VIVEKANAND COLLEGE, KOLHAPUR
(AUTONOMOUS)

DEPARTMENT OF BOTANY
Three/Four- Years UG Programme
Department/Subject Specific Core or Major (DSC)

Curriculum, Teaching and Evaluation Structure

for

B.Sc.-I Botany

Semester-I & II

(Implemented from academic year 2023-24 onwards)

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

Department of Botany

Program Outcomes (POs):

PO1: Disciplinary Knowledge: Graduates will gain in-depth understanding in their specific major or discipline, mastering the foundational principles and theories, as well as advanced concepts. Execute strong theoretical and practical understanding develoed from the specific programme in the area of work.

PO2:Problem-Solving Skills: Graduates will learn to use their knowledge to identify, analyze, and solve problems related to their field of study.

PO3:Analytical Skills: Graduates will gain the ability to collect, analyze, interpret, and apply data in a variety of contexts. They might also learn to use specialized software or equipment.

PO4:Research Skills and Scientific temper: Depending on the field, graduates might learn how to design and conduct experiments or studies, analyze results, and draw conclusions. They might also learn to review and understand academic literature.

PO5:Communication Skills: Many programs emphasize the ability to communicate effectively, both orally and in writing. Graduates may learn to present complex information clearly and succinctly, write detailed reports, and collaborate effectively with others.

PO6:Ethics and Professionalism: Graduates may learn about the ethical and professional standards in their field, and how to apply them in real-world situations.

B.Sc. in Botany

Program Specific Outcomes (PSOs):

PSO1: The aims of this programme is to enable the student to reach current understanding of botany and practical skills in an expanding field of employment.

PSO2: Identify problems and independently propose solutions using creative approaches, acquired through interdisciplinary experiences, and a depth of knowledge/expertise in the field of Plant Identification.

PSO3: Students will be able to access the literature, identify relevant works for a particular topic, and evaluate the scientific content of these works.

VIVEKANAND COLLEGE, KOLHAPUR (EMPOWERED AUTONOMOUS)

Department of Botany

Teaching and Evaluation scheme

Three/Four- Years UG Programme Department/Subject Specific Core or Major (DSC)

(as per NEP-2020 Guidelines)

First Year Semester-I & II

Sr. No.	Course Abbr.	Course code	Course Name	Teaching Scheme Hours/week		Examination Scheme and Marks				Course Credits
				TH	PR	ESE	CIE	PR	Marks	
Semester-I										
1	DSC-I	DSC03BOT11	Basic in Botany	2	-	40	10	-	50	2
2	DSC-II	DSC03BOT12	Plant Morphology	2	-	40	10	-	50	2
3	MIN-I	MIN03BOT11	Basic in Botany	2	-	40	10	-	50	2
4	MIN-II	MIN03BOT12	Plant Morphology	2	-	40	10	-	50	2
5	OEC-I	OEC03PLP11	Agri Based Microenterprises - I	2	-	40	10	-	50	2
6	OEC-II	OEC03PLP12	Agri Based Microenterprises - II	2	-	40	10	-	50	2
7	IKS-I	IKS03GEC11	Indian Knowledge System	2	-	25	-	-	25	2
8	DSC-PR-I	DSC03BOT19	DSC Botany Lab-1	-	4	-	-	25	25	2
9	MIN-PR-I	MIN03BOT19	MIN Botany Lab-1	-	4	-	-	25	25	2
10	OEC-PR-I	OEC03PLP19	OEC Botany Lab -1	-	4	-	-	25	25	2
Semester –I Total				**14**	**12**	**265**	**60**	**75**	**400**	**20**
Semester-II										
1	DSC-III	DSC03BOT21	Reproductive Botany	2	-	40	10	-	50	2
2	DSC-IV	DSC03BOT22	Diversity and conservation of Plants	2	-	40	10	-	50	2
3	MIN-III	MIN03BOT21	Reproductive Botany	2	-	40	10	-	50	2
4	MIN-IV	MIN03BOT22	Diversity and conservation of Plants	2	-	40	10	-	50	2
5	OEC-III	OEC03PLP21	Herbal Technology- I	2	-	40	10	-	50	2
6	OEC-IV	OEC03PLP22	Herbal Technology- II	2	-	40	10	-	50	2
7	VSC-I	VSC03BOT21	Basic Tools of Life Sciences	-	4	-	-	25	25	2
8	DSC-PR-II	DSC03BOT29	DSC Botany Lab-2	-	4	-	-	25	25	2
9	MIN-PR-II	MIN03BOT29	MIN Botany Lab-2	-	4	-	-	25	25	2
10	OEC-PR-II	OEC03PLP29	OEC Botany Lab-2	-	4	-	-	25	25	2
Semester –II Total				**12**	**16**	**240**	**60**	**100**	**400**	**20**

B. Sc. Part – I Semester -I BOTANY

DSC-I: DSC03BOT11: Basic in Botany

Theory: 30 hrs.

