21.	Introduction to fungi	Mycology, Alexopoulos and Mims, , Introduction to Mycology, R S Mehrotra and K R Aneja P.D.sharma B.R.Vasishta H.C.Dube Webster Junior
22.	Fungal ultra-structure and mycelial growth	Introduction to Mycology, R S Mehrotra and K R Aneja Deacon Alexopoulos and Mims
23.	General characters and life cycle patterns.	Mycology, Alexopoulos and Mims, , Introduction to Mycology, R S Mehrotra and K R Aneja P.D.sharma
24.	Fungal systematics-I	Introduction to Mycology, R S Mehrotra and K R Aneja Mycology, Alexopoulos and Mims, H.C.Dube Webster Junior
Tutorial 6	General characters of fungi	Lecture notes
Seminar 6	Nutrition in fungi (necrotrophs, biotrophs and symbionts)	Lecture notes
25.	Fungal systematics-II	Introduction to Mycology, R S Mehrotra and K R Aneja Mycology, Alexopoulos and Mims, H.C.Dube Webster Junior
26.	Morphology, reproduction, life cycle and economic importance of Masigomycotina-I	Introduction to Mycology, R S Mehrotra and K R Aneja Mycology, Alexopoulos and Mims 1979 P.D.sharma B.R.Vasishta H.C.Dube

		Webster Junior Mehrotra and aneja
27.	Morphology, reproduction, life cycle and economic importance of Zygomycotina	Introduction to Mycology, R S Mehrotra and K R Aneja Mycology Alexopoulos and Mims 1979 P.D.sharma B.R.Vasishta H.C.Dube Webster Junior
28.	Morphology, reproduction, life cycle and economic importance of Ascomycotina-I	Introduction to Mycology, R S Mehrotra and K R Aneja Mycology Alexopoulos and Mims 1979 P.D.sharma B.R.Vasishta H.C.Dube Webster Junior
Tutorial 7	Phylogenetic relationship among fungal groups	Lecture notes
Seminar 7	Economic importance of Masigomycotina and Zygomycotina	
29.	Morphology, reproduction, life cycle and economic importance of Ascomycotina-I	Introduction to Mycology, R S Mehrotra and K R Aneja Mycology Alexopoulos and Mims 1979 P.D.sharma B.R.Vasishta H.C.Dube Webster Junior Mehrotra and aneja
30.	Morphology, reproduction, life cycle and economic importance of Ascomycotina-II	Introduction to Mycology, R S Mehrotra and K R Aneja Mycology Alexopoulos and Mims 1979 P.D.sharma B.R.Vasishta H.C.Dube Webster Junior

		Mehrotra and aneja
31.	Morphology, reproduction, life cycle and economic importance of Ascomycotina-II	Introduction to Mycology, R S Mehrotra and K R Aneja Mycology Alexopoulos and Mims 1979 P.D.sharma B.R.Vasishta H.C.Dube Webster Junior Mehrotra and aneja
32.	Morphology, reproduction, life cycle and economic importance of Basidiomycotina-I	Mycology Alexopoulos and Mims 1979 P.D.sharma B.R.Vasishta H.C.Dube Webster Junior Mehrotra and aneja
Tutorial 8	Economic importance of Ascomycotina	Lecture notes
Seminar 8	Economic importance of Basidiomycotina	
33.	Morphology, reproduction, life cycle and economic importance of Basidiomycotina-II	Mycology Alexopoulos and Mims 1979 P.D.sharma B.R.Vasishta H.C.Dube Webster Junior Mehrotra and aneja
34.	Economic importance of fungi	Introduction to Mycology, R S Mehrotra and K R Aneja Mycology by Alexopoulos and Mims 1979 P.D.sharma B.R.Vasishta H.C.Dube Webster Junior Mehrotra and aneja
35.	Parasexuality Heterothallism and heterokaryosis	Introduction to Mycology, R S Mehrotra and K R Aneja H.C.Dube

