

SOLAPUR UNIVERSITY, SOLAPUR.

Syllabus of B.Sc.Part-I (Botany) Semester system.

(With effect from June-2010)

There shall be two papers of 50 marks each for each semester. Theory examination will be held at the end of each semester. The details of course are as follows.

A) Semester-I

Theory Paper-I. Plant diversity, Classification of Plant kingdom,

Non Vascular plants & Plant Pathology,

50 Marks

Theory Paper –II. Plant Biochemistry and Horticulture.

50 Marks

B) Semester-II.

Theory Paper-III. Vascular plants.

50 Marks

Theory Paper-IV. Cell Biology and Plant Biotechnology.

50 Marks

C) Practical Course:-

50 Marks

The practical course is to be covered in twenty-six practicals. The practical examination of 50 marks, based on the above practical course, will be conducted at the end of second semester.

Syllabus of B.Sc. Part – I (Botany) Semester System
(With effect from June2010)

Semester – I

Paper – I

50 Marks

(Plant diversity, Classification of Plant kingdom Non-Vascular Plants and Plant Pathology)

- 1. Introduction to plant diversity (05)**
 - 1.1 What is plant diversity?
 - 1.2 Why to study plant diversity? (Importance / Value)
 - 1.3 Different aspects of diversity in lower plants with respect to –
 - a. Habitat, b. Form c. Life span d. Nutrition e. Ecological status

- 2. Cryptogams: (02)**
 - 2.1 Introduction
 - 2.2 General characters
 - 2.3 Classification according to G.M. Smith up to Class.

- 3. Algae: (08)**
 - 3.1 Introduction
 - 3.2 General characters and classification (According to G. M.Smith) 02
 - 3.3 Life history of Spirogyra –
Systematic position with reasons, Habit and Habitat, Structure of thallus,
Structure of typical cell, Reproduction – Vegetative and Sexual, Alternation
of generation 02
 - 3.4 Life history of Sargassum –
Systematic position with reasons, Habit and Habitat, External and Internal
structure, Reproduction – Vegetative and Sexual (Development of
Conceptacles and sex organs not expected), Alternation of generations. 03

| | | |
|-----------|---|-------------|
| 3.5 | Brief account of economic importance of algae – | 01 |
| 4 | Fungi | (07) |
| 4.1 | Introduction | |
| 4.2 | General characters and classification (According to Ainsworth) | |
| 4.3 | Life history of <u>Mucor</u> – | |
| | Systematic position with reasons, Occurrence, Structure of mycelium, Nutrition, Reproduction – Vegetative, Asexual and Sexual. | 03 |
| 4.4 | Life history of <i>Puccinia graminis tritici</i> (Wheat rust) | |
| | Systematic position with reasons, Occurrence, Structure of mycelium, Nutrition, Reproduction | 03 |
| 4.5 | Brief account of economic importance of fungi | 01 |
| 5. | Bryophytes | (05) |
| 5.1 | Introduction | |
| 5.2 | General characters and Classification (According to G.M. Smith) | 01 |
| 5.3 | Life history of <i>Riccia</i> – | |
| | Systematic position with reasons, Habit and Habitat, External and Internal structure of thallus (gametophyte), and Reproduction (Development of Sex organs not expected), Alternation of generations. | 03 |
| 5.4 | Economic importance of Bryophytes | 01 |
| 6. | Plant Pathology | (08) |
| 6.1 | Introduction | |
| 6.2 | Study of following diseases with respect to Host, Pathology, Symptoms And Management | |
| | a. Grassy shoot of Sugarcane | 02 |
| | b. Yellow vein mosaic of Bhendi | 02 |
| | c. Citrus canker | 02 |
| | d. Grain smut of Jowar | 02 |

Semester-I
Paper-II (Plant Biochemistry and Horticulture.)

