

GUJARAT UNIVERSITY

BOTANY

Choice Based Credit System (CBCS) Theory syllabus

Effective from June-2011

SEMESTER-II

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: 3hours

Unit-1 Study of higher plants

Objective: To acquaint students with Higher plants.

Gymnosperms:

Outline Classification of Gymnosperms by Chamberlain 1 hour

Cycas 4 hours

Occurrence, distribution, taxonomic position, morphology, reproduction and life history of the genus (excluding anatomy), Indian contribution on Gymnosperms.

Angiosperms: Sunflower and Maize 5 hours

Occurrence, distribution, taxonomic position, morphology, reproduction and life history of the genus (excluding anatomy).

Suggested reading:

- (i) Bhatnagar, S.P. and Moitra, A. 1996. *Gymnosperms*. New Age International Pvt. Ltd., New Delhi.
- (ii) Raghavan, V.1999. *Developmental Biology of Flowering plants*. Springer - Verlag, New York.
- (iii) Singh, G. 1999. *Plant Systematics - Theory and Practice*. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
- (iv) Naik, V.N. 1984. *Taxonomy of Angiosperms*. Tata McGraw - Hill Publishing Co. Ltd. New Delhi.
- (v) Verma B. K. 2011. Introduction to Taxonomy of Angiosperms. PHI Learning Private Ltd. New Delhi
- (vi) Botany for degree students- Vol. V, Gymnosperm by P. C. Vasishta (S. Chand, Delhi)
- (vii) Gymnosperm by G. L. Chopra (S. Nagin & Co., Jullundhar)
- (viii) Gymnosperm by Vasishta (S. Chand, Delhi)

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Unit-2 Morphology and Taxonomy

Objective: To acquaint students with basic morphology and physiology of higher plants.

1. Morphology 4.5 hours

1. Bracts and Inflorescence :

Bracts – Scaly, Involucral, Foliaceous, Petaloid and Spathe, Inflorescence:

Racemose – Raceme Spike, Catkin, Spadix, Umbel, Capitulum

Cymose – Solitary terminal, Solitary axillary, Helicoid, Scorpioid, Biparous,
Multiparous cymes.

Special Types of Inflorescences: Hypanthodium, Verticillaster, Cyathium

2. Taxonomy

To enable students to understand systematic botany of higher plants with the economic importance of plants.

Outline Classification of Bentham and Hooker's System of Classification. 1.5 hour

Detailed study of the following families: 4 hours

Dicotyledons- Polypetalae – *Malvaceae*

Dicotyledons- Gamopetalae- *Convolvulaceae*

Dicotyledons- Apetalae- *Nyctaginaceae*

Monocotyledons- *Amaryllidaceae*

Suggested Readings

- (i) Plant Systematics, Gurucharan Singh, Oxford & IBH.
- (ii) Advanced Plant Taxonomy, A. K. Mondal, New Central Book Agency (P) Ltd.
- (iii) Taxonomy of Angiosperms, B. P. Pandey, S. Chand Publication.
- (iv) Raghavan, V. 1999. *Developmental Biology of Flowering plants*. Springer - Verlag, New York.
- (v) Stebbins, G.L. 1974. *Flowering Plant - Evolution above Species Level*. Edward Arnold Ltd. London.
- (vi) Takhtajan, A.L. 1997. *Diversity and Classification of Flowering Plants*. Columbia University Press, New York.
- (vii) Naik, V.N. 1984. *Taxonomy of Angiosperms*. Tata McGraw - Hill Publishing Co. Ltd. New Delhi.

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Exam Duration: 3hours

Unit-3 Plant physiology and growth and development

Objective: To acquaint students with basic physiology of higher plants and related organelles.

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|--|---------|
| 1. Structure and Functions of Chloroplast and Mitochondria | 1 hour |
| 2. Plant-Water Relations: Water Potential,
Diffusion,
Imbibition,
Osmosis,
Plasmolysis | 4 hours |
| 3. Respiration and Photosynthesis. | 2 hours |
| 4. Physiology of Flowering:
Role of temperature in flowering (Vernalization)
Role of light in flowering (Photoperiodism) | 2 hours |
| 5. Transpiration | 1 hour |

Suggested Readings

- (i) Plant Physiology by S Mukherji and A K Ghosh, New Central Book Agency(P) Ltd
- (ii) Plant Physiology by S.N.Pandey and B.K. Sinha, Vikas Publishing House.
- (iii) Plant Physiology and Biochemistry by S.K. Verma, S. Chand & Co.
- (iv) Hopkins, W. G. 1995. *Introduction to Plant Physiology*. John wiley & Sons, Inc., New York, USA.
- (v) Moore, T. C. 1989. *Biochemistry and Physiology of Plant Hormones* (2nd edition). Springer - Verlag, New York, USA
- (vi) Salisbury, F.B. and Ross, C.W. 1992. *Plant Physiology* (4th edition). wadsworth Publishing Co. california, USA.
- (vii) Singhal, G.S., Renger, G., Sopory, S.K., Irrgang, K.D. and Govindjee 1999. *Concept in Photobiology: Photosynthesis and Photomorphogenesis*. Narosa Publishing House, New Delhi.
- (viii) Taiz, L. and Zeiger, E. 1998. *Plant Physiology* (2nd edition). Sinauer Associates, Inc., Publishers, Massachusetts, USA.
- (ix) Westhoff, P. 1998. *Molecular Plant Development: from Gene to Plant*. Oxford University Press, Oxford, UK.