		Rappaport
36.	Mycorrhizae	Lecture notes Harley Smith P.D.Sharma
Tutorial 9	Methods of reproduction in fungi	Lecture notes
Seminar 9	Mycorrhizae	
37.	Lichens	Mycology Alexopoulos and Mims 1979 The Fungi, Michael J Carlile, Lecture Notes P.D.Sharma B.R.Vasistha
38.	General account of morphology, reproduction, life cycle of Fungi <i>imperfecti</i>	Mycology Alexopoulos and Mims 1979 Introduction to Mycology, R S Mehrotra and K R Aneja
39.	General account of morphology, reproduction, life cycle of Fungi <i>imperfecti</i>	Mycology Alexopoulos and Mims 1979 Introduction to Mycology, R S Mehrotra and K R Aneja
40.	General account of morphology, reproduction, life cycle of Fungi <i>imperfecti</i>	Mycology Alexopoulos and Mims 1979 Introduction to Mycology, R S Mehrotra and K R Aneja
Tutorial 10	Economic importance of Fungi <i>imperfecti</i>	Lecture notes
Seminar 10	Lichens	

*=The list of reference is only for guidance and question paper can be framed out of this list.
Students are advised to refer to other related text and reference books for those topics.

For additional information students may consult the following reference books.

Reference Books:

1. Bold H. C and Wynne M.J (1975). Introduction to the Algae: Structure and Reproduction Prentice Hall Biological Science Series.
2. Chapman V.J and Chapman D.J (1973). The Algae. Macmillan and company, New York.
3. Fritsch F.E (1945). The Structure and Reproduction of the Algae Volume I and II, Cambridge University Press.
4. Kumar H.D. 1988. Introductory Phycology. Affiliated East-West Press Ltd., New Delhi.
5. Morris I. 1986. An Introduction to the Algae. Cambridge University Press, U.K.
6. Round F.E. 1986. The Biology of Algae. Cambridge University Press, Cambridge.
7. Vijayraghavan M.R and Bela Bhatia (1997), Brown Algae: Structure, Ultrastructure and Reproduction, APH publishing Corporations, New Delhi.
8. Vijayraghavan M.R and Bela Bhatia (1997), Red Algae: Structure, Ultrastructure and Reproduction, APH publishing Corporations, New Delhi.
9. Alexopoulos, C. J., Mims, C. W. and Blackwel, M., Introductory Mycology, John Wiley & Sons Inc. Mandahar, C. L. Introduction to Plant Viruses. Chand & Co. Ltd., Delhi.
10. Mehrotra, R. S. and Aneja, R. S. An Introduction to Mycology. New Age Intermediate Press.
11. Manual of Microbiology: Tools and Techniques; Kanika Sharma. Ane books. New Delhi. 2007
12. Textbook of Microbiology; Kanika Sharma. Ane books. New Delhi. 2011
13. Lee R. A. Phycology Second Edition, Cambridge university press
14. Pandey S. N. and Trivedi P., S., A textbook of botany Volume I tenth Edition, Vikas Publishing house
15. Carlile M.J. The Fungi second edition, Academic press
16. Mandahar C.L, Introduction to plant viruses S. Chand and company.

Core course 2
MIBOT02CT02
Biology and Diversity of Archegoniate

External :80 marks

Internal: 20 Marks

Lectures: 40 hrs

Tutorials: 10 hrs

Additional Contact Hours : 10 (Seminars, quiz, assignments, group, discussion etc)

Serial No.	Lecture(L) Tutorial(T)	TOPIC	Reference* @
1.	L 1	1. Bryophytes: Origin of Bryophytes.	B1& B4
2.	L2	2. Bryophytes: Characters and classification	B2&B3
3.	T-1	3. Bryophytes: Evolution of gametophyte and sporophyte.	
4.	L4	4. Bryophytes: Comparative study of structure in Hepaticopsida-1	B5
5.	L5	5. Bryophytes: Comparative study of reproduction of Hepaticopsida-2	B4& B5
6.	L6	6. Bryophytes: Comparative study of life cycle of Hepaticopsida-3	B4& B5
7.	L-7	7. Bryophytes: Comparative study of structure Anthocerotopsida -1	B4& B5
8.	L-8	8. Bryophytes: Comparative study of reproduction and life cycle of Anthocerotopsida.-2	B4& B5
9.	L-9	9. Bryophytes: Comparative study of structure of Bryopsida.-1	B4& B5
10.	L-10	10. Bryophytes: Comparative study of reproduction and life cycle of Bryopsida-2	B4& B5
11.	L-11	11. Bryophytes: Comparative study of reproduction and life cycle of Bryopsida.-3	B4& B5
12.	T-2	12. Pteridophyta: characters and classification	
13.	T-3	13. Pteridophyta: Evolution of stelar system;	
14.	T-4	14. Pteridophyta: Evolution of Prothallus	

15.	T-5	15. Pteridophyta: Soral evolution	
16.	L-12	16. Pteridophyta: Heterospory and seed habit;	P 1
17.	T-6	17. Pteridophyta: Cytological evolution of ferns	P 1
18.	L-13	18. Pteridophyta: Apogamy and Apospory.	P 1
19.	L-14	19. Pteridophyta: Telome theory.	P 1
20.	L-15	20. Pteridophyta: Study of structure, reproduction, evolution of the Pteridophyta with special reference to Rhyniophytosida-1	P 1
21.	L-16	21. Pteridophyta: Study of classification and inter-relationships of the Pteridophyta with special reference to Rhyniophytosida-2	P 1
22.	L-17	22. Pteridophyta: Study of structure, reproduction, evolution of the Pteridophyta with special reference to Psilotopsida -1	P 2
23.	L-18	23. Pteridophyta: Study of classification and inter-relationships of the Pteridophyta with special reference to Psilotopsida -2	P 2
24.	L-19	24. Pteridophyta: Study of structure, reproduction, evolution of Pteridophyta with special reference to Lycopsida-1	P 2
25.	L-20	25. Pteridophyta: Study of classification and inter-relationships of the Pteridophyta with special reference to Lycopsida-2	P 2
26.	L-21	26. Pteridophyta: Study of structure, reproduction, evolution of the Pteridophyta with special reference to Sphenopsida -1	P 2
27.	L-22	27. Pteridophyta: Study of classification and inter-relationships of the Pteridophyta with special reference to Sphenopsida -2	P 2
28.	L-23	28. Pteridophyta: Study of structure, reproduction, evolution of the Pteridophyta with special reference to Pteropsida- 1	P 2

29.	L-24	29. Pteridophyta: Study of classification and inter-relationships of the Pteridophyta with special reference to Pteropsida-2	P 2
30.	T-7	30. Palaeobotany -introduction, aim and scope contribution of Prof. Birbal Sahani	
31.	L-25	31. Palaeobotany types and nomenclature of fossils	G1 G2 G3
32.	T-8	32. Palaeobotany Fossilization,	
33.	T-9	33. Palaeobotany Methods of study of fossils.	G2 G6 G8
34.	L-26	34. Palaeobotany Study of fossil archegoniates-1	G3
35.	L-27	35. Palaeobotany study of fossil archegoniates-2	
36.	L-28	36. Palaeobotany Study of fossil archegoniates-3	
37.	L-29	37. Palaeobotany Study of fossil archegoniates-4	
38.	L-29	38. Gymnosperms: General Characters, phylogeny and relationships of the main groups of gymnosperms-1.	G G7
39.	L-30	39. Gymnosperms: General Characters, phylogeny and relationships of the main groups of gymnosperms-2.	
40.	L-31	40. Gymnosperms: Study of structure, life history with special reference to Cycadopsida-1	G5
41.	L-32	41. Gymnosperms: Study of reproduction with special reference to Cycadopsida -2	G5
42.	L-33	42. Gymnosperms: Study of evolution with special reference to Cycadopsida -3	G5
43.	L-34	43. Gymnosperms: Study of classification with special reference to Cycadopsida -4	G5
44.	L-35	44. Gymnosperms: reproduction, life history with special reference to Coniferopsida- 2	G5

45.	L-36	45. Gymnosperms: evolution with special reference to Coniferopsida-3	G4 G5
46.	L-37	46. Gymnosperms: classification with special reference to Coniferopsida-4	G5 G7
47.	L-38	47. Gymnosperms: Study of structure with special reference to Gnetopsida-1	G5 G7
48.	L-39	48. Gymnosperms: Study of reproduction special reference to Gnetopsida-2	
49.	L-40	49. Gymnosperms: Study of evolution, , life history with special reference to Gnetopsida- 3	
50.	T-10	50. Gymnosperms: Evolution of the female strobilus in Coniferales.	

*=The list of reference is only for guidance and question paper can be framed out of this list. Students are advised to refer to other related text and reference books for those topics.

@ B = Bryophytes, P = Pteridophytes, G = Gymnosperms

References:

- B1: The evolution and Palaeobiology of Land plants. Barry A. Thomas and Robert A. Spicer.
 B2:- The Structure and Life of bryophytes. A. J. Jain.
 B3:- The interrelationship of Bryophytes- Frank Cavers.
 B4:-An introduction of Bryophytes – A. Rashid
 B5: An Introduction to Embryophytes-N.s. Parihar
 P-1 : An introduction to Pteridophyta by Chandreshwar Prasad, emkay Publicacation-2012, New Delhi
 P-2 : An introduction to Pteridophyta by A. Rashid, Vikas Publishing House, New Delhi
 G1: Fundamentals of Paleobotany. S. V. Meyen.
 G2:Essentials of Paleobotany. Ashok. C. Shukla and Shital P. Misra.Vikas Publishing House.
 G3:Palaeobotany and the evolution of plants. Wilson N. Stewart. Cambridge Univ. Press.
 G4:The evolution and Palaeobiology of land plants. Barry A. Thomas and Robert A Spicer.

G5: Gymnosperms-Structure and evolution. Charles Joseph Chamberlain. Dover Publications, Inc. New York.

G6: Studies in Palaeobotany. H. N. Andrew. John Wiley & Sons.

G7: Indian conifers and Gnetophytes and Phylogeny of gymnosperms. P. N. Mehra.

Additional reading:

1. The morphology of Gymnosperms. B I Publishers.
2. An Encyclopedic dictionary of Palaeobotany. D. N. Pant
3. Fossil Plants. A. C. Steward. Hafner Publishing Company
4. Gymnosperms of India and adjacent Countries. K. C. Sahni
5. An introduction to Palaeobotany. Chester A. Arnold. Tata Mc. Graw. Hill Publishing Co. Ltd.

List of seminars

1. Economic importance of Bryophytes.
2. Ecological importance of Bryophytes.
3. General account of present distribution of Pteridophyte with special reference to India.
4. General account of past distribution of Pteridophyte with special reference to India.
5. General account of present distribution of Gymnosperms with special reference to India.
6. General account of past distribution of Gymnosperms with special reference to India.
7. Economic importance of Gymnosperms.
8. Geological time scale.
9. Affinities of Bryophytes with algae and Pteridophytes.
10. Heterospory and evolution of seed habit in Pteridophytes.

Core course 3

M1BOT03CT03

Cell Biology and Biochemistry

External :80 marks

Internal: 20 Marks

Lectures: 40 hrs

Tutorials: 10 hrs

Additional Contact Hours : 10 (Seminars, quiz, assignments, group, discussion etc)

Lecture No. 1 h each	Topic	Text/reference*
L1	Cell types, Difference between pro- and eukaryotic cells, Intracellular compartments	Lecture Notes
L2	Structure and functions of Cell wall	The Cell: A Molecular Approach; Geoffrey M. Cooper, Robert E. Hausman. Ch 14, Biochemistry and Molecular Biology of Plant; Buchanan, Gurissem and Jones; Ch 2,
L3	Structure and functions of cell membrane	Cell and Molecular Biology; Gerald Carp. Ch4,
L4	Structure and functions of nucleus	The Cell: A Molecular Approach; Geoffrey M. Cooper, Robert E. Hausman. Ch 9,
L5	Structure and functions of mitochondria	The Cell: A Molecular Approach; Geoffrey M. Cooper, Robert E. Hausman. Ch 11,
L6	Structure and functions of chloroplasts	The Cell: A Molecular Approach; Geoffrey M. Cooper, Robert E. Hausman. Ch 11,
L7	Structure and functions of vacuoles and ribosomes	Biochemistry and Molecular Biology of Plant; Buchanan, Gurissem and Jones; Ch 1, and lecture Notes
L8	Structure and functions of cytoskeleton	The Cell: A Molecular Approach; Geoffrey M. Cooper, Robert E. Hausman. Ch 12,
<i>Tutorial 1</i>	Structure and functions of cell organelles (Golgi apparatus, lysosomes,).	The Cell: A Molecular Approach; Geoffrey M. Cooper, Robert E. Hausman. Ch 10

Seminar 1	Cell organelles	
<i>Tutorial 2</i>	Structure and functions of endoplasmic reticulum	The Cell: A Molecular Approach; Geoffrey M. Cooper, Robert E. Hausman. Ch 10
Seminar 2	Cell organelles	
L9	Signal Hypothesis	The Cell: A Molecular Approach; Geoffrey M. Cooper, Robert E. Hausman. Ch 15 Biochemistry and Molecular Biology of Plant; Buchanan, Gurissem and Jones; Ch 4
L10	Protein sorting to mitochondria and chloroplasts	Biochemistry and Molecular Biology of Plant; Buchanan, Gurissem and Jones; Ch 4 The Cell: A Molecular Approach; Geoffrey M. Cooper, Robert E. Hausman. Ch 11
<i>Tutorial 3</i>	Synthetic cell and recent developments	Lecture Notes
Seminar 3	Cell Division	
L11	Cell division: mitosis	Lecture Notes
L12	Cell division : meiosis	Lecture Notes
L13	Chromosomes: Structure of chromatin and chromosomes,	The Cell: A Molecular Approach; Geoffrey M. Cooper, Robert E. Hausman. Ch 5
L14	Unique and repetitive DNA, heterochromatin, euchromatin,	The Cell: A Molecular Approach; Geoffrey M. Cooper, Robert E. Hausman. Ch 5
L15	Nucleosome structure, DNA scaffolds and loops.	Cell and Molecular Biology ,P.K. Gupta ,Ch 33
<i>Tutorial 4</i>	Types, occurrence, organization and biological significance of Lampbrush chromosomes,	Cell and Molecular Biology ,P.K. Gupta ,Ch 12
<i>Tutorial 5</i>	Types, occurrence, organization and biological significance Polytene chromosomes, Supernumerary chromosomes	Cell and Molecular Biology ,P.K. Gupta ,Ch 17,

<i>Seminar4</i>	Chromosomes	
L16	Structural alternations in Chromosomes: Duplication,	Cell and Molecular Biology ,P.K. Gupta Ch 28,
L17	Structural alternations in Chromosomes: Deficiency	Cell and Molecular Biology ,P.K. Gupta Ch 28,
L18	Structural alternations in Chromosomes: Inversion,	Cell and Molecular Biology ,P.K. Gupta Ch 28,
L19	Structural alternations in Chromosomes: translocation heterozygotes	Cell and Molecular Biology ,P.K. Gupta Ch 28,
Tutorial 6	Numerical alterations in Chromosomes: Haploids, aneuploids and euploids	Cell and Molecular Biology ,P.K. Gupta Ch 29,
Seminar 5	Chromosomal abbreviations	
L20	C-value and C-value paradox	Buchanan, Gurissem and Jones; Biochemistry and Molecular Biology of Plant; Ch 7,
L21	Cot curve and its significance	Lecture Notes
L22	Bioenergetics: Principles of the thermodynamics, free energy and chemical potential,	Williams G. Hoppkins, Introduction to plant Physiology, Ch 9
L23	Bioenergetics: Free energy of Oxidation – reduction reactions, redox potential.	Williams G. Hoppkins, Introduction to plant Physiology, Ch 9
L24	Bioenergetics: Types of Phosphorylations, structure and functions of Energy carriers (ATP, GTP)	Williams G. Hoppkins, Introduction to plant Physiology, Ch 9
<i>Tutorial7</i>	Bioenergetics: Types of Phosphorylations, structure and functions of Energy carriers (NADP, FADH etc.)	Lecture Notes
<i>Seminar6</i>	Bioenergetics	
L25	Fats and Lipids: Volatile oils, Fatty acids and fatty oils	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch

		11,
<i>L26</i>	Fats and Lipids: Sesquiterpenes, diterpenes, triterpenes and tetraterpenes.	Lecture Notes
<i>L27</i>	Fats and Lipids: Structure and function of lipids	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch 11,
<i>L28</i>	Fats and Lipids: Classification of lipids, fatty acids	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch11
<i>Tutorial 8</i>	Fats and Lipids: Biosynthesis of lipids and fatty acids	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch 24,
<i>Seminar7</i>	Fats and Lipids	
<i>L29</i>	Carbohydrates: Classification Structure and properties	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch 10,
<i>L30</i>	Carbohydrates: Biosynthesis of starch and sucrose	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch 23,
<i>Seminar8</i>	Carbohydrates	
<i>L31</i>	Enzymes: General characters Nomenclature and classification	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch 8,
<i>L32</i>	Enzymes: Mode of enzyme action, Michaelis – Menton equation and its significance	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch 8,
<i>L33</i>	Enzymes: Determining <i>KM</i> and <i>Vmax</i> , Lineweaver-Burk (Double Reciprocal Plot).	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch 8,
<i>L34</i>	Enzymes: Regulation of enzymes Enzymes: Allosteric modulation, enzyme inhibition	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch 9,

<i>Tutorial9</i>	Enzymes: Coenzymes, isoenzymes. Factors effecting enzyme activity.	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch 9, and Lecture notes
<i>Seminar9</i>	Enzymes	
<i>L35</i>	Amino acids: Structure and Types	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch. 4,
<i>L36</i>	Amino acids: Properties and Stereoisomers	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch 4,
<i>L37</i>	Amino acids: Functions, Amino Acids as Precursors of Biomolecules	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch 4,
<i>L38</i>	Amino acids: Biosynthesis and catabolism,	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch 4, and Lecture notes
<i>L39</i>	Amino acids: Regulation of amino acid synthesis.	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch 4, and Lecture notes
<i>L40</i>	Proteins: Types and Properties Structure and function	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch 5,6,
<i>Tutorial10</i>	Proteins: Cellular localization, Reverse turn and Ramchandran Plot.	Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger Ch 5,6,
<i>Seminar 10</i>	Proteins	

*=The list of reference is only for guidance and question paper can be framed out of this list. Students are advised to refer to other related text and reference books for those topics.

Reference Books:

1. G. Karp, Cell and Molecular Biology, John Wiley & Sans, Inc.
2. EDP De Robertis, Cell and Molecular Biology, Zea and Febiger.

3. H. Lodish, A. Berk, P. Matsudaira, C.A. Kaiser etc., Molecular Cell Biology, Scientific American Books.
4. Biochemistry; Voet and Voet, John Wiley & Sons, Inc., New York, USA.1992.
5. Biochemistry & Molecular Biology of Plants; Eds: Bob Buchanan, Wilhelm Gruissem, Russell Jones (Editor) Wiley; 1st. edition. 2002.
6. Biochemistry. Lubert Stryer, Jeremy M. Berg, John L. Tymoczko. W. H.Freeman and Co. 5th edition. 2002
7. Biochemistry; The molecular basis of cell structure and function. A. L. Lehninger. Worth Publishers. 1982.

Core course 4
MIBOT04CT04
Plant Ecology and Biodiversity Conservation

External: 80 Marks

Internal: 20 marks

Lectures: 40hrs

Tutorials: 10hrs

Additional Contact Hours : 10 (seminars, quiz, assignments, group discussion etc.)

No.	Topic	Reference*
L-1	Environment: Physical environment, biotic environment	3
L-2	Ecosystem concept: Structure and function	1
L-3	Ecological energetics	5
L-4	Energy flow through ecosystem-1	1
L-5	Energy flow through ecosystem-2	1
L-6	Biogeochemical cycles (C)-1	5
L-7	Biogeochemical cycles (C)-2	5
L-8	Biogeochemical cycles (N)-1	5
L-9	Biogeochemical cycles (N)-2	5
L-10	Biogeochemical cycles (P)	5
L-11	Biogeochemical cycles (S)	5
T-1	Homeostasis	1
L-12	Communitites structure and dynamics	3
T-2	Edges and ecotones	3
L-13	Processes shaping communities	3
L-14	Organismal and individualistic model of community	3
L-15	Mechanism of ecological succession-1	5
L-16	Mechanism of ecological succession-2	3
T-3	Changes in ecosystem properties during succession	5
L-17	Population ecology: Properties of populations	5
L-18	r- and k- strategies	3
T-4	Life history patterns	5
L-19	Intraspecific population regulation	3
L-20	Interspecific competition,	3
L-21	Type of interactions	3
L-22	Species coexistence	3
L-23	Population Genetics and speciation	3
L-24	Adaptive radiation, Concept of metapopulation – demes and dispersal, interdemic extinctions.	3

L-25	Sustainability; global carrying capacity	4
T-5	Harvesting living resources from wild	4
T-6	Farming of monocultures	4
L-26	Pest control-1	4
L-27	Pest control-2	4
L-28	Environmental pollution; agricultural pollution	4
L-29	Atmospheric pollution	4
L-30	Global environmental changes	Lecture Notes
T-7	Mining and quarrying	4
L-31	Restoration ecology	4
L-32	Environmental impact assessment	Lecture Notes
T-8	Phytogeography	2
L-33	Major biomes of the world with special reference to desert and grassland-1	3
L-34	Phytogeographical regions of India	2
L-35	Concept, levels of biodiversity, diversity indices, status in India,	6
L-36	Strategies for conservation	6
T-9	Life form	5
L-37	Biological spectrum	Lecture Notes
L-38	Concept of niche	Lecture Notes
T-10	Niche width and overlap	Lecture Notes
L-39	Principles of limiting factor	Lecture Notes
L-40	Plant indicators	Lecture Notes

*=The list of reference is only for guidance and question paper can be framed out of this list. Students are advised to refer to other related text and reference books for those topics.

References:

1. Odum, E.P. 1983. Basic Ecology. Saunders, Philadelphia.
2. Sen, D.N. 1978. Concepts in Indian Ecology, Shoban Lal Nagin Chand & Co., Delhi-7.
3. Smith, R.L. and Smith T.M. 1998. Elements of Ecology. Benjamin/Cummings Publication.
4. Townsend, C.R., Begon, M., Harper, J.L. 2007. Essentials of Ecology. Blackwell Publishing.

5. Kormondy, E.J. 1996. Concepts of Ecology. PrenticeHall of India Pvt.Ltd., New Delhi.
6. Krishnamurthy, K.V. 2006. An advanced textbook on biodiversity: principles and practice. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.

Topics for Additional Contact Hours : 10 (seminars, quiz, assignments, group discussion etc.)

S.No.	Topic
1	Ecosystem concept: Structure and function
2	Ecological energetics
3	Energy flow through ecosystem
4	Biogeochemical cycles (C)
5	Biogeochemical cycles (N)
6	Biogeochemical cycles (P)
7	Biogeochemical cycles (S)
8	Homeostasis
9	Communitites structure and dynamics
10	Processes shaping communities
11	Mechanism of ecological succession
12	Population ecology: Properties of populations
13	Life history patterns
14	Intraspecific population regulation
15	Interspecific competition,
16	Species coexistence
17	Population Genetics and speciation
18	Concept of metapopulation – demes and dispersal
19	Sustainability; global carrying capacity
20	Harvesting living resources from wild
21	Farming of monocultures
22	Pest control
23	Environmental pollution; agricultural pollution
24	Atmospheric pollution
25	Global environmental changes
26	Mining and quarrying
27	Restoration ecology
28	Environmental impact assessment
29	Phytogeography
30	Major biomes of the world with special reference to desert and grassland
31	Phytogeographical regions of India
32	Concept, levels of biodiversity, diversity indices, status in India
33	Strategies for conservation
34	Concept of niche
35	Niche width and overlap
36	Principles of limiting factor