Marks-50 (Credits: 02)

Course Outcomes: After the completion of the course the student will be able to:

CO1: Develop basic skills to study botany in details.

CO2: Understand unique and general features of algae, fungi, bryophytes, pteridophytes and gymnosperm.

CO3: Understand the diversity of plants with respect to algae, fungi, bryophytes, pteridophytes and gymnosperm.

CO4: Acquaint the knowledge regarding importance of plants.

Unit -1: Importance of Plant: (4 Lectures.)

Role of plants in human welfare. (Direct and indirect), Role of plants in ecological services.

Evolutionary history of plants.

Unit -2: General outline of Plant Kingdom: (10 Lectures.)

Study of characters of plant kingdom, Study of classification of plant kingdom.

Study of five divisions with respect to characters and economic importance.

Unit -3: Study of following examples with reference to occurrence , plant body and life cycle: (10 Lectures.)

Study of Algae : *Nostoc* , Study of Fungi : *Mucor*. , Study of Bryophyte : Moss.

Study of Pteridophyte : *Pteris*., Study of Gymnosperm : *Cycas*.

Unit-4: Organization of higher plant body: (6 Lectures.)

Plant organs (Root, Stem and Leaf). Development of plant body (seedling development).

Internal organization, Study of tissue systems – Meristematic tissue and Simple and Complex.

Reference Books:

- Sharma O. P. Textbook of Thallophytes , McGraw Hill, Publishing Co. New Delhi. (1992)
- Smith G. M. , Crytptogamic Botany Vol. II. Bryophytes and Pteridophytes, Tata McGraw Hill, Publishing New Delhi. (1971)
- Pandey B. P., College Botany Vol. I , S. Chand and Company Ltd. New Delhi. (2010)
- Gangulee and Kar, College Botany.

B. Sc. Part – I Semester -I BOTANY
DSC-II: DSC03BOT12: Plant Morphology
Theory: 30 hrs.
Marks-50 (Credits: 02)

Course Outcomes: After the completion of the course the student will be able to:

CO1: Understand general organization of plant body.

CO2: Acquire basic knowledge required for understanding plant functioning.

CO3: Get and insight into be the fruit and seed development.

CO4: Understand the morphology and development of different plant parts.

Unit-1:General organization of plant body: **(12 Lectures.)**

Root system – Introduction, types and modification of root with one example.

Shoot system - Introduction and modification of stem with one example.

Leaf – Introduction, Types- Simple and Complex, Phyllotaxy, Leaf venation, Modification with one example.

Unit-2: Study of Inflorescence: (**4 Lectures**)

Definition and characters, types of inflorescence and significance of inflorescence.

Unit- 3: Study of Flower: (**10 Lectures**)

Definition and parts of a typical flower, Symmetry, Insertion of floral whorls-

Hypogynous, Perigynous and Epigynous., Calyx and Corolla – forms, aestivation.

Perianth- types., Androecium- parts and types.

Gynoecium- parts, arrangement and types of placentation.

Unit-4: Study of Fruit: (**4 Lectures**)

Introduction and types with one example each.

Reference books:

- Saxena N. B. and Saxena S., Plant Taxonomy, Pragati Publication, Pune. (2012)
- Sharma O. P., Plant Taxonmy, Tata McGraw Hill, Publishing New Delhi. (2013)
- P.H. Davis and V.H. Haywood, Principles of Angiosperm Taxonomy.,Oliver and Royd, London.(1963)
- Naik V. N., Taxonomy of Angiosperms., Tata McGraw Hill, New York. (1994).

B. Sc. Part – I Semester -II BOTANY

DSC-III: DSC03BOT21: Reproductive Botany

Theory: 30 hrs.

Marks-50 (Credits: 02)

Course Outcomes: After the completion of the course the student will be able to:

CO1: Understand reproduction of plants.

CO2: Impart basic knowledge of pollination and fertilization in plants.

CO3: Understand the development of reproductive parts.

CO4: Get and insight into be the fruit and seed development.

