

Dr.C.V.RAMAN SCIENCE COLLEGE,SIRONCHA
GADCHIROLI

SYLLABUS

For

B. Sc.

BOTANY

SEMESTER I & II

Under

Choice Based Credit System

(CBCS)

(With effect from : 2016-17)

DR.C.V.RAMAN SCIENCE COLLEGE, SIRONCHA

SYLLABUS

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(With effect from: 2016-17)

SEMESTER – I:

Papers	Title of the Paper	Th/Pr	Int.Assessment	Total Marks
Paper – I	Plant Diversity I (Micro-organisms, Algae, Fungi and Plant Pathology)	40 Marks	10 Marks	50 Marks
Paper – II	Plant Diversity II (Bryophyta, Pteridophyta, Gymnosperm and Paleobotany)	40 Marks	10 Marks	50 Marks
Practical – I	Based on Theory Paper –I & II of Semester – I	30 Marks	20 Marks	50 Marks

Internal Assessment:

Based on Assignment, Seminar, Unit Test & overall attendance and performance of the student

SEMESTER – II:

Papers	Title of the Paper	Th/Pr	Int.Assessment	Total Marks
Paper – I	Morphology and Anatomy of Angiosperms	40 Marks	10 Marks	50 Marks
Paper – II	Taxonomy & Diversity of Angiosperms	40 Marks	10 Marks	50 Marks
Practical – I	Based on Theory Paper –I & II of Semester – II	30 Marks	20 Marks	50 Marks

Internal Assessment:

Based on Assignment, Seminar, Unit Test & overall attendance and performance of the student

B.Sc. BOTANY

SEMESTER – I

REFERENCE BOOKS

1. Smith, K. M. : Plant Viruses [1992] 6th Ed. (University Book Stall, New Delhi)
2. Tortora, G.E.B.R.Funke, C. L. Case [1997] : Microbiology, An Introduction, 6th Ed. (Addison Neslley Logman, Inc.)
3. Dubey, RC, DK Maheshwari [1999] : Text Book of Microbiology (S. Chand & Co.)
4. Sharma, P.D. [1993] : Microbiology and plant pathology (Rastogi & Co.)
5. Clifotn, A [1958] : Introduction to the Bacteria (McGraw Hill & Co. N.Y.)
6. Carr, N. J. and B. A. Whitton [1973] : The Biology of Blue Green Algae (Univ. of California press, Berkeley)
7. Fogg, G.E.W.D. P. Stewart, P. Ray and A.E. Walsby [1973] : The Blue – Green Algae (Academic Press, London)
8. Bold, H.C.C.J Alexopoulos and T Delevoryas [1980] : Morphology of Plants and Fungi (Harper and Row Publishers, N.Y.)
9. Singh, V.P. C. Pande, D. K. Jain [1995] : A Text Book of Botany (Rastogi & Co. Meerut)
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12. Chapman, V. J. [1962] The Algae (Macmillan and Co. Ltd.)
13. Dodge, J. D. [1973] : The Fine Structure of Algal Cell (Academic Press, London)
14. Kumar, H. D. and H. N. Singh [1982] : A text book of Algae (Affiliate East-West Press, Pvt. Ltd., New Delhi)
15. Prescott, G. W. [1969] : The Algae-A Review (Moughton miffin Cop)
16. Round, F. E. [1973] : The Histology of the Algae, 2nd Ed. (Edward Arnold)
17. Sharma, O. P. [1992] : Text Book of Thallophytes (McGraw Hill Publishing Co.)
18. Smith, G. M. [1971] : Cryptogamic Botany, Vol. I Algae and Fungi (TMH)
19. Vasishtha, B. R. [1990] : Algae (S. Chand & Co. New Delhi)
20. Bhatia, Algae
21. Alexopoulos, C. J. and G. W. Min & M. Blackwell, Indrodctory Mycology, CBS distributors & publishers, Delhi
22. Dube, H. C. [1990] introduction to Fungi (Vikas Publishing House Pvt. Ltd, Delhi)

