GUJARAT UNIVERSITY

BOTANY

Choice Based Credit System (CBCS) Theory syllabus

Effective from June-2012

SEMESTER-IV

Course BOT-205

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 I: PTERIDOPHYTA

1. Life histories of the following with morphology and anatomy excluding development.
    a. **Lycopsida : *Selaginella***
    b. **Pteropsida : *Adiantum***
2. Heterospory and seed habitat.
3. Condition and formation of fossils.

Suggested Readings:

1. Pandey, S.N. , Trivedi, P.S. and Misra S.P. 2005. *A Textbook of Botany Vol. I and II*, Vikas Publishing House Pvt. Ltd.
2. Das, Dutta, Gangulle and Kar., 1959. *College Botany Vol. I and II*, New Central book Agency.
3. Vashishta, B.R. 1983. *Botany for degree student- Pteridophyta*, S. Chand pub, New Delhi.
4. Parihar, N.S. 1991. *Pteridophyta*. Central Book Depot, Allahabad.
5. Sporne, K.K. 1991. *The Morphology of Pteridophytes*. B.I. Publishing Pvt. Ltd. Bombay.

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UNIT II: **GYMNOSPERMS**.

1. General characters.
2. Classification of Gymnosperms by Chamberlain (1934).
3. Life history of *Pinus* including Morphology, Anatomy (Secondary structure of stem, R.L. S., T.L.S.), Reproduction, Embryogeny.

Suggested Readings:

1. Bhatnagar, S.P. and Moitra, A. 1996. *Gymnosperms*. New Age International Pvt. Ltd., New Delhi.
2. Vashishta, P.C. 1983. *Botany for degree student- Gymnosperms*, S. Chand Publications, New Delhi.
3. Chopra, G.L. *Gymnosperms*. S. Nagin & Co., Jullundhar.
4. Vashishta, P.C. 1983. *Gymnosperms*, S. Chand Publications, New Delhi.
5. Coulter, J.M. & Chamberlain, C.J. 1978. *Morphology of Gymnosperms*. Central Book Depot, Allahabad.
6. Foster, A.S. and Gifford, F.M. 1967. *Comparative Morphology of Vascular plants*. Freeman Publishers, Sanfransisco.
7. Bierhost, D.W. 1971. *Morphology of vascular plants*. Mc Millan, New York.

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UNIT III: MORPHOLOGY AND TAXONOMY

Angiosperms: Morphology:

1. Types of Leaf and phyllotaxy.
2. Classification of the following families as per Bentham and Hooker's system of classification including examples of economic importance.
    a. Dicotyledons:
        i. Polypetalae : *Cruciferae, Cesalpinaceae,*
        ii. Gamopetalae : *Rubiaceae, Apocynaceae*
        iii. Apetlae: *Euphorbiaceae,*
    b. Monocotyledons:

        Palmae and *Gramineae.*

Suggested Readings:

1. Raghavan, V. 1999. *Developmental Biology of flowering plant*. Springer- Verlag, New York.
2. Singh, G. 1999. *Plant Systematics- Theory nad Practice*. Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi.
3. Naik, V.N. 1984. *Taxonomy of angiosperms*. Tata McGraw- Hill Publishing Co. Ltd. New Delhi.
4. Verma B.K. 2011. *Introduction to Taxonomy of angiosperms*. PHI Learning Pvt. Ltd. New Delhi.
5. Takhtajan 1997, *Diversity and Classifaication of Flowering Plants*. Columbia University Press, New York.

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UNIT IV: PLANT PHYSIOLOGY

1. Absorption of water
   a. Properties of water.
   b. Mechanism of water absorption.
   c. Transportation of water: Dixon's theory of cohesion force.
2. Growth and development

   Definition, Phases of Growth
3. Mineral nutrition in plants

   Macro and Micronutrients-C, H, O, N, S, P, K, Ca, Fe, Mg, Mn, Zn, B, Cu, Mo

   Source, Functions and Deficiency symptoms.