Unit-1: Study of Microsporogenesis: **(8 Lectures.)**

Study of microsporangium., Study of anther. (Structure and dehiscence),

Study of microsporgenesis., Study of pollen grain, Study of male gametophyte development.

Unit-2: Study of Megasporogenesis: **(8 Lectures.)**

Study of types of ovule, Study of megasporogenesis.,Study of typical embryosac.

Study of types of embryosac : Monosporic (*Polygonum* type), Bisporic (*Alliumsp.*)

and Tetrasporic (*Peperomia* type).

Unit-3 : Pollination and Fertilization: **(7 Lectures.)**

Introduction and definition., Types of pollination.(self, cross and its sub types)

Agents of pollination , Double fertilization : Definition and mechanism.

Unit-4: Endosperm and Embryo: **(7Lectures.)**

Introduction, Development of endosperm, Types of endosperm, Embryogeny.

Structure of dicot and monocot embryo, Seed formation, Polyembryony.

Reference Books:

- Pandey B. P. A Textbook of Botany , Angiosperms, S. Chand Publications , New Delhi. (1998)
- Naik V. N., Taxonomy of Angiosperms., Tata McGraw Hill, New York. (1994)
- V. Raghavan., Embryogenesis in Angiosperms: A Development and Experimental Study, Cambridge University Press New York. USA. (1986)
- K.R Sporne, The Morphology of Angiosperms., B.I. Publication, Bombay.(1977)

B. Sc. Part – I Semester -II BOTANY

DSC-IV: DSC03BOT22: Diversity and Conservation of Plants

Theory: 30 hrs.

Marks-50 (Credits: 02)

Course Outcomes: After the completion of the course the student will be able to:

CO1: Understand outline of different classification system.

CO2: Classify the groups and the different the taxonomic forms.

CO3: Generate interest among the students about plant conservation.

CO4: Make the student aware about the extent of the total biodiversity and the importance of their Conservation.

Unit-1: Study of classification systems: (**12 Lectures**)

Introduction and definition, Ranks of classification.

Study of five kingdom classification system (R. H. Whittaker).

Study of general characters of each kingdom.

Unit-2: Domains of Life: (**3 Lectures**)

Study of three domains of life – Archaea, Bacteria and Eukarya.

(Study of general character of each).

Unit-3: Plant Diversity: (**7 Lectures**)

Introduction and definition, Types of diversity, Importance of diversity.

Threats of diversity, Magnitude of diversity.

Unit-4: Conservation of Plant Diversity: (**6 Lectures**)

Introduction and definition, Types of conservation. (*In situ / Ex situ*)

Necessity of conservation.

Reference books:

- Sing V., Pande P. C. and Jian D. K. , A text book of Botany- Angiosperms (2007).
- Singh G. Plant Systematics, Theory and Practice, Oxford and IBH Pvt. Ltd., New Delhi. (2012)
- Jackson R. B., Biology,8th Edition, San Francisco, California, Pearson Benjamin Cummings.(2012)
- V.H. Heywood, D.M. Moore, Current Concepts in Plant Taxonomy, Academic Press, London. (1984).

DSC- PR-I : DSC03BOT29: DSC BOTANY LAB
Practical: Four lectures of 60 minutes per week per batch
Marks: 50 (Credits 02)

PRACTICAL – I

(Based on Paper I and Paper II)

1) Study of Microscope and its parts.
2) Study of *Nostoc*.
3) Study of *Mucor*.
4) Study of Moss.
5) Study of *Pteris*.
6) Study of *Cycas*.
7) Study of *Hibiscus*.
8) Study of different types of tissue – Simple and Complex.
9) Study of types of seed –Dicot and Monocot.
10) Study of root and its modification.
11) Study of stem and its modification.
12) Study of leaf and its modification.
13) Study of inflorescence- Racemose, Cymose, Special and its types.
14) Study of typical flower.
15) Study of different types of fruit.

DSC- PR-I : DSC03BOT29: DSC BOTANY LAB
Practical: Four lectures of 60 minutes per week per batch
Marks: 50 (Credits 02)

PRACTICAL – II

(Based on Paper III and Paper IV)

1) Study of typical anther and its types.

2) Study of different types of ovule.

3) Study the structure of pollen grains.

4 to 5) Study of pollen viability and germination.

6) Study of seed germination.

7 to 8) Study of pollen morphology of the following plants – *Hibiscus*, *Vinca*, *Ixora* by microscopic observation.

9) Study of kingdom monera with suitable example.

10) Study of kingdom protista with suitable example.

11) Study of different types of Bacteria.