| | |
|---|-------------|
| 1. Introduction | (2) |
| 1.1 Cell as a biochemical entity | 02 |
| 2. Cell chemistry | (08) |
| 2.1 Structure, Properties and Biological significance of water | 03 |
| 2.2 pH and Buffers – Significance of pH, pH scale, Iso electric point, Inorganic and Organic buffers and their significance | 03 |
| 2.3 ATP – Structure and function. | 02 |
| 3 Enzymology | (7) |
| 3.1 Classification and Nomenclature of enzymes | 02 |
| 3.2 Physicochemical properties of enzymes, Co-factors, Coenzymes and Isozymes | 03 |
| 3.3 Mechanism of enzyme action | 02 |
| 4. Horticulture | (02) |
| 4.1 Introduction | |
| 4.2 Definition | |
| 4.3 Scope and Importance | |
| 4.4 Export potential | |
| 5.0 Branches of Horticulture | (03) |
| (Definition and description of the Following branches) | |
| 5.1 Pomoculture | |
| 5.2 Olericulture | |
| 5.3 Floriculture | |
| 5.4 Ornamental and landscape gardening | (03) |

| | | |
|-----------|--|-------------|
| 6. | Propagation of horticultural plants. | (13) |
| 6.1 | Sexual methods (seed propagation) – Definition, Merits and Demerits, Criteria for selection of seeds | 03 |
| 6.2 | Asexual (Vegetative) propagation – Definition, Types- Natural and Artificial | 01 |
| 6.3 | Natural methods of vegetative propagation | |
| | i) Definition | |
| | ii) Runners, Suckers, Bulbs, Tubers, Rhizomes, Bulbils, Stolons and Offsets. | |
| | iii) Merits and demerits of vegetative propagation | 01 |
| 6.4 | Propagation by artificial methods | |
| | i) Cuttings – Definition, Types (listing), Stem cutting – Soft wood, Semi hard wood and Hardwood cuttings | 02 |
| | ii) Layering – Definition, Types (listing), Simple, Air layering | 02 |
| | iii) Grafting – Definition, Stock and scion relationship, Types (listing), Whip and Approach Grafting | 02 |
| | iv) Budding – Definition, Types – “T” and Patch budding | 02 |

Semester-II

Paper-III. (Vascular Plants)

50 Marks

- | | |
|---|-------------|
| 1. Pteridophytes | (07) |
| 1.1 Introduction | |
| 1.2 General characters and classification (According to G.M. Smith) | 01 |
| 1.3 Life history of <u>Selaginella</u> – Systematic position with reasons, Habit and Habitat, External morphology of sporophyte, Anatomy of stem and Reproduction, (Development of sex organs and embryo not expected), Alternation of generations. | 05 |
| 1.4 Economic importance of Pteridophytes | 01 |
| 2. Gymnosperms | (09) |
| 2.1 Introduction | |
| 2.2 General characters and classification up to classes (According to Sporne 1965) | 02 |
| 2.3 Life history of <u>Pinus</u> – Systematic position with reasons, Sporophyte – Habit and Habitat, External morphology, Anatomy of needle, Reproduction – Structure of male and female cones, Structure of microsporophyll and ovuliferous scale, Structure of male and female gametophytes (Development of male and female gametophytes and embryo not expected). | 06 |
| 2.4 Brief account of economic importance of Gymnosperms. | 01 |
| 3. Angiosperms | (19) |
| 3.1 Introduction | |
| 3.2 Salient features and diversity | 02 |
| 3.3 Bentham and Hooker's system of classification – Outline, Merits and Demerits | 02 |
| 3.4 Salient features of International Code of Botanical Nomenclature (ICBN) | 02 |

- 3.5 General account of morphology with respect to inflorescence, flower, fruit,
Concept of floral formula and floral diagram. 09
- 3.6 Study of families of angiosperms – Systematic position, General account 04
Of the following families with respect to diagnostic features and economic
importance
- i) *Caesalpinaceae*
 - ii) *Solanaceae*
 - iii) *Nyctaginaceae*
 - iv) *Amaryllidaceae*

Paper-IV

(Cell Biology and Plant Biotechnology)