23. Sharma, P. D. [1991] : The Fungi (Rastogi & Co. Meerut)
24. Vasishta, B. R. [1990] : Fungi (S. Chand & Co. New Delhi)
25. Sharma, O. P. : Fungi (TMH)
26. Agrios, G. N. 1997 Plant Pathology, 4th ed. (Harcourt Asia PTE Ltd. Academy Press)
27. Ainsworth, G. C. 1971 Ainsworth and Bisby's Dictionary of the Fungi, 6th ed. (Commonwealth Mycological Institute, Kew Surrey)
28. Mehrotra, R. S. and Aneja, K. R. 1990 : An Introduction to mycology (Wiley Estern Ltd.)
29. Prem puri [1980] : Bryophyta (Atma Ram & Sons Delhi)
30. Ram Udar [1970] : An Introduction ot Bryophyta (Shashidhar Malviya Prakashan, Lacknow)
31. Vashishtha, B. R. [1992] : Bryophyta (S. Chand & Co. New Delhi)
32. Parihar, N. S. [1997] The Biology and Morphlogy of Bryophytes (Central Book Depot, Allahabad)
33. Sporne, K. R. J : The Morphology of Bryophytes (Hutchinson University, London)
34. Srivastava H. N. [2006] : Diversity of Microbes & Cryptogams (Pradeep Publications, Jalandhar)
35. Pandey, B. P. [2007] : Botany for Degree Students (S. Chand & Co. New Delhi)
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37. Rashid, A. [1989] : An Introduction to Pteridophyta (Vikas Publishing House Pvt. Ltd., New Delhi)
38. Sharma, O. P. [1990] : Text Book of Pteridophyta (Mcmillan India Ltd.)
Bhatnagar, S. P. and Moitra A. 1996 Gymnosperms. New Age International Limited, New Delhi
39. Sporne, K. R. 1965. The Morphology of Gymnosperms. Htchinson University Library Press, London
40. Stewart, W. N. and G. W. Rothwell 1993 : Paleobotany and the Evolution of Plants, 2nd

41. Mukerjee, S. K. 1984. College Botany Vol. III New Central Book Agency, Calcutta.
42. Dutta, A. C. – College Botany
43. Shrivastava, H. N. [2006] : Pradeep's Botany Vo. II (Pradeep Publication, Jalandar)

Botany Practical's SEMESTER – I

Laboratory Exercises:

Make use of the permanent micro-preparation, temporary mounts, transparencies, photographs, charts etc.

- 1) Study of construction, working principle and handling of Compound and Dissecting microscopes
- 2) Study of various bacterial forms .
- 3) To perform Gram staining of Bacteria
- 4) Study of Cyanobacteria e.g. **Nostoc, Gleocapsa**
- 5) Study of various forms of Algae:
 - (i) *Chlamydomonas*
 - (ii) *Oedogonium*
 - (iii) *Chara*
 - (iv) *Voucheria*
 - (v) *Ectocarpus*
 - (vi) *Batrachospermum*
- 6) Study of various forms of Fungi:
 - (i) *Albugo*
 - (ii) *Mucor*
 - (iii) *Penicillium*
 - (iv) *Puccinia*
 - (v) *Cercospora*
- 7) Study of different types of Lichens: (i) Crustose
(ii) Foliose
(iii) Fruticose
- 8) Study of different Plant Diseases:
 - a) Viral Disease: Mosaic disease of Tobacco (TMV)
 - b) Fungal Disease: Red rot of Sugarcane (***Colletotrichum fulcatum***)
: Brown spot of rice (***Helminthosporium oryzae***)
: Loose smut of wheat (***Ustilago hordei***)
 - c) Bacterial disease: Bacterial Blight of Cotton (***Xanthomonas compestris***)
- 9) Study of different forms of Bryophytes:
 - (i) *Riccia*
 - (ii) *Anthoceros*
 - (iii) *Funaria*
- 10) Study of different forms of Pteridophytes: (i) *Selaginella*
(ii) *Equisetum*
(iii) *Marsilea*
- 11) Study of different forms of Gymnosperms: (i) *Cycas*
(ii) *Pinus*
- 12) Study of different types of fossil:
 - (i) Impression
 - (ii) Compression
 - (iii) Petrification
- 13) Study of fossil Gymnosperms:
 - (i) *Glossopteris*
 - (ii) *Cycadeoidea*

Dr.C.V.RAMAN SCIENCE COLLEGE,SIRONCHA

CBCS Semester Pattern Syllabus

For

B.Sc. BOTANY

SEMESTER – I

PRACTICAL

Based on Theory Paper - I & II of Semester – I

[Time 5 Hours]

[Max. Marks – 30]

- Que. 1: Gram-stain the **Bacterial** strain/stain the **Cyanobacterial** material **[A]** and identify?
[Writing not necessary] 03 Marks
- Que. 2: Prepare temporary mount, Identify and classify the given **Algal** material **[B]**
[Slide preparation 2 marks, writing 1 mark] 03 Marks
- Que. 3: Prepare temporary mount, Identify and classify the given **Fungal** material **[C]**
[Slide preparation 2 marks, writing 1 mark] 03 Marks
- Que. 4: Prepare temporary mount, Identify and classify the given **Bryophytic** material **[D]**
[Slide preparation 2 marks, writing 1 mark] 03 Marks
- Que. 5: Prepare temporary mount, Identify and classify the given **Pteridophytic** material **[E]**
[Slide preparation 2 marks, writing 1 mark] 03 Marks
- Que. 6: Prepare temporary mount, Identify and classify the given **Gymnospermic** material **[F]**
[Slide preparation 2 marks, writing 1 mark] 03 Marks
- Que. 7: SPOTTING:
SPOT-G: Algae 06 Marks
SPOT-H: Fungi/ Lichens
SPOT-I: Plant Pathology
SPOT-J: Bryophyta/Pteridophyta
SPOT-K: Gymnosperms
SPOT-L: Fossils
- Que. 8: Practical Record (2 Marks)
Excursion Report (2 Marks)
Viva-voce (2 Marks) 06 Marks

NOTE: Well labeled diagrams are expected wherever necessary.

DR.C.V.RAMAN SCIENCE COLLEG,SIRONCHA

CBCS Theory Question Paper Pattern

For

B.Sc. BOTANY

SEMESTER – I

Theory

All questions are compulsory and carry equal marks

Draw well labelled diagram where ever necessary

[Time 3 Hours]

[Max. Marks – 40]

Question 1. Based on Unit - I

Write notes on : 04 x 2 = 08

- a. Unit - I
- b. Unit - I
- c. Unit - I
- d. Unit - I

OR

- e. Unit - I
- f. Unit - I
- g. Unit - I
- h. Unit - I

Question 2. Based on Unit - II

Write notes on : 04 x 2 = 08

- a. Unit II
- b. Unit II
- c. Unit II
- d. Unit II

OR

- e. Unit II
- f. Unit II
- g. Unit II
- h. Unit II

Question 3. Based on Unit - III

Write notes on : 04 x 2 = 08

- a. Unit III
- b. Unit III
- c. Unit III
- d. Unit III

OR

- e. Unit III
- f. Unit III
- g. Unit III
- h. Unit III

Question 4. Based on Unit - IV

- a. Unit IV
- b. Unit IV
- c. Unit IV
- d. Unit IV

OR

- e. Unit IV
- f. Unit IV
- g. Unit IV
- h. Unit IV

Write notes on : 04 x 2 = 08

Question 5. Write any eight questions in one or two lines only
(Diagrams are NOT necessary)

- a. Unit I
- b. Unit I
- c. Unit I
- d. Unit II
- e. Unit II
- f. Unit II
- g. Unit III
- h. Unit III
- i. Unit III
- j. Unit IV
- k. Unit IV
- l. Unit IV

1 x 8 = 08

B.Sc. SEMESTER – II

Paper – I

Morphology and Anatomy of Angiosperms (48 Periods)

- UNIT – I: Vegetative Morphology of Angiosperm (12 Periods)**
- 1. Mode of living:**
 - i. Autotrophic
 - ii. Heterotrophic
 - 2. Habit:** Erect forms, weak forms
 - 3. Root:**
 - i. Normal root (Tap and Fibrous)
 - ii. Modified root (Modification of Tap & Adventitious roots)
 - 4. Stem:**
 - i. Branching pattern
 - ii. Modification of stem
 - 5. Leaf:**
 - i. Parts of foliage leaf
 - ii. Lamina – shape, margin, apex, base, surface, texture, venation.
 - iii. Types of leaves (simple and compound)
 - iv. Modification of leaves
 - v. Phyllotaxy
 - vi. Stipules
- UNIT – II: Reproductive Morphology of Angiosperm (12 Periods)**
- 1. Inflorescence:** Definition and Types (Racemose, Cymose and Special)
 - 2. Flower:**
 - i. Flower is a modified shoot evidences
 - ii. Types (Neuter, Achlamydeous, Monochlamydeous, Dichlamydeous, Sessile & Pedicellate, Cyclic and Acyclic)
 - iii. Parts of flower (Perianth, Calyx and its modification, Corolla, Aestivation, Androecium, Gynoecium)
 - iv. Floral formula and Floral diagram
 - 3. Fruit:** Types of fruit
- UNIT – III: Anatomy (12 Periods)**
- 1. Meristems:**
 - i. Classification (based on origin and position)
 - ii. Root apical Meristem (Newman Theory)
 - iii. Shoot apical Meristem (Tunica-Carpus Theory)
 - 2. Tissue:** Types (Simple, Complex, and Secretary)
 - 3. Vascular Bundle:** Types
 - 4. Tissue Systems:** Epidermal, Ground or Fundamental and Vascular Tissue Systems.
 - 5. Xylem:** Structure and function
 - 6. Phloem:** Structure and function
 - 7. Cambium:** Structure and function
 - 8. Periderm:** Structure and function
- UNIT – IV: Anatomy (12 Periods)**
- 1. Primary structure:**
 - i. Dicot root e. g. **Sunflower**
 - ii. Monocot root e. g. **Maize**
 - iii. Dicot stem e. g. **Sunflower**
 - iv. Monocot stem e. g. **Maize**
 - v. Dicot leaf e. g. **Sunflower**

Contd.....

vi. Monocot leaf e. g. **Maize**

2. Secondary structure: Dicot stem e. g. **Moringa**

3. Anamolous secondary structure in stem:

- i. **Bignonia**
- ii. **Boerhaavia**
- iii. **Dracaena**

4. Anamolous secondary structure in root: e. g. **Beta vulgaris (Beet)**

B.Sc. SEMESTER – II

Paper – II

Taxonomy & Diversity of Angiosperms (48 Periods)

- UNIT – I:** **1. Angiosperms: Origin (Bennettitalian Theory).** (12 Periods)
2. Example of primitive angiosperm – *Magnolia*.
3. **Fossil Angiosperms:** i. Flower- *Saharianthus*
- 4. Botanical Nomenclature:** Principles, rules, taxonomic ranks, typification.
5. Brief History of classification: Theophrastus and Linnaeus
- UNIT – II:** **1. Classification of Angiosperms:** (12 Periods)
 i. Types (Artificial, Natural and Phyllogenetic),
 ii. System proposed by Bentham and Hooker and its
 Merits & Demerits
2. Herbarium Techniques: Classical and Virtual (Digital)
- UNIT – III:** **1. Diversity of flowering plants:** Dicot families i. **Ranunculaceae** (12 Periods)
 ii. **Brassicaceae**
 iii. **Malvaceae**
 iv. **Fabaceae (Pappilionaceae)**
 v. **Caesalpiniaceae**
 vi. **Mimosaceae**
 vii. **Solanaceae**
- UNIT – IV:** **1. Dicot families (contd.)** i. **Lamiaceae** (12 Periods)
 ii. **Apocynaceae**
 iii. **Asclepiadaceae**
 iv. **Asteraceae**
 v. **Euphorbiaceae**
- 2. Diversity of flowering plants:** Monocot families i. **Liliaceae**
 ii. **Poaceae**
 iii. **Orchidaceae**

B.Sc. BOTANY
SEMESTER – II

REFERENCE BOOKS

1. Davis, P. H. and Heywood V. H. 1963. Principals of Angiosperm Taxonomy. Oliver and Boyd London.
2. Gifford, E. M. and Foster A. S. 1988. Morphology and Evolution of Vascular Plants. W. H. Freeman & Company, New York.
3. Heywood, V. H. and Moore D. M.(eds)1984. Current concepts in plant Taxonomy. Academic Press London
4. Jeffrey, C. 1983. An Introduction of plant Taxonomy. Cambridge University Press, Cambridge, London.
5. Jones, S. B. Jr. and Luchsinger A. E. 1985. Plants systematic (2nd Edn.). McGraw Hill Book Co. New York.
6. Maheshwari, J. K. 1963. Flora of Delhi. CSIR, New Delhi
7. Radford, A. E. 1986 Fundamentals of plant systematic. Harper And Row, New York
8. Singh, G. 1999. Plant systematic : Theory and practice. Oxford and IBH Pvt. Ltd., New Delhi
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10. Stace, C. A. 1989. Plant Taxonomy and Biosystematics (2nd Edn.). Edward Arnold, London.
11. Stewart, W. N. and G. W. Rothwell 1993 : Paleobotany and the Evolution of Plants, 2nd Edn. Cambridge University Press.
12. Thomas, P. 2000. Trees : Their Natural History. Cambridge University Press.
13. Pande, P. B. Text Book of Botany. S. Chand & Co.
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15. Dutta, A. C. – College Botany
16. Naik, V. N. – Taxonomy of Angiosperm
17. Shrivastava, H. N. [2006] : Pradeep's Botany Vo. II (Pradeep Publication, Jalandar)
18. Ugemuge, N.R. 1986. Flora of Nagpur District. Shree Prakashan, Nagpur
19. Bhojwani, S.S. and Bhatnagar, S.P. 2000. The Embryology of Angiosperms. Vikas Publishing
20. Proctor, P.H. , Evert, R.F. and Eichhorn, S.E. 1999. Biology of Plants, 5th Edn. W.H.Freeman and Co. , Worth Publisher, New York
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32. Pandey P. B. *Economic Botany*, S. Chand & Co.,
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36. Fahne, A. 1974 Plant Anatomy, 2nd Edn. Pergamon Press, Oxford.
37. Mauseth, J. D. 1988. Plant Anatomy. The Benjamin/Cummings Publishing Company Inc. Menlo Park, California, U.S.A.
38. Gifford, E. M. and Foster A. S. 1988. Morphology and Evolution of Vascular Plants. W. H. Freeman & Company, New York.
39. Heywood, V. H. and Moore D. M.(eds)1984. Current concepts in plant Taxonomy. Academic Press London
40. Jeffrey, C. 1983. An Introduction of plant Taxonomy. Cambridge University Press, Cambridge, London.
41. Jones, S. B. Jr. and Luchsinger A. E. 1985. Plants systematic (2nd Edn.). McGraw Hill Book Co. New York.
42. Maheshwari, J. K. 1963. Flora of Delhi. CSIR, New Delhi
43. Radford, A. E. 1986 Fundamentals of plant systematic. Harper And Row, New York
44. Singh, G. 1999. Plant systematic : Theory and practice. Oxford and IBH Pvt. Ltd., New Delhi
45. Stace, C. A. 1989. Plant Taxonomy and Biosystematics (2nd Edn.). Edward Arnold, London.
46. Thomas, P. 2000. Trees : Their Natural History. Cambridge University Press.
47. Pande, P. B. Text Book of Botany. S. Chand & Co.
48. Bierhorst, D. W. [1971] : Morphology of Vascular Plants. Macmillan & Co. N. R.
49. Dutta, S. C. 1989. Systematic Botany. Wiley Eastern Co.
50. Mukerjee, S. K. 1984. College Botany Vol. III New Central Book Agency, Calcutta.
51. Dutta, A. C. – College Botany
52. Naik, V. N. – Taxonomy of Angiosperm
53. Shrivastava, H. N. [2006] : Pradeep's Botany Vo. II (Pradeep Publication, Jalandar)

B.Sc. Botany Practical

SEMESTER – II

Laboratory Exercises:

Make use of the permanent micro-preparation, temporary mounts, transparencies, photographs, charts, preserved or fresh specimens etc.

- 1) Study of Vegetative Morphology of Angiosperms :
 - (i) Root (Type, modification)
 - (ii) Stem (Branching pattern, modification)
 - (iii) Leaves (Type, phyllotaxy, venation, modification)
- 2) Study of Reproductive Morphology of Angiosperms :
 - (i) Inflorescence (Types: Racemose, Cymose & Special)
 - (ii) Flower (Types, parts of flower)
 - (iii) Fruit (Types)
- 3) Study of Anatomy of primary structure in :
 - (i) Dicot : Root, stem & leaf e. g. Sunflower
 - (ii) Monocot : Root, stem & leaf e. g. Maize
- 4) Study of Anatomy of secondary structure in Dicot stem e. g. *Moringa*
- 5) Study of Anamolous secondary growth in stems of :
 - (i) *Bignonia*
 - (ii) *Boerhaavia*
 - (iii) *Dracaena*
- 6) Study of Anamolous secondary growth in root e. g. *Beta vulgaris* (Beet)
- 7) Study of fossil Angiosperms: *Sahalianthus*, *Enigmocarpon*
- 8) Study of locally available plants belonging to families included in the syllabus
- 12) To construct/compose Virtual (Digital) herbarium of plant resources available in the area

NOTES:

1. Frequent field visits in the surrounding areas to study the vegetation are necessary.
2. One long excursion is necessary along with excursion report duly signed by HOD.
3. The teacher should prevent students from collecting plants from the wild and submitting for practical examination, instead the students should asked to prepare the field report [photographic evidences, virtual (Digital) herbarium can be given.]

DR.C.V.RAMAN SCIENCE COLLEGE, SIRONCHA

CBCS Semester Pattern Syllabus

For

B.Sc. BOTANY

SEMESTER – II

PRACTICAL

Based on Theory Papers of Semester – II

[Time 5 Hours]

[Max. Marks – 30]

Que. 1: Write the vegetative and reproductive morphology of given Angiosperm plant **[A]** 06 Marks

Que. 2: Prepare double stained permanent mount of the given Angiosperm material **[B]**
and identify giving diagnostic characters
[Slide preparation 4 marks, writing 2 mark] 06 Marks

Que. 3: Draw floral diagram and right floral formula of the given flower**[C]**
[Slide preparation 2 marks, writing 2 mark] 04 Marks

Que. 4: SPOTTING:
SPOT-D: Vegetative Morphology of Angiosperms 04 Marks
SPOT-E: Reproductive Morphology of Angiosperms
SPOT-F: fossil Angiosperms
SPOT-G: Anatomy

Que. 8: Practical Record (2 Marks)
Excursion Report (2 Marks)
Viva-voce (2 Marks)
Virtual (Digital) herbarium (4 Marks) 10 Marks

NOTE: Well labeled diagrams are expected wherever necessary.