12 to 13) Assessment of diversity, abundance and frequency of plant species by quadrat method.

14) Study of typical dicot and monocot embryo.

15) Study of dicot and monocot endosperm.

B. Sc. Part – I Semester -I BOTANY
MIN-I: MIN03BOT11: Basic in Botany
Theory: 30 hrs.
Marks-50 (Credits: 02)

Course Outcomes: After the completion of the course the student will be able to:

CO1: Develop basic skills to study botany in details.

CO2:Understand unique and general features of algae, fungi, bryophytes, pteridophytes and gymnosperm.

CO3: Understand the diversity of plants with respect to algae, fungi, bryophytes, pteridophytes and gymnosperm.

CO4: Acquaint the knowledge regarding importance of plants.

Unit -1: Importance of Plant: (4 Lectures.)

Role of plants in human welfare. (Direct and indirect) , Role of plants in ecological services.

Evolutionary history of plants.

Unit -2: General outline of Plant Kingdom: (10 Lectures.)

Study of characters of plant kingdom, Study of classification of plant kingdom.

Study of five divisions with respect to characters and economic importance.

Unit -3: Study of following examples with reference to occurrence , plant body and life cycle: (10 Lectures.)

Study of Algae : *Nostoc* , Study of Fungi : *Mucor*. , Study of Bryophyte : *Moss*.

Study of Pteridophyte : *Pteris*., Study of Gymnosperm : *Cycas*.

Unit-4: Organization of higher plant body: (6 Lectures.)

Plant organs.(Root, Stem and Leaf , Development of plant body (seedling development).

Internal organization., Study of tissue systems – Meristematic tissue and Simple and Complex.

Reference Books:

- Sharma O. P. Textbook of Thallophytes , McGraw Hill, Publishing Co. New Delhi. (1992)
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- Pandey B. P., College Botany Vol. I , S. Chand and Company Ltd. New Delhi. (2010)
- Gangulee and Kar, College Botany.

B. Sc. Part – I Semester -I BOTANY
MIN -II: MIN03BOT12: Plant Morphology
Theory: 30 hrs.
Marks-50 (Credits: 02)

Course Outcomes: After the completion of the course the student will be able to:

CO1:Understand general organization of plant body.

CO2: Acquire basic knowledge required for understanding plant functioning.

CO3: Get and insight into be the fruit and seed development.

CO4: Understand the morphology and development of different plant parts.

Unit-1:General organization of plant body: **(12 Lectures.)**

Root system – Introduction, types and modification of root with one example.

Shoot system - Introduction and modification of stem with one example.

Leaf – Introduction, Types- Simple and Complex, Phyllotaxy, Leaf venation, Modification with one example.

Unit-2: Study of Inflorescence: (**4 Lectures**)

Definition and characters, types of inflorescence and significance of inflorescence.

Unit- 3: Study of Flower: (**10 Lectures**)

Definition and parts of a typical flower, Symmetry, Insertion of floral whorls-

Hypogynous, Perigynous and Epigynous., Calyx and Corolla – forms, aestivation.

Perianth- types., Androecium- parts and types.

Gynoecium- parts, arrangement and types of placentation.

Unit-4: Study of Fruit: (**4 Lectures**)

Introduction and types with one example each.

Reference books:

- Saxena N. B. and Saxena S., Plant Taxonomy, Pragati Publication, Pune. (2012)
- Sharma O. P., Plant Taxonmy, Tata McGraw Hill, Publishing New Delhi. (2013)
- P.H. Davis and V.H. Haywood, Principles of Angiosperm Taxonomy.,Oliver and Royd, London.(1963)
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B. Sc. Part – I Semester -I BOTANY

IKS: IKS03GEC11: Indian Knowledge System

Theory: 10 hrs.

Course Outcomes: After the completion of the course the student will be able to:

CO1: Understand the importance of Ayurveda in everyday life.

CO2: Enable to advise the constitutional method of diet and Ayurveda life style.

CO3: Understand the source, chemical constituents and its uses of some medicinal plants.

CO4: Know the different system of medicine.

