# B.Sc. BOTANY

# I YEAR – I SEMESTER

# COURSE CODE: 7BBOA1

# ALLIED COURSE - I – PLANT DIVERSITY, PLANT PATHOLOGY AND ANATOMY

**THALLOPHYTA**

**Unit I**

**Algae**

General Characters, structure and life history of Cyanophyceae (*Oscillatori*a) and Rhodophyceae ( *Polysiphonia*).

**Fungi**

General Characters, Structure and Life history of Basidiomycetes (*Puccinia*). General Features, Structure and Life history of Lichens (*Usnea*).

**Unit II**

**Bryophyta**

General Characters, structure and life history of Moss(*Polytrichum*)- Development of Gametophyte, Sporophyte and sex organs need not be discussed.

**Plant Pathology**

Study of the Following Plant Diseases with reference to causes, symptoms, dissemination, Control and preventive measures.

* 1. Virus Diseases – Bunchy top of Banana.
  2. Bacterial Disease – Citrus Canker.

**Unit III**

**Pteriophyta**

General Characters, structure and Life history of *Selaginella* (Development of gametophyte, sporophyte and sex organs need not be discussed).

**Unit IV**

**Gymnosperms**

General Characters , structure and Life history of *Pinus* (Development of Pinus need not be discussed)

**Unit V**

**Anatomy**

1. Tissues – Simple and permanent tissues.
2. Normal secondary thickening in dicot and monocot stem.

**Text books:**

1. Pandey B.P.– College Botany, Vol.I & II S.Chand & Co., P.Ltd., Ram Nagar, New Delhi.
2. Pandey, B.P. (1978) Plant Anatomy, S.Chand & Co., Calcutta

**Books for Reference:**

**Algae**

1. Vashista B.R – Algae, S.Chand & Co.Ltd., New Delhi.
2. Bhatia, K.M. – A Treatise of Algae R.Chand & Co., New Delhi.
3. Chopra G.D.A. Text Book of Algae – S.Nagin & New Delhi.
4. Gupta G.S. – Text Book of Algae-Oxford & IBH Publishing C., New Delhi.

**Fungi**

1. Chopra G.L. – A text Book of Fungi – S.Nagin & Co., New Delhi.
2. Munkur B.B. – Fungi & Plant diseases.

**Bryophyta**

1. Watson E.V. – The structure and Life of Bryophyta – Hutchinson, University Library, London.
2. Parithar N.S. An Introduction to Bryophyta Vol. I Central Book Depot, Allahabad.

**Pathology**

1. Rengaswami G – Diseases of crop plant in India.

**Pteridophytes**

1. Pandey B.P. – A text book of Botany (Bryophyta, Pteridophyta & Gymnosperms) – S.Chand & Co., New Delhi.
2. Parihar N.A. An Introduction of Pteridophyta Vol.II Central Book depot of Allahabad.

**Gymnosperms**

1. Gupta M.N. – The Gymnosperms- Shivalal Agarwala & Co., Agra.
2. Vashista P.C. – Botany for Degree Students – Gymnosperms–S.Chand & Co. New Delhi.

**Internal Morphology (Anatomy)**

1. Vashista, P.C. (1968) A Text Book of Plant Anatomy, S.Negin & Co.

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**I YEAR – I/II SEMESTER**

**COURSE CODE: 7BBOAP1**

**ALLIED PRACTICAL – I – PLANT DIVERSITY, PLANT PATHOLOGY, INTERNAL MORPHOLOGY, TAXONOMY OF ANGIOSPERMS, ECONOMIC BOTANY AND EMBRYOLOGY OF ANGIOSPERMS**

**(Covering the Allied Courses I & II)**

1. Micro – Preparations and Identification of the Thallophyta prescribed in the Syllabus(Algae-*Oscillatoria, Polysiphonia*: Fungi-*Puccinia*: Lichens-*Usnea*.
2. Cutting and Mounting of T.S. of Vegetative parts of *Polytrichum, Selaginella* and *Pinus*.
3. Identification of Micropreparations of cones of *Selaginella, Pinus* and capsule of *Polytrichum*.
4. To observe and identify spot at sight and make detailed study of the types of disease studied.
5. Cutting, Mounting and identifications of T.S. of dicot and monocot stem.
6. Identification of Micropreparations of Dicot and monocot stem.
7. To assign the given plant specimens to the respective families giving reasons.
8. To describe the given plant in technical terms
9. To identify the economic products specified in the syllabus pointing out the Botanical Names and their uses.
10. Identification of Micro preparations of Anther(*Datura*) ,Dicot Embryo(*Tridax*), different ovules

**Submission of certified and bonafide record note book is mandatory for External Practical.**

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**Course Code: 7BBOAP1**

**Allied Practical - I – Plant Diversity, Plant Pathology, Internal Morphology, Taxonomy of Angiosperms, Economic Botany and Embryology of Angiosperms.**

**EXTERNAL QUESTION**

**Time: 3 hours Max. Marks- 30**

1. Work out the specimen **A**  and identify its family through elimination process

(Identification-1, Elimination process -2, Reason -2) 5 marks

1. Make suitable micropreparation of “B” and “C” mount in Glycerin.

Draw labeled sketches and identify giving reason. Submit the slide

for valuation 2x4= 8 marks

1. Comments on the etiology of “D” 2 marks
2. Identify draw sketches and write notes on

(‘E’, ‘F’, ‘G’, ‘H’ and ‘I’) 5x2= 10 marks

1. Submission of Record note book 5 marks

**Total = 30 marks**

**EXTERNAL**

**KEY AND SCHEME OF VALUATION**

1. **A** – Angiosperm specimen selected from families in the syllabus 5 marks

(Identification at family level -1, Elimination process -2, Reason -2)

1. B and C (Dicot and monocot stem from anatomy)

(Slide -1, Identification-1, sketch-1, Reason-1) (2x4=8marks)

1. D – Etiology specimen prescribed in the syllabus

(Identification-1, sketch-1/2, Reason-1/2) 2 marks

1. Algae/ Fungi/ Bryophytes/ lichen/ anther/dicot embryo) (any 5 slides)

(‘E’, ‘F’, ‘G’, ‘H’ and ‘I’) (Identification-1, sketch-1/2, Reason-1/2) 10 marks

1. Submission of Record note book 5 marks

**Total = 30 marks**

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**course Code: 7BBOAP1**

**Allied Practical - I – Plant Diversity, Plant Pathology, Internal Morphology, Taxonomy of Angiosperms, Economic Botany and Embryology of Angiosperms.**

**INTERNAL QUESTION**

**Time: 3 hours Max-marks- 20**

1. Work out the specimen **A**  and identify its family through elimination process

(Identification-1, Elimination process -2, Reason -2) 5 marks

1. Make suitable micropreparation of “B” and “C” mount in Glycerin.

Draw labeled sketches and identify giving reason. Submit the slide

for valuation 2x3= 6 marks

1. Comments on the etiology of “D” 1 marks
2. Identify draw sketches and write notes on **E**-Algae, **F**- Fungi, 5x1= 5 marks
3. **G**- Bryophytes **H**-Lichen, **I** - anther/dicot embryo.
4. Continuous Assessment 3 marks

**Total =20 marks**

**INTERNAL KEY AND SCHEME OF VALUATION**

1. **A** – Angiosperm specimen selected from families in the syllabus 5 marks

(Identification at family level -1, Elimination process -2, Reason -2)

1. **B** and **C** (Dicot and monocot stem from anatomy)

(Slide -1, Identification-1, Reason-1) (2x3=6marks)

1. **D** – Etiology specimen prescribed in the syllabus

(Identification- ½, Reason-½) 1 marks

1. **E**-Algae, **F**- Fungi, **G**- Bryophytes **H**-Lichen, **I** - anther/dicot embryo.

(Identification-½, Reason-½) 5 marks

1. Continuous assessment based on the performance in the practical, attendance, record submission etc 3 marks

**Total=20 marks**

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**I YEAR – II SEMESTER**

**COURSE CODE: 7BBOA2**

**ALLIED COURSE - II – TAXONOMY OF ANGIOSPERMS, ECONOMIC BOTANY AND EMBRYOLOGY OF ANGIOSPERMS**

**Unit I Taxonomy of Angiosperms**

1. Aim and significance of Taxonomy
2. Herbarium techniques
3. Outline of Benthem and Hooker of classification.

**Unit II Families**

1. Annonaceae
2. Rutaceae
3. Asclepiadaceae
4. Euphorbiaceae
5. Poaceae

**Unit III Economic Botany**

Cereals – Paddy & Ragi

Pulses – Green Gram & Soyabean

Fruits – Pomegranate & Mango

Beverages – Coffee & Cocoa

Fibres – Jute & Cotton

Essential Oils – Sandal oil & Olive Oil

**Unit IV Embryology of Angiosperms**

Structure of anther and male gametophyte, Different types of Ovules, Structure and development of embryo sac(*Polygonum* type)

**Unit V**

1. Fertilization – double fertilization, syngamy-significance
2. Different types of endosperm(Nuclear, cellular, helobial)
3. Structure and development of dicot (*Capsella*) and monocot embryo(*Lazula*).

**Text books:**

1. Vasishta P.C. – Taxonomy of Angiosperms’ R.Chand and Co., New Delhi.
2. Kochar, S.L.–Economic Botany – TATA Mc Graw Hill Publishing Co., Ltd., New Delhi.
3. Bhojwani, S.S. and Bhatnagar S.P. – The embryology of Angiosperms’ Vikas Publishing House P.Ltd., New Delhi.

**Books for Reference:**

**Taxonomy of Angiosperms**

1. George H.M.Lawrence – Taxonomy of vascular plants. Oxford and IBH publishing Co., New Delhi.
2. Singh V. and D.K.Jain – Taxonomy of Angiosperms. Rastogi Publications.
3. Verma, V.A – Text Book of Botany.

**Economic Botany**

1. Sharma, B.K. and Awasthi, P.B. – Economic Botany – Praksh Book Depot, Boreilley.
2. Hill, A.W, 1951 – Economic Botany – Mc Graw Hill Publishing House.
3. Pandey B.I.1980 – Economic Botany – S.Chand & Ltd.

**Embryology of Angiosperms**

1. Maheswari, P – Introduction to Embryology of Angiosperms – Tata McGraw Hill publishing Ltd., New Delhi.

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**II YEAR – III SEMESTER**

**COURSE CODE: 7BBOA3**

**ALLIED COURSE - III – CELL BIOLOGY AND PLANT TISSUE CULTURE**

**Cell Biology**

**Unit I**

Ultra structure and functions of Plant cell and Ergastic substances

**Unit II**

Cell organelles – Nucleus, Mitochondria, Chloroplast, Endoplasmic reticulum, Golgi complex

**Unit III**

Cell division, Mitosis, Meiosis and their significance

**Plant Tissue Culture**

**Unit IV**

Definition – History and Scope, Tissue culture techniques, Application of culture techniques in Crop improvement

**Unit V**

Cell culture- Meristem culture – Callus induction- Protoplast- culture, Isolation, Purification and culture-Anther Culture

**Text books:**

1. Verma, P.S. and V.K.Agarwal – Cytology – S.Chand & Co. New Delhi
2. Reinert, J. Plant cell tissue and organs culture, Sathish Book Centre Press, Agra

**Books for Reference:**

**Cell Biology**

1. De Robertis E.D.P. Wilkter, W.Nowinkshi & Francis Co.A.Sal 2 Cell biology, W.Sawnders Co. London
2. Wilson, G.P & John H.Harrison – Cytology – East West Press Ltd., New Delhi
3. Carl P.Swanson & Peter L.Webster – The Cell – Prentice Hall of India P. Ltd., New Delhi
4. Burke, J.D. – Cell Biology, Scientific Book Agency, Calcutta

**Plant Tissue Culture**

1. Dodas, J.H. and Roberts, L.W. – Experiments in Plant tissue culture – Cambridge University Press
2. Johri, B.M. 1982 – Experimental Embryology of Vascular plants – Narosa Publishing House, New Delhi

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**II YEAR – III/IV SEMESTER**

**COURSE CODE: 7BBOAP2**

**ALLIED PRACTICAL – II – CELL BIOLOGY, PLANT TISSUE CULTURE, PLANT PHYSIOLOGY AND ENVIRONMENTAL BIOLOGY**

**(Covering the Allied Courses III & IV)**

1. Identifications from Photographs/ models/ micro preparation of cell organelles(chloroplast, Mitochondria, ER, Golgi Complex, Ribosome, Nucleus).
2. Plant tissue culture techniques, Preparation of culture medium
3. To identify and write critical notes on Callus culture, anther culture
4. Ganong’s Potometer, Potato osmoscope, Ganong’s respire scope, Light screen experiment, Evolution of O2 during Photosynthesis
5. Ecological study method – Temporary Quadrat
6. To identify and write critical notes on **Spotters at sight**-Tissue culture item-autoclave, inoculation loop, Auxin, Cytokinin, Action spectrum, absorption spectrum, red drop.

**Submission of certified and bonafide record note book is mandatory for External Practical.**

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**Course Code: 7BBOAP2**

**Allied Practical - II – Cell Biology, Tissue Culture, Plant Physiology and Environmental Biology**

**EXTERNAL QUESTION**

**Time: 3 hours Max. Marks- 30**

1. Taking a lot from the set of the physiology experiments, write the procedure, 8 marks

Complete the experiment, tabulate the data and interpret the result

(Requirement -2, Procedure- 3, Result and data/tabulation-2, interpretation-1)

1. Identify and write a protocol and critical notes on **A**  3 marks

(Indentification-1, Protocol-1, Critical notes-1)

1. Identify draw sketches and write notes on **B, C** and **D** 3x3=9 marks

(Indentification-1, Sketch -1, Critical notes-1)

4. **E** Write a Procedure, tabulate the observation and give critical notes on 5 marks

the vegetation setup (Procedure, 2,Tablation-1, Graph -1, Critical notes-1)

5. Submission of Record note book 5 marks

**Total = 30 marks**

**EXTERNAL**

**KEY AND SCHEME FOR VALUATION**

**Time: 3 hours Max. Marks- 30**

1. Taking a lot from the set of the physiology experiments, write the procedure, 8 marks

Complete the experiment, tabulate the data and interpret the result

(Requirement -2, Procedure- 3, Result and data/tabulation-2, interpretation-1)

1. Identify and write a protocol and critical notes on **A** (from Tissue Culture**)** 3 marks

(Indentification-1, Protocol-1, Critical notes-1)

1. Identify draw sketches and write notes on **B, C** and **D** 3x3=9 marks

(Photographs/models/micro preparation from cytology

and tissue culture)(Indentification-1, Sketch-1, Critical notes-1)

4. **E** Write a Procedure, tabulate the observation and give critical notes on 5 marks

the vegetation setup (Procedure, 2,Tablation-1, Graph -1, Critical notes-1)

5. Submission of Record note book 5 marks

**Total = 30 marks**

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**Course Code: 7BBOAP2**

**Allied Practical II – Cell Biology, Tissue Culture, Plant Physiology and Environmental Biology**

**INTERNAL QUESTION**

**Time: 3 hours Max. Marks- 20**

1. Taking a lot from the set of the physiology experiments, write the procedure, 5 marks

Complete the experiment, tabulate the data and interpret the result

(Requirement -1, Procedure- 2, Tabulation and Result -2)

1. Identify and write a protocol and critical notes on **A**  3 marks

(Indentification-1, Protocol-1, Critical notes-1)

1. Identify draw sketches and write notes on **B, C** and **D** 3x2=6 marks

(Indentification-1, Critical notes-1)

4. **E** Write a Procedure, tabulate the observation and give critical notes on 3 marks

the vegetation setup (Procedure-1,Graph -1, Critical notes-1)

5. Continuous assessment 3 marks

**Total = 20 marks**

**INTERNAL KEY AND SCHEME FOR VALUATION**

**Time: 3 hours Max. Marks- 20**

1. Taking a lot from the set of the physiology experiments, write the procedure, 5 marks

Complete the experiment, tabulate the data and interpret the result

(Requirement -1, Procedure- 2, Tabulation and Result -2)

1. Identify and write a protocol and critical notes on **A** (from Tissue Culture**)** 3 marks

(Indentification-1, Protocol-1, Critical notes-1)

1. Identify draw sketches and write notes on **B, C** and **D** 3x2=6 marks

(Photographs/models/micro preparation from cytology

and tissue culture)(Indentification-1, Critical notes-1)

4. **E** Write a Procedure, tabulate the observation and give critical notes on 3 marks

the vegetation setup (Procedure, 1,Graph -1, Critical notes-1)

5. Continuous assessment based on the performance in the practical class, 3 marks

attendance, record submission etc

**Total = 20 marks**

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**II YEAR – IV SEMESTER**

**COURSE CODE: 7BBOA4**

**ALLIED COURSE - IV – PLANT PHYSIOLOGY AND ENVIRONMENTAL BIOLOGY**

**Plant Physiology**

**Unit I**

Absorption of water – Transpiration and Ascent of sap

**Unit II**

Photosynthesis – Mechanism of Light Reaction – Dark Reaction Photosynthesis in C4 Plant

**Unit III**

Respiration – Mechanism of Aerobic respiration, Fermentation and its significance

Photorespiration – Photoperiodism and Vernalisation

**Environmental Biology**

**Unit IV**

Concept of ecosystem. Food chain, Food web, Energy flow and Ecological Pyramids – Pollution – kinds – Cause – Harmful effects including Green House effect and acid rain & control measures

**Unit V**

Deforestation Land Misuse (Indiscriminate tree felling and raising of Plantations) Effects of Deforestation – Conservation and Management of Forests, Social Forestry, Ecological Studies in the Field Conditions – Quadrat Method – Transect Method

**Text books**

1. Jain V.K.Fundamentals of Physiology S.Chand & Co, New Delhi.
2. Sharma P.D. – Elements of Ecology – Rastogi Publishing, Meerut

**Books for Reference:**

**Plant Physiology**

1. Ray Noggle, G and George J.Frits – Introduction to Plant Physiology. Prentice Hall of India P.Ltd., New Delhi.
2. Robert M.Devlinn – Plant Physiology. Affiliated East West Press P.Ltd., New Delhi.

**Environmental Biology**

1. Odum E.P. – Fundamentals of Ecology – W.B.Saunder Co, London
2. Kumar, H.D. – Modern Concepts of Ecology – Vikas Publishing House, New Delhi
3. Sukla R.S. and P.S.Chandel–Plant Ecology and Soil Science S.Chand and Co. Ltd. New Delhi
4. Singh, P. – Environmental pollution and Management, Bishen Singh, Mahendra Palsingh Publishing Co. Dehradun. ♣♣♣♣♣♣♣♣♣