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Contact Hours per week: 4

Exam Duration: 3hours

Unit-4 Plant resources, utilization, horticulture and gardening

4 hours

Botanical name, common name, family, useful part, brief description, important chemical constituents if any, climate and cultivation (only for cereals, pulses and oil seeds) and uses of the following plants:

1. Cereals- Wheat, Rice
2. Pulses- Gram, Pea
3. Oil seeds- Castor
4. Medicinal plants- Ginger, Aloe, Neem and Ashwagandha

Horticulture and Gardening

1. Horticulture: Definition, Scope and Branches 1 hour
2. Gardening: Introduction, Uses of gardens, Types of gardens 1 hour
(Kitchen garden, water garden, rock garden and terrace garden)
3. Garden Operations- digging, planting 1 hour
4. Identification of common plants for different garden locations 2 hours
(Minimum 5 plants for each location): paths, avenue, hedges and flower beds.
5. Cutting, Layering and grafting methods of asexual plant propagation 1 hour

Suggested Readings

- (i) Economic Botany by V. Verma
- (ii) Economic Botany of the Tropics by S.L.Kochhar
- (iii) Economic Botany by A.F. Hill & O.P.Sharma, Tata McGraw Hill, New Delhi.
- (iv) Gardening in India – Percy Lancaster, Oxford & IBH Publishing Co. Pvt Ltd.
- (v) Gardens – Laeeq Futehally, National Book Trust, India.
- (vi) Economic Botany by A.V.S.S. Samba Murty and N.S. Subramanyam, Wiley Eastern
- (vii) A Manual of Ethnobotany, 2nd Edition, by S.K. Jain. Scientific Publishers, Jodhpur.
- (viii) Ethnobiology, by Rajiv K. Sinha and Shweta Sinha, Surbhi Publication, Jaipur.

CBCS BOTANY PRACTICAL SYLLABUS

SEMESTER-II

1. Study of Gymnosperms- Life-History of *Cycas*
 - a) Specimen- *Cycas* whole plant, coralloid roots, compound leaf, male cone, Megasporophyll and ovules
 - b) Mounting – *Cycas* microspores
 - c) Permanent slides- TS Microsporophyll, LS Ovule
2. Study of Angiosperms - Life-History of **Sunflower**
 - a) Specimen – Whole plant, Inflorescence, Root System
 - b) Slides – Ray floret and Disc floretLife-History of **Maize**
 - a) Specimen – Whole plant, Inflorescence, Seed , Root system
 - b) Slides – LS of Seed
3. Study of Plant Morphology:
 - a) Types of Bracts- Foliaceous, Involucral, Spathe, Petaloid
 - b) Types of Inflorescences including Special types
 - i) Racemose- Raceme, Spike, Spikelet, Catkin, Umbel, Capitulum
 - ii) Cymose – Solitary –Terminal and Axillary; Monochasial- Helicoid and Scorpioid; Dichasial and Multichasial
 - iii) Special types- Verticillaster, Cyathium, Hypanthodium
1. Study of Plant families- *Malvaceae*, *Convolvulaceae*, *Nyctaginaceae* and *Amaryllidaceae* - Classification with reasons, Identifying characters, floral formula and floral diagrams, habit sketch, androecium, gynoecium and TS of ovary; 3-4 botanical and common names of examples.
5. Cell Biology and Plant Physiology- Experiments for-
 - a) Diffusion- Saffranin or Potassium permanganate in water,
 - b) Imbibition- Demonstration of Endosmosis, Exosmosis in grapes
 - c) Osmosis- Potato osmoscope
 - d) Plasmolysis- Tradescantia leaf
 - e) Transpiration- Four Leaf , Comparision of Stomata of Monocot and Dicot
 - f) Study of structure of Chloroplast and Mitochondria through charts or models
6. Economic Botany- Study of plants as per theory syllabus
7. Study of Garden tools as per theory syllabus through charts- Scissors, Hoe, Hose, Clippers, Watering can, Sprinkler
8. Study of any five Avenue trees, five ornamentals and five foliage plants of your area through fresh specimen and herbaria.

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Choice Based Credit System (CBCS) Practical paper
Effective from June-2011
SEMESTER-II

Date: _____

Total Marks: _____

Time: 3 Hours

- | | |
|---|----|
| Q.1 Identify and describe Specimen A. | 04 |
| Q.2 Mount the _____ from the Specimen B. | 04 |
| Q.3 Identify the Family of the Specimen C, classify it, give general characters
and draw labeled diagrams. | 04 |
| Q.4 Perform the physiological experiment as per the chit. | 04 |
| Q.5 Identify and describe the specimens | 10 |
| Specimen D (MORPHOLOGY) | |
| Specimen E (MORPHOLOGY) | |
| Specimen F (CELLBIOLOGY) | |
| Specimen G (ECONOMIC BOTANY) | |
| Specimen H (GARDEN TOOLS) | |
| Q.6 Journal | 04 |

GUIDENCE FOR ARRANGEMENT OF SPECIMENS IN THE EXAMINATION.

Specimen A: Gymnosperm or Angiosperm.

Specimen B: Gymnosperm or Angiosperm.