Unit-1: Introduction to Ayurveda. **(10 Lectures.)**

1a. Ayurvedic medicinal system

1b. Principles of Ayurveda (Vata, Pitta, Kapha)

1c. Ayurvedic therapies

1d. Unani system of medicine

1e. Siddha system of medicine

1f. Future of herbal drugs

1g. Study of medicinal plants- Punarnava, Vasaka, Shatavar, Brahmi and Arjuna

Reference books:

- Textbook of Pharmacognosy (Second edition) , Dr. Mohammed Ali, CBS Publishers and distributers, New Delhi.
- A Text book on Research methodology and Medical Statistics in Ayurveda, Rashmi Pujar & Aswin Haridas, A house of oriental, Ayurvedic books, Varanasi.
- Ayurveda- The Science of Self Healing, Dr. Vasant Lad, A Practical Guide, Motilal Banarsidas Publishers, Pvt. Ltd, India.

B. Sc. Part – I Semester -II BOTANY

MIN -III: MIN03BOT21: Reproductive Botany

Theory: 30 hrs.

Marks-50 (Credits: 02)

Course Outcomes: After the completion of the course the student will be able to:

CO1: Understand reproduction of plants.

CO2: Impart basic knowledge of pollination and fertilization in plants.

CO3: Understand the development of reproductive parts.

CO4: Get and insight into be the fruit and seed development.

Unit-1: Study of Microsporogenesis: **(8 Lectures.)**

Study of microsporangium., Study of anther. (Structure and dehiscence),

Study of microsporgenesis., Study of pollen grain, Study of male gametophyte development.

Unit-2: Study of Megasporogenesis: **(8 Lectures.)**

Study of types of ovule, Study of megasporogenesis.,Study of typical embryosac.

Study of types of embryosac : Monosporic (*Polygonum* type), Bisporic (*Alliumsp.*)

and Tetrasporic (*Peperomia* type).

Unit-3 : Pollination and Fertilization: **(7 Lectures.)**

Introduction and definition., Types of pollination.(self, cross and its sub types)

Agents of pollination , Double fertilization : Definition and mechanism.

Unit-4: Endosperm and Embryo: **(7Lectures.)**

Introduction, Development of endosperm, Types of endosperm, Embryogeny.

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- K.R Sporne, The Morphology of Angiosperms., B.I. Publication, Bombay.(1977)

B. Sc. Part – I Semester -II BOTANY

MIN -IV: MIN03BOT22: Diversity and Conservation of Plants

Theory: 30 hrs.

Marks-50 (Credits: 02)

Course Outcomes: After the completion of the course the student will be able to:

CO1: Understand outline of different classification system.

CO2: Classify the groups and the different the taxonomic forms.

CO3: Generate interest among the students about plant conservation.

CO4: Make the student aware about the extent of the total biodiversity and the importance of their Conservation.

Unit-1: Study of classification systems: (**12 Lectures**)

Introduction and definition, Ranks of classification.

Study of five kingdom classification system (R. H. Whittaker).

Study of general characters of each kingdom.

Unit-2: Domains of Life: (**3 Lectures**)

Study of three domains of life – Archaea, Bacteria and Eukarya.

(Study of general character of each).

Unit-3: Plant Diversity: (**7 Lectures**)

Introduction and definition, Types of diversity, Importance of diversity.

Threats of diversity, Magnitude of diversity.

Unit-4: Conservation of Plant Diversity: (**6 Lectures**)

Introduction and definition, Types of conservation. (*In situ / Ex situ*)

Necessity of conservation.

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- Sing V., Pande P. C. and Jian D. K. , A text book of Botany- Angiosperms (2007).
- Singh G. Plant Systematics, Theory and Practice, Oxford and IBH Pvt. Ltd., New Delhi. (2012)
- Jackson R. B., Biology,8th Edition, San Francisco, California, Pearson Benjamin Cummings.(2012)
- V.H. Heywood, D.M. Moore, Current Concepts in Plant Taxonomy, Academic Press, London. (1984).

MIN-PR-I: MIN03BOT29: MIN BOTANY LAB

Practical: Four lectures of 60 minutes per week per batch

Marks: 50 (Credits 02)

PRACTICAL – I

(Based on Paper I and Paper II)

1) Study of Microscope and its parts.
2) Study of *Nostoc*.
3) Study of *Mucor*.
4) Study of Moss.
5) Study of *Pteris*.
6) Study of *Cycas*.
7) Study of *Hibiscus*.
8) Study of different types of tissue – Simple and Complex.
9) Study of types of seed –Dicot and Monocot.
10) Study of root and its modification.
11) Study of stem and its modification.
12) Study of leaf and its modification.
13) Study of inflorescence- Racemose, Cymose, Special and its types.
14) Study of typical flower.
15) Study of different types of fruit.