Suggested Readings:

1. Verma, S.K. *Plant Physiology*. S. Chand & Co.
2. Verma, S.K. *Plant Physiology*. Emkay Publication.
3. Sundararjan, S. *College Botany Vol. I to IV*. Himalaya Publishing House.
4. Witham, F.H., Delvin , R.M. 1983. *Plant Physiology*. Willard Grant. Boston, MA.
5. Salisbury, F.B. & Ross, C.W. 1992. *Plant Physiology*. Wadsworth Publishing Co. California, USA.
6. Kumar, A. & Purohit, S.S.2001. *Fundamentals & Application* 2nd edition. Agrobios.

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SEMESTER-IV (Practical)

Course BOT-207

SEMESTER 4:

Unit-I Pteridophytes:

(i) ***Selaginella:*** Specimen

Selaginella cone L.S. & T.S. Permanent slides.

Mounting of *Selaginella* spores from cone.

(ii) ***Adiantum*****:** Specimen

Permanent slide of T.S. Passing through sori of *Adiantum* leaflet.

Mounting of sporangia of *Adiantum*

Unit-II Gymnosperm

(i) Pinus

Mounting of Pollengrain

T.S. of Pinus needle.

Specimens: Male cone, Female cone, Needle

Permanent slides: Ovule, Needle, male cone L.S.

Unit-III Morphology and Taxonomy

(i) Morphology specimens as per theory syllabus.

(ii) Study of Families as per theory syllabus.

Unit-IV Plant Physiology

(i) Demonstration practical Conduction of water through xylem.

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SEMESTER-IV (Practical)

Course BOT-207

Session-I

Date:_____ Total Marks: 35

Time: 3 Hours

Q.1 Identify and classify giving reasons of given Specimen A. 05

Q.2 Identify and classify giving general characters of the given family from specimen B & C. 14

Q.3 Identify and describe specimen D & E (Pteridophyte, Gymnosperm and Physiology) 06

Q.3 Viva voce 10

Session-II

Date: _____ Total Marks: 35

Time: 3 Hours

Q.1	Expose reproductive structure from specimen F.	08
Q.2	Identify and describe Morphology of specimen G, H & I	12
Q.3	Herbarium	10
Q.4	Journal	05

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SEMESTER-IV

Course BOT-206

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 I: ANATOMY

1. Complex tissue (Xylem and Phloem).
2. Epidermal tissue system including Periderm and Lenticels.
3. Anamalous primary structures in ***Nyctanthes*** **stem**.
4. Anamalous Secondary growth in ***Bignonia*** **stem**.
5. Anamalous Secondary growth in ***Ficus*** **aerial root**.

Suggested Readings:

1. Roy, Piyush. *Plant Anatomy*, New Central Book Agency, Calcutta
2. Das, Dutta, Gangulle and Kar., 1959. *College Botany Vol. I and II*, New Central Book Agency.
3. Esau, K. 2006. *Plant Anatomy*. Pub John Willey & Sons Inc.
4. Fahn, A. 1990. *Plant Anatomy*. Pergamon Press, University of Michigan
5. Mcdaniels, Eanes. *Plant Anatomy*. Publications, John Willey & Sons Inc.

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Choice Based Credit System (CBCS) Theory syllabus

Effective from June-2012

SEMESTER-IV

Course BOT-206

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

Contact Hours per week: 4 Duration: 3hours

UNIT II Economic Botany

A brief introduction of medicinal plants and their chief constituents:

Turmeric, *Ephedra, Adhatoda,Terminalia chebula, Tinospora, Isaphgul.*

Firewood species:

a. *Prosopis* spp.
b. *Holoptelia integrifolia*
c. *Zizyphus jujuba*
d. *Acacia nilotica.*
e. *Salvadora persica.*

A concise account of Tobacco

Suggested Readings:

1. Sen, S. 1992. *Economic Botany*, New Central Book Agency, Calcutta.
2. Verma, V. 1974. *A Textbook of Economic Botany*, Emcay Publication, New Delhi.
3. Kochar, S.L. 2011. *Economic Botany in the Tropics*, 4th edition, Mcmillan Pub, New Delhi.
4. Hiil, A. 1976. *Economic Botany*, Tata Mc Graw Hill Publishing Co., Ltd., New Delhi.
5. Bendre, A., Kumar, A. *Economic Botany*, Rastogi Publication, New Delhi.

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Choice Based Credit System (CBCS) Theory syllabus

Effective from June-2012

SEMESTER-IV

Course BOT-206

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 III: GENETICS

1. Mendelian genetics (Monohybrid, Dihybrid ratio).
2. Gene interactions (Complementary and Supplementary genes).
3. Cytoplasmic inheritance : (Mirabilis, male sterility in maize)
4. Sex determination in plants.

Suggested Readings:

1. Powar. *Genetics* Vol. I & II
2. Strickberger, M.W. 2008. *Genetics*. PHI Learning Pvt. Ltd. New Delhi.
3. Arumugon, N. *Cell Biology, Genetics, Evolution.* Saras Publication, Kanyakumari.
4. Stent, G.S. 1971. *Molecular Genetics*. W.H. Freeman. San Francisco.
5. Russel, P.J. 1992. *Genetics*. Harper Collins College.

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SEMESTER-IV

Course BOT-206

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Contact Hours per week: 4 Exam Duration: 3 hours

UNIT IV: BIOCHEMISTRY

1. pH and Buffer.
2. Protoplasm as a colloidal system.
3. Classification & types Carbohydrates and Lipids.
4. Enzymes:
    a. Definition
    b. Nomenclature and classification of enzymes
    c. Chemical nature of enzymes
    d. Properties of enzymes
    e. Mechanism of enzyme action
    f. Factors affecting enzyme activity

Suggested Readings:

1. Verma, S.K. *Plant Physiology*. S. Chand & Co.
2. Verma, S.K. *Plant Physiology*. Emkay Publication.
3. Sundararjan, S. *College Botany vol. I to IV*. Himalaya Publishing House.
4. Witham, F.H., Delvin , R.M. 1983. *Plant Physiology*. Willard Grant. Boston, MA.
5. Salisbury, F.B. & Ross, C.W. 1992. *Plant Physiology*. Wadsworth Publishing Co. California, USA.
6. Kumar, A. & Purohit, S.S.2001. *Fundamentals & Application 2nd edition*. Agrobios.

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SEMESTER-IV (Practical)

Course BOT-208

Unit-I Anatomy

(i) Permanent slides of Xylem and Phloem

(ii) Epidermal tissue system (a) Types of hairs and glands,
(b) Types of stomata, (c) Types of Epidermis (Unisereate and Multisereate) (d) Periderm and Lenticell

(iii) Make a temporary double stained preparation of *Nyctanthus* stem, *Bignonia* stem and *Ficus* aerial root.

Unit-II Economic Botany

As per the theory syllabus.

Unit-III Genetics

Genetics problems (as per appendix)

Unit-IV Biochemistry

(i) Determination of pH of Four various solutions.

(ii) Agar-agar (Sol & Gel)

(iii) Histochemical test of Carbohydrate (starch, glucose and Lignin) & Lipid.

(iv) Enzyme activity- amylase and Catalase

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SEMESTER-IV (Practical)

Course BOT-208

Session-I

Date:_____ Total Marks: 35

Time: 3 Hours

Q.1 Take T. S. and prepare a double stained slide of given specimen A. 10

Q.2 Identify and describe the specimens F, G, H with its family, Botanical name, it's Chemical constituents and economic importance. 15

Q.3 Viva voce 10

Session-II

Date: _____ Total Marks: 35

Time: 3 Hours

Q.1 Perform the Histochemical test of given specimen A 05

Q.2 Perform the enzyme activity amylase or Catalase. 05

Q.3 Determine pH value of given solution with the help of universal indicator and show your results to examiner. 05

Q.4 Solve the genetic problem 05

Q.5 Project (Genetics, Economic Botany or Biochemistry) 10

Q.6 Journal 05