50 Marks

- | | |
|---|-------------|
| 1. The cell | (03) |
| 1.1 Structure of Prokaryotic and Eukaryotic cell. | |
| 1.2 Comparison between Prokaryotic and Eukaryotic cell | |
| 2. Cell division | (06) |
| 2.1 Mitosis – Various stages in progression, Cytokinesis and significance | 02 |
| 2.2 Meiosis - Various stages in progression, Cytokinesis and significance | 03 |
| 2.3 Mechanism of cell cycle and apoptosis | 01 |
| 3.0 Nucleus | (03) |
| 3.1 Ultra structure and functions | 01 |
| 3.2. Structure of chromosomes, Nucleosome- Solenoid model | 02 |
| 4. Ribosome | (02) |
| 4.1 Occurrence | |
| 4.2 Types | |
| 4.3 Chemical composition | |
| 4.4 Functions | |
| 5. Golgi complex | (02) |
| 5.1 Origin | |
| 5.2 Occurrence | |
| 5.3 Organization | |
| 5.4 Chemical composition | |
| 5.5 Functions | |
| 6. Micro bodies | (02) |
| 6.1 Peroxisomes | |
| 6.2 Glyoxysomes | |

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|------------|--|-------------|
| 7. | Cell-wall | (02) |
| 7.1 | Origin | |
| 7.2 | Ultra structure of cell wall | |
| 7.3 | Chemical composition of cell wall | |
| 7.4 | Functions | |
| 8. | Cell membrane | (02) |
| 8.1 | Origin | |
| 8.2 | Ultra structure | |
| 8.3 | Chemical composition | |
| 8.4 | Models of cell membrane | |
| | I) – Bilayer – Model – Daniell – Davson’s Sandwich model | |
| | II) – Subunit model – Singer – Nicholson’s Fluid – Mosaic Model. | |
| 8.5 | Functions | |
| 9. | Biotechnology | (02) |
| 9.1 | Introduction and Definition | |
| 9.2 | Scope of biotechnology | |
| 9.3 | Multidisciplinary nature of biotechnology | |
| 10. | Biotechnology in Agriculture | (11) |
| 10.1 | Tissue culture – General technique, Applications of tissue culture in Agriculture and Forestry | 05 |
| 10.2 | Biofertilizers – Definition, Necessity, Types – BGA and Rhizobium | 06 |

SOLAPUR UNIVERSITY, SOLAPUR

Practicals of B.Sc. Part – I Botany (Semester System)

(With effect from June 2010)

Botanical Excursion:

One teacher along with a batch not more than 20 students be taken for Botanical. Excursion to places of Botanical interest, one in each term. If there are female students in a batch of twenty students, one additional lady teacher is permissible for excursion. T.A. and D.A. for teacher and non-teaching staff participating in excursions should be paid as per University rules. Tour report duly certified by teacher concerned and Head of the Department should be submitted at the time of practical examination.

Practical Course:

B.Sc. Part – I Botany practical course is to be covered in twenty six practicals. These practicals are to be performed by the students. Each practical is to be supplemented by permanent slides, preserved / fresh specimens, materials, charts, herbarium sheets where ever necessary.

List of Practical:

1. Study of Compound and Dissecting microscope.
2. Study of Spirogyra
3. Study of Sargassum
4. Study of Mucor
5. Study of Puccinia
6. Study of Lichens
7. Study of Riccia
8. Study of Plant Disease – as per theory syllabus
9. Study of Plant Disease – as per theory syllabus

10. Study of Selaginella (sectioning of Root, Rhizophore, Leaf not expected)
11. Study of Pinus (sectioning of Root and Stem not expected)
12. Study of Plant families – as per theory syllabus
13. Study of Plant families – as per theory syllabus
14. Study of cell structure in Onion peels (cataphyll), it's staining and mounting.
15. Comparative cell structure of Onion and Hydrilla
16. Measurement of pH of different plant / Fruit juices in Lemon and Sugarcane.
17. Study of enzyme activity - Catalase and Dehydrogenase
18. Study of means of Vegetative Propagation-Sucker, Offset, Stolon, Runner.
19. Study of means of Vegetative propagation-Tuber, Bulb, Rhizome, Bulbil.
20. Study of Cut flowers – Gladiolus, Gerbera, Rose.
21. Propagation of Horticultural plants by Cutting ,Air – Layering and Whip grafting.
22. Technique of potting and repotting.
23. Propagation of Horticultural plants by Budding methods – 'T'shaped and Patch budding
24. Study of Mitosis
25. Use of dialysis to separate smaller molecules from larger molecules.
26. Study of Biofertilizers – BGA, Rhizobium and their effect on Plant growth.

Details of Practical Examination:

A) Every candidate must produce a certificate from Head of Department of his / her college, saying that he / she has completed practical course in satisfactory manner as per terms laid down by Academic council on the recommendations of Board of Studies in Botany. The student should record his / her observation and report of each experiment in the journal.

The journal is to be signed periodically by teacher incharge and certified by the Head of Department at the end of year. Candidates have to produce their certified journal and tour report at the time of practical examination. Candidate is not allowed to appear for the practical examination without a certified journal / a certificate from Head of Botany Department regarding the same.

B) Practical Examination should be of five hours duration and shall test a candidate in the following respect.

1. Practical study of external and internal structures of different plant types and their classification.
2. Making temporary stained preparations and identification.
3. Identification and setting of biochemical experiments.
4. Study of plant families as per syllabus.
5. Spotting of the specimens as per syllabus.

B.Sc.Part-I-Botany

Reference Books

1. Algae -Kumar H.D.and H.N.Singh (1991)
2. Algae -Sharma C.P. (1986)
3. Algae -Pandey B.P. (1994)
4. Algae -Vashishta B.R. (1994).
5. Algae -Venkatam et.al. (1974)
6. Botany for Degree students-Algae-B.R.Vashishta.
7. Cryptogrammic Botany-Smith G.M. (1973) Vol. -I and Vol. -II
8. Introduction to fungi -Dube H.C. (1990).Vikas publishing House Ltd.Delhi.
9. The Fungi-Mehrta B.S. (1967).Int.pub.Allahabad.
10. Introductory Mycology -Alexopoluos C.J. and C.W.Mims. (1962)
11. Text book of fungi -Sharma C.P. (1989)
12. Fungi -Pandey B.P (1994).
13. Biology of Lichens -Hale I.E. (1967) Edward Arnold, London.
14. Interrelationship of Bryophytes -1964-Cavers F.
15. Biology in India-Ram Udar (1976).
16. Manual of Biology-Verdoom F. (1932).
17. Bryophytes -Kumar H.D. (Atmaram & Sons).
18. Botany for Degree students -Bryophyte- B.R.Vashishta.S.Chand Company.
19. Morphology and Evolution of Vascular Plants -Fifford E.M.and Foster A.S.(1989)
20. Morphology of Vascular plants-Bierhorst D.W. (1971).
21. Phylogeny and classification of ferns -Jermy A.O.(1973).
22. In Introduction to Pteridophytes-Rashid A. (1978).
23. Morphology of Pteridophytes -Sporne K.R. (1966).
24. The Ferns -Bower F.O. (1963).
25. Botany for Degree students-Pteridophyta-P.C.Vashishta.
26. Gymnosperms-Vashishta (1976).
27. Morphology of Gymnosperms-Sporne. K.R. (1967).
28. Morphology of Gymnosperms-Coulter and Chamberlain (1978).
29. Gymnosperm-Chamberlain (1966).

30. Indian Gymnosperms in Time and Space-Ramanujan C.G.-Today & Tomorrow Publication.
31. Comparative Morphology of Vascular plants- Foster A.S. and Gifford E.M. (1959).
-Published by Vakil, Feffer and Simons ltd.
32. Plant diseases –Singh R.S. (1963).
33. Manual of plant pathology –Padoley S.K. & Mistry P.B.
34. Hand book of field crop diseases-Ny.Vall (1979).
35. Experiments in Microbiology, Plant pathology and Tissue culture-Aneja K.R.(1993).
36. Clinical plant pathology –Gangopadhyay (1984).
37. Plant Taxonomy-Benson L. (1962).
38. Evolution and Classification of flowering plants –Cronquist A. (1968).
39. Principles of Angiosperms Taxonomy-Davis P.H. and V.M.Heywood (1963).
40. Morphology of Angiosperms-Ealms A.J.(1961).
41. Taxonomy of Angiosperms-V.N.Naik (1984).
42. Biodiversity of Plants (floristic aspects)Rao R.R.(1980).
43. Introduction of plant Anatomy-Eames and Macdeniels.
44. Experimental Biochemistry-Dryer R.L.and Lata G.G.(1989).
45. Plant cell Biology –Structure and function-Gunning B.E.S and Steer M.W.(1996).
46. Plant cell Biology-A practical approach.-Hari N.and Oparka K.J.(1994).
(IRL-Press of oxford University UK.).
47. A. Biologist guide to principles and techniques of practical Biochemistry-
Wilson and Goulding K.H. (1996)
48. Principles of biochemistry-Conan and Smmpff, John and Wiley (2000).
49. Cell- Physiology and Biochemistry –Me.Elory,Prentice Hall (1972).
50. Cell Biology- De.Robert et.al. (1982),(publ.Sundar and Company).
51. Cell Biology –C.B.Powar (1992), Himalaya publ.House,Delhi.
52. Plant Biochemistry-Cell-Sumps P.K. and Connie’s.(1981).
53. Molecular Cell Biology-Albert’s B.Bray D.Lewis J.Faff M.Robert K. &
Watson J.D.(1999). (publ.Garlands publishing co-In,New York U.S.A.
54. Biochemistry-Campbell M.K.(1999).Publ.Saunders College publishing,U.S.A.
55. Text Book of cell and molecular biology –Gupta P.K.(1999),
publ.Rastogi publication,Meerat.
56. Principles of Biochemistry-Nelson D.L. and Cox. M.M.(2000),Worth publisher,
New York.

57. Biochemistry –Rawh D.L. (1989),Neil Pattersoh Publisher U.S.A.
58. Molecular and Cellular Biology-Wolfe S.L.(1993),Wadsworth publishing Company, California, U.S.A.
59. Biochemistry-Zubay G. (1993),WCB,publisher,Lowa U.S.A.
60. Fundamentals of Horticulture –J.B.Edmond and J.L.Senn,Tata Mc.Graw Hill publishing company Ltd –New Delhi.
61. Advances in Horticulture and Forestry –S.P.Singh.,Science publishers,SA,New Pali Road, No.91,Jodhpur-342001.
62. Manula of Gardening –W.Burns (Edn)-Saeed Internation (Regd.) E-9-Jungpura (Extn).New Delhi-110014.
63. Gardening of India-T.K.Bose and D.Mukhargee.,Oxford and IBH-publishing Co.Pvt.Ltd.Culcutta.
64. The culture of Vegetables and flowers-Martin-Sutton-Ambey-publications Delhi.
- 65.PlantPropagation-M.K.Sadhi,WileyEasternLimited,4835/29,Ansari Road,Daryaganj,New Delhi -110002.
66. Text book of Horticulture and Gardening-Dr.M.R.Khan.
67. Biotechnology and Plant pathology-D.K.Arora &P.C.Trevedi,-Printwell publishers Distributers,Jaipur.
68. Biotechnology and other Alternative Technologies –Amelendu Chakrawaorty, (Indian Institute of Technology,Kharagpur),-Oxford & IBH. publishing Co.Pvt.Ltd.Culkatta/New Delhi.
69. Advanced Biotechnology –Kagumarti B.Rao.-K.R.S-Sambasiva Rao.- Discovery publishing house,New Delhi -110002.
70. Biotechnology (Recent Development)-Dr.Vandan Mohod, 1999 Book Enclave,Jaipur.
71. Biotechnology in Agriculture –S.Natesh,V.L.Chopra,-S.Ramchandran, -Oxford&IBH publishing Co.Pvt.Ltd.,New Delhi,Bombay,Culcutta.
72. Text book of foods nutrition and Dietetics – M. Haheena Begum –Sterling publisher Pvt.Ltd. L-10, Green park ,Extention ,New Delhi 110016.
73. Biotechnology- Steve Prentiss –obis publishing Limited, London.
74. Basic Biotechnology – Rev. Fr. Dr. S. Ignacimuthu.
75. A Text Book of biotechnology –H.D. Kumar.
- 76 An Introduction to Biotechnology –S.C.Jain ,C-A. Shivraman ,T.S. Rao.
77. Advances in biotechnology-S. N. Jogdand.
78. Plant pathology- R.S.Mehrotra, Dean, Faculty of science, Kurkshetra

University, Kurukshetra.

79. Plant Diseases- F.T. Brooks, periodical Expert book Agency, D-42, Vivek Vihar, Delhi 1100032.
80. Plant diseases –Rajani shrma,Campus books international, 4831/24 prahlad Street, An sari Road, Daryaganj, New Dehli-110002.
81. Diseases of crop plant in India –Dr.Rangaswami .
- 82 Plant diseases –R.S. Singh
- 83 Modern plant pathology – R. S. Bilgrami and H.C.Dube
84. A text book of a plant physiology and Biochemistry –S.K.Verma., S.Chand And Company Limited,Ramnagar New Delhi.
85. A concept of a molecular biology –P.S.Verma, V.K. Agarwal,-S.Chand And Company Limited, Ramnagar New Delhi.
86. A concept of a Cell biology –P.S.Verma, V.K. Agarwal,-S.Chand and Company Limited, Ram agar New Delhi.
87. Botany for Degree students- Algae- B.R.Vasistha.
88. Botany for Degree students- Pteridophyta- P.C.Vasistha.
89. Botany for Degree students- Bryophytes- B.R.Vasistha.
90. Botany for Degree students- Fungi - B.R.Vasistha. , -S.Chand and Company -New Delhi
- 91 Plant physiology- P.S. Gill –S. Chand and Company, New Delhi



Solapur University, Solapur
Nature of Question Paper For Semester Pattern
• **Faculty of Science**
(w.e.f. June 2010)

Time :- 2 hrs.

Total Marks-50

- Q. No.1) Multiple choice questions. (10)**
- 1) -----
a) b) c) d)
- 2)
3)
4)
5)
6)
7)
8)
9)
10)
- Q.No.2) Answer any Five of the following (10)**
- i)
ii)
iii)
iv)
v)
vi)
- Q.No.3) A) Answer any Two of the following (06)**
- i)
ii)
iii)
- B) Write the Answer/Solve/Problem/Note (04)**
- Q.No.4) Answer any Two of the following (10)**
- i)
ii)
iii)
- Q.No.5) Answer any Two of the following (10)**
- i)
ii)
iii)

1. Structure of the courses :-

- A) Each paper of every subject for Arts, Social Sciences & Commerce Faculty shall be of 50 marks as resolved by the respective faculties and Academic Council.
- B) For Science Faculty subjects each paper shall be of 50 marks and practical for every subject shall be of 50 Marks as resolved in the faculty and Academic Council.
- C) For B. Pharmacy also the paper shall be of 50 marks for University examination. Internal marks will be given in the form of grades.
- D) For courses which were in semester pattern will have their original distribution already of marks for each paper.
- E) For the faculties of Education, Law, Engineering the course structure shall be as per the resolutions of the respective faculties and Academic Council.

2. Nature of question paper:

A) Nature of questions.

“20% Marks - objectives question” **(One mark each and multiple choice questions)**

“40% Marks - Short notes / Short answer type questions / Short Mathematical type questions/ Problems. **(2 to 5 Marks each)**

“40% Marks - Descriptive type questions / Long Mathematical type questions / Problems. **(6 to 10 Marks each)**

- B) Objective type question will be of multiple choice (MCQ) with four alternatives. This answer book will be collected in first 15 minutes for 10 marks and in first 30 minutes for 20 marks. Each objective question will carry one mark **each**.
 - C) Questions on any topic may be set in any type of question. All questions should be set in such a way that there should be permutation and combination of questions on all topics from the syllabus. As far as possible it should cover entire syllabus.
 - D) There will be only five questions in the question paper. All questions will be compulsory. There will be internal option **(30%)** and not overall option. **for questions 2 to 5.**
3. Practical Examination for B. Sc. I. will be conducted at the end of second semester.
4. Examination fees for semester Examination will be decided in the Board of Examinations.

The structures of all courses in all Faculties were approved and placed before the Academic Council. After considered deliberations and discussion it was decided not to convene a meeting of the Academic Council for the same matter as there is no deviation from any decision taken by Faculties and Academic Council. Nature of Question Paper approved by Hon. Vice Chancellor on behalf of the Academic Council.