MIN-PR-I: MIN03BOT29: MIN BOTANY LAB

Practical: Four lectures of 60 minutes per week per batch

Marks: 50 (Credits 02)

PRACTICAL – II

(Based on Paper III and Paper IV)

1) Study of typical anther and its types.

2) Study of different types of ovule.

3) Study the structure of pollen grains.

4 to 5) Study of pollen viability and germination.

6) Study of seed germination.

7 to 8) Study of pollen morphology of the following plants – *Hibiscus*, *Vinca*, *Ixora* by microscopic observation.

9) Study of kingdom monera with suitable example.

10) Study of kingdom protista with suitable example.

11) Study of different types of Bacteria.

12 to 13) Assessment of diversity, abundance and frequency of plant species by quadrat method.

14) Study of typical dicot and monocot embryo.

15) Study of dicot and monocot endosperm.

B. Sc. Part – I Semester -I BOTANY
OEC-I: OEC03PLP11: Agri Based Microenterprises -I
Theory: 30 hrs.
Marks-50 (Credits: 02)

Course Outcomes: After the completion of the course the student will be able to:

CO1: Impart knowledge of the sustainable agriculture and organic farming.
CO2: Give knowledge about nursery management.
CO3: Impart knowledge of opportunities for a carrier in botany.
CO4: Acquaint the knowledge of bio pesticides.

Unit -1: Organic farming and composting technique: (10Lectures)

Introduction and definition, Advantages of organic manures and fertilizers.

Composition of fertilizers – NPK content of various fertilizers.

Common organic manure - cow dung, oil cake, poultry waste, organic compost and bone meal.

Study of preparation and advantages of both aerobic and anaerobic compost.

Study of preparation of vermicompost and vermiwash, Study of Biofertilizers.

Unit -2: Horticulture and Nursery management: **(10 Lectures)**

Study of types of soil with its components, Study of potting mixture.

Study of common garden tools and implements.

Study of methods of plant propagation – sexual (seed) and asexual (cutting, grafting, budding and layering), Use of growth regulators for rooting.

Study of types of garden.

Unit -3: Food spoilage and Preservation technique: **(6 Lectures)**

Causes of food spoilage, Study of preservation technique- asepsis, removal of microorganisms, anaerobic conditions.

Study of special methods like drying, heat treatment, low temperature storage, by food additives.

Unit-4: Bio pesticides: (4 Lectures)

Introduction and definition, Importance of green pesticide.

Study of green pesticide with suitable examples.

Study of different green pesticide formulation.

Reference Books:

- Bose T. K., Mukherjee D. Gardening in India, Oxford and IBH Publishing Co. New Delhi. (1972)
- Gupta M. K. Handbook of organic farming and bio fertilizers, ABD Publishers, Jaipur. (2008)
- Hartmann H. T., Kester D. E., Plant propagation principles and practices, India Prentice Hall. (1975)
- Roy R. K. Fundamentals of Garden Designing, A color encyclopedia India, New India Publishing Agency. (2013).

B. Sc. Part – I Semester -I BOTANY
OEC -II: OEC03PLP12: Agri Based Microenterprises -II
Theory: 30 hrs.
Marks-50 (Credits: 02)

Course Outcomes: After the completion of the course the student will be able to:

CO1: Know symptoms, etiology, disease cycle and management of diseases.

CO2: Gain knowledge about different grades of chemical fertilizers.

CO3: Aware of the environment in which the agribusiness is conducted.

CO4: Impart knowledge of recent trends and advances in agriculture.

Unit-1: Fundamentals of Plant Pathology: **(10 Lectures)**

Introduction and definition of plant pathology, Terminologies used in plant pathology.

Introduction and definition of Integrated Disease Management (IDM).

Concepts and tools of disease management.

Basic principles of IDM with reference to cultural, chemical and biological disease management.

Study of IDM in different crops.

Unit-2: Agri Inputs – Fertilizer technology and Management: ` (**6 Lectures**)

Fertilizer development – concept and scope, Resource availability, Import and export.

Different grades of chemical fertilizers.

Unit- 3: Agribusiness and Agrieconomics **(7 Lectures)**

Defination and scope of agribusincess, Study of various business models in agri business.

Agri economics meaning, definition and scope.

Basic concepts – goods, services and utility.

Unit-4: Advances in agriculture (**7 Lectures**)

Remote sensing, GIS and GPS in agriculture. Study of agro meteorological instruments.
Scope of agribusiness, Study of agrotourism.

Reference Books:

- Agricultural policy framework for Maharashtra : Issues and options , Dev, M. S. Proceeding/ Project report No. 21, July 1966.
- Agro Tourism : Innovative supplementary income generating activity for enterprising farmers. Taware, P. https://www.agrotourism.in/
- Farm based recreation: A statistical profile Brown D. M., Reeder R. J., USDA, Economics Research Service, USA. (2007).

B. Sc. Part – I Semester -II BOTANY

OEC-III: OEC03PLP21: Herbal Technology- I

Theory: 30 hrs.

Marks-50 (Credits: 02)

Course Outcomes: After the completion of the course the student will be able to:

CO1: Acquaint the knowledge regarding selection and processing of herbal drugs as raw material for herbal drug preparation.

CO2: Explain method for identification and authentication of herbal drugs.

CO3: Impart knowledge of different medicinal plants.

CO4: Gain the knowledge of active principles of medicinal plants.

Unit-1: Herbal medicine: (6 Lectures)

Definition of herbal medicine, History and scope, Role of medicinal plants in Ayurveda.
Importance of herbal medicine, Herbal drug industries.

Unit-2: Medicinal plants: (7 Lectures)

Introduction and definition, History, present and future status.
Cultivation, processing, storage, marketing and utilization of medicinal plants.
Precautions during the use of herbal medicinal products

Unit-3 Study of medicinal plants - I: **(8 Lectures)**

Study of different plant parts used in medicine.
Study of plants used in hair care (Reetha, Shikakai).
Study of plants used in skin care (Aloevera, Turmeric and Sandle wood powder).
Study of plants used as ant diabetic(Guduchi, Neem and Jamun

Unit-4: Study of medicinal plants - II: **(9 Lectures)**

Study of plants used in respiratory disorders (Adulsa, Jeshthamadh, Tulsi and Ginger).
Study of plants used in digestive disorders (Bael, Ajwain).
Study of plants used in antiaging (Amla, Basil, Clove and Lemon).

Reference Books:

- Sivarajan V. V. and Balachandran I., Ayurvedic drugs and their plant source, Oxford IBH Publishing Co. (1994)
- Miller L. and Miller B. Ayurveda and Aromatherapy, Banarsidas, Delhi. (1998)
- Chopra R. N., Nayar S. L. nad Chopra I. C., Glossary of Indian Medicinal Plants, CSIR New Delhi.(1956).
- Arber A. Herbal plants and drugs, Mangal Deep publications. (1999)

B. Sc. Part – I Semester -II BOTANY

OE -IV: OEL03PLP22: Herbal Technology -II

Theory: 30 hrs.

Marks-50 (Credits: 02)

Course Outcomes: After the completion of the course the student will be able to:

CO1: Acquaint the basic knowledge and importance of Pharmacognosy.

CO2: Gain the knowledge of various phytochemicals.

CO3: Impart the knowledge regarding conservation of herbal plants.

CO4: Familiarize the students with various types of drug adulterations.

Unit-1: Pharmacognosy: (**8 Lectures**)

History and definition, Importance of Pharmacognosy.

Study of techniques of Pharmacognosy.

Role of pharmacognosy in medicines.

Unit-2: Photochemistry: (**9Lectures**)

History and definition, Importance of phytochemicals.

Study of different types of phytochemicals.

Study of different methods of testing of active chemicals.

Unit-3: Analytical Pharmacognosy: (**7 Lectures**)

Study of secondary metabolites, Drug adulteration, Types of drug adulteration.

Methods of drug evaluation.

Unit-4: Conservation of herbal plants : (**6 Lectures**)

In situ and *Ex situ* methods of conservation.

Herbal garden.

Reference Books:

- Shah and Quadry's , Pharmacognosy, B. S. Shah prakashan, India. (2005)
- Daniel. Phytochemicals (2008)
- Kokate C. K., Pharmacognosy, Nirali Prakashan, Pune. (2002)
- Sheth A., The herbs of Ayurveda, Vol. I, II, III and IV. (2005)

VSC-I: VSC03BOT21: Basic Tools of Life Sciences
Practical: Four lectures of 60 minutes per week per batch
Marks: 25 (Credits 02)

PRACTICAL

1) Study of Dissecting microscope and its parts.
2) Study of Compound microscope and its parts.
3) Study of spectrophotometer.
4) Study of agarose gel electrophoresis.
5) Study of Gram staining.
6) Study of tissue culture technique.
7) Preparation of PDA and NA culture media.
8 to 15) Demonstration of Lab equipment's – Oven, Water bath, Centrifuge, Autoclave, Laminar air flow, Distillation unit and Calorimeter.

OE-PR-I: OEL03PLP29: OEC BOTANY LAB
Practical: Four lectures of 60 minutes per week per batch
Marks: 25 (Credits 02)

" Agri Based Microenterprises I and II "

PRACTICAL – I

1) Study of preparation of vermicompost and vermiwash.
2) Study the effect of vermiwash on seed germination.
3) Study of different types of soil and its components.
4) Study of common garden tools and implements.
5 to 6) Study of plant propagation methods.
7) Study of different formulations of green pesticides.
8) Study and preparation of potting mixtures.
9) Study of various instruments used in disease management.
10) Study of chemical fertilizers with different grades.
11) Study of biofertilizers.
12) Study of agro meteorological instruments.
13) Study of remote sensing/GIS/GPS systems.
14) Visit to agro tourism center.
15) Preparation of project report.

OE-PR-I: OEL03PLP29: OEC BOTANY LAB
Practical: Four lectures of 60 minutes per week per batch
Marks: 25 (Credits 02)

" Herbal Technology - I and II "

PRACTICAL – II

1 to 2) Study of medicinal plants with respect to common name, botanical name, family, part used, chemical constitute and its medicinal importance of Shikakai, Aloe vera, Guduchi, Adulsa, Bael and Basil.

3) Manufacture of churn, arista and asav.

4) Preparation of herbal product kadha, ayurvedic juices.

5) Preparation of amla candy and herbal tea.

6) Preparation of shampoo and face cream.

7) To perform preliminary phytochemical screening of crude drugs.

8) Analysis of crude drugs by biochemical test like starch, oil and honey.

9) To study the macroscopic and microscopic study of *Datura* leaf.

10) To study the macroscopic and microscopic study of Senna leaf.

11) To study the starch grains and calcium oxalate crystals from given plant material.

12) Study of different chemical tests for *Acacia*.

13) Identification of starch grains in different powder drugs.

14) Prepare the report on phytochemical analysis of some medicinal plants.

15) Preparation, maintains and submission of *Oscimum* and Guduchi plant.

B. Sc. Part – I Semester -I & II BOTANY

Semester End Examination

Structure of Question Paper

Total Marks : 40 **Time : 2 hours**

Question No.	Question Pattern	Marks
Q.1	Choose and rewrite the correct alternative (One mark each):	08
Q.2	Attempt any TWO (Eight marks each):	16
Q.3	Attempt any FOUR (Four marks each):	16
	Total	40

B. Sc. Part – I Semester -I & II BOTANY

Continuous Internal Evaluation (CIE)

Evaluation Type	Marks
Home Assignment/ Book Review/ Student Project/ Test/ PPT Presentation	10

Seat No.	

Ques. paper code	

VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

B.Sc. Part- I (Botany) (Semester-I) Examination……..

Course Code and Name: DSC03BOT11: Basic in Botany

Day: Time: 2 hours

Date: --/--/---- Marks : 40

Instructions:

1) All the questions are compulsory.

2) Figures to the right indicate full marks.

3) Draw neat labelled diagrams wherever necessary.

4) Use of log table/calculator is allowed.

Q. 1. Choose and rewrite the correct alternative (One mark each): [8 Mks]

i) Xyzabcdefghijklmnop ----------
a) -------- b) -------- c) -------- d) --------

ii) Xyzabcdefghijklmnop ----------
a) -------- b) -------- c) -------- d) --------

iii) Xyzabcdefghijklmnop ----------
a) -------- b) -------- c) -------- d) --------

iv) Xyzabcdefghijklmnop ----------
a) -------- b) -------- c) -------- d) --------

v) Xyzabcdefghijklmnop ----------
a) -------- b) -------- c) -------- d) --------

vi) Xyzabcdefghijklmnop ----------
a) -------- b) -------- c) -------- d) --------

vii) Xyzabcdefghijklmnop ----------
a) -------- b) -------- c) -------- d) --------

viii) Xyzabcdefghijklmnop ----------
a) -------- b) -------- c) -------- d) --------

Q.2. Attempt any TWO (Eight marks each): [16 Mks]

i) Xyzabcdefghijklmnop.
ii) Xyzabcdefghijklmnop.
iii) Xyzabcdefghijklmnop

Q.3. Attempt any FOUR (Four marks each): [16 Mks]

i) Xyzabcdefghijklmnop.
ii) Xyzabcdefghijklmnop.
iii) Xyzabcdefghijklmnop.
iv) Xyzabcdefghijklmnop.
v) Xyzabcdefghijklