

GUJARAT UNIVERSITY



BOTANY

Choice Based Credit System (CBCS) Theory syllabus

Effective from June-2011

SEMESTER-I

Detailed Curriculum has been designed as per semester system. There shall be one theory paper having four units.

Contact Hours per week: 4

Exam Duration: 3 hours

Unit-1 Study of lower plants

Objective: To acquaint students with lower plants.

Algae: *Spirogyra*, *Nostoc* 3 hours

Taxonomic Position, structure of thallus, vegetative, asexual and sexual modes of reproduction of the genus, Economic importance of algae.

Fungi: *Mucor*, *Albugo* 3 hours

Taxonomic Position, structure of thallus, vegetative, asexual and sexual modes of reproduction of the genus, Economic importance of fungi.

Bryophyte: *Riccia* 2 hours

Taxonomic Position, Morphology, structure of thallus, vegetative, asexual and sexual modes of reproduction of the genus. General characters of Bryophytes.

Pteridophyte: *Nephrolepis* 2 hours

Taxonomic Position, Morphology, structure of thallus, vegetative, asexual and sexual modes of reproduction of the genus, Economic importance of Pteridophytes

Suggested Readings

- (i) A Textbook of Botany vol. I and II S.N. Pandey, P. S. Trivedi and S. P. Misra., Vikas Publication House Pvt. Ltd.
- (ii) Collage Botany Vol. I & II Das, Dutta, Gangulee and Kar., New Central Book Agency
- (iii) Algae, Fungi, Bryophyte, Pteridophyte by Vasishta., S. Chand Pub, New Delhi
- (iv) Smith, G. M. 1972. *Cryptogamic Botany*. Vol. 1 & 2. Tata McGraw Hill Publishing Co. Ltd. New Delhi.
- (v) Webster, J. 1985. *Introduction to Fungi*. Cambridge University Press.
- (vi) Sporne, K.K. 1991. *The Morphology of Pteridophytes*. B.I. Publishing Pvt. Ltd. Bombay.

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Unit-2 Genetics and Molecular biology

Objective: To acquaint students with the concepts of cell biology and genetics

1. DNA and RNA Composition and Structure	3 hours.
2. Watson and Crick's model of DNA	1 hour
3. Types of RNA	1 hour
4. DNA Replication	1 hour
5. Genetic code	1 hour
6. Protein Synthesis	2 hour
7. Regulation of gene expression in prokaryotes – Operon concept	1 hour

Suggested Readings

- (i) The World of Cell by Backer, Kleinsmith and Hardin Pearson Education
- (ii) Elements of Cytology by C. B. Powar
- (iii) Lewin, B.2000. *Genes VIII. Oxford University Press*, New York.
- (iv) Alberts, B., Bray,D., Lewis, J., Raff, M., Roberts, K. and Watson, J.D. 1999. *Molecular Biology of the Cell*. Garland Publishing, Inc. New York.
- (v) Wolfe, S.L. 1993. *Molecular and Cellular Biology*. Wadsworth Publishing Co. California, USA.
- (vi) Kleinsmith, L.J. and Kish, V.M.1995. *Principles of cell and Molecular Biology* (2nd Ed.). Harper Collins College Publishers, New York, USA.
- (vii) Lodish, H., Berk, A., Zipursky, S.L., Matsudaira, P., Baltimore, D. and Darnell, J. 2000. *Molecular Cell Biology* (4th Ed.). W.H. Freeman and Co., New York, USA.
- (viii) Cytogenetics by S. Sundara Rajan., First edition, Anmol Publications, New Delhi

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Exam Duration: 3hours

Unit-3 Plants and environment

Objective: To acquaint students with the concept of Ecology and Environment.

Course content:

1. Introduction, Scope and Branches of Ecology 0.5 hour
2. Ecosystems : 5.5 hours
Kinds of Ecosystem: Natural, Artificial
Structure and Functions of Ecosystems
Ecological Pyramids, Productivity of an Ecosystem, Energy flow in an Ecosystem
Biogeochemical Cycles-Carbon, Nitrogen, Phosphorus, Sulfur, Components of
Freshwater Ecosystem (Pond) Components of Terrestrial Ecosystem (Grassland)
3. Biotic Factors : 3 hours
Symbiosis: Mutualism, Proto-cooperation, Commensalism
Antagonism: Predation, Parasitism, Antibiosis, Competition, Saprophytism
4. Concept of Sustainable Biodiversity: 1 hour
Case study: The Messenger Pigeon gone forever

Suggested Readings

- (i) Textbook of Ecology by G.Tailer Miller, Jr.Scott E. Spoolman. Cengage Learning
- (ii) Plants and Environment by Daubenmire (Wiley-Eastern Pvt. Ltd., New Delhi)
- (iii) Ecology and Environment by P.D.Sharma Rastogee Publication
- (iv) Basic Ecology – Eugene P. Odum
- (v) Fundamentals of Ecology- P. Odum
- (vi) Concept in Indian Ecology and Environmental Science – S. V. S. Rana
- (vii) Ecology Theories and Application – Peter Stiling
- (viii) Ecology & Environment – P. D. Sharma
- (ix) Indian Manual of Plant Ecology – R .Misra & G. S. Puri

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Contact Hours per week: 4

Exam Duration: 3 hours

Unit-4 Plant Biotechnology

Objective: To acquaint students with the latest technological developments in the field of Biotechnology and plant tissue culture.

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| 1. Introduction, Brief History, Scope and Types of Plant Biotechnology | 1 hour |
| 2. Plant Tissue Culture – Tools & Technique; Applications | 2 hours |
| 3. Types of Culture- Callus, Cell | 2 hours |
| 4. Secondary Metabolites in Plant Culture | 2 hours |
| 5. Protoplast Culture and Somatic Hybridization. | 2 hours |
| 6. Applications of Plant Tissue Cultures | 1 hour |

Suggested Readings

- (i) Biotechnology by U. Satyanarayana Books and Allied (P) Ltd
- (ii) Elements of Biotechnology by P.K.Gupta, Rastogi Publications.
- (iii) Plant cell and tissue culture by Narayanswamy, Tata McGraw Hill.
- (iv) Bhojwani, S.S. 1990. Plant Tissue Culture: Theory and Practical (a revised edition). Elsevier Science Publishers, New York, USA.
- (v) Basic Biotechnology by S. Ignacimuthu, Tata McGraw Hill.
- (vi) A Text Book of Biotechnology by R.C. Dubey, S. Chand & Co.
- (vii) Vasil, I.K. and Thorpe, T.A. 1994. Plant Cell and Tissue Culture. Kluwer Academic Publishers, the Netherlands
- (viii) Snustad, D.P. and Simmons, M.J. 2000. Principles of Genetics. John Wiley & Sons, Inc., USA.
- (iv) Stent, G.S. 1986. Molecular Genetics. CBS Publication.
- (v) Brown, T.A. 1999. Genomes. John Wiley & Sons (Asia) Pvt. Ltd., Singapore.

CBCS BOTANY PRACTICAL SYLLABUS

SEMESTER 1:

1. Study of Algae- ***Spirogyra***
 - a) Mounting- Thallus, conjugation types
 - b) P.S. - Thallus and conjugations***Nostoc***
 - a) Mounting- Colony
 - b) P.S. - Colony

2. Study of Fungi- ***Mucor***
 - a) Specimen- Bread/ Roti with Mucor
 - b) Mounting- Reproductive structure- spores, sporangia
 - c) PS- Mucor sporangia, Zygosporangia***Albugo***
 - a) Specimen- On host
 - b) Mounting- Reproductive structures
 - c) PS- Vegetative and Reproductive structures

3. Study of Bryophytes-***Riccia***
 - a) Specimen - Thallus with Sporophyte
 - b) P.Slides – Thallus v.t.s., thallus with Antheridia and Archegonia

4. Study of Pteridophytes- ***Nephrolepis***
 - a) Specimen- Sporophytic plant
 - b) Mounting- Ramenta, Hydathode, Sporangia
 - c) PS- Prothallus with Antheridia and Archegonia; T.S. leaflet passing through sorus

5. Detail study of Genetic Codes.

6. Study of Biotic Factors- examples of Symbiosis and Antagonism
 - a) Symbiosis- Root nodules, Lichen
 - b) Proto-cooperation- Hermit crab and Fierasfer fish
 - c) Antagonism- Cuscuta, Loranthus, Viscum, Utricularia, Nepenthes, Drosera

7. Study of structure of Nucleic acids (DNA, RNA) through charts or models- Watson & Crick Model

8. DNA Replication and Protein Synthesis through charts or models.

9. Study of various tools: Plant Tissue Culture.
 - a) Laboratory design
 - b) Laminar Air Flow, Autoclave, pH meter, oven, digital balance

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SEMESTER-I

Date: _____

Total Marks: 30

Time: 3 Hours

Q.1 Identify and describe Specimen A and B.	08
Q.2 Mount the _____ from the Specimen C.	04
Q.3 Mention the Amino Acids for the _____, _____, _____, Genetic Codes	02
Q.4 Identify and Describe the specimens	12
Specimen D (Algae or Fungi)	
Specimen E (Bryophytes or Pteridophytes)	
Specimen F (Ecology)	
Specimen G (Ecology)	
Specimen H (Genetics)	
Specimen I (PTC)	
Q.5 Journal	04

GUIDENCE FOR ARRANGEMENT OF SPECIMENS IN THE EXAMINATION.

Specimen A: Algae or Fungi.

Specimen B: Bryophytes or Pteridophytes.

Specimen C: Reproductive structure of Algae, Fungi, Bryophytes or Pteridophytes or Ramenta or Hydathode may be asked.

(Q.3 Different 5 types of sets should be prepared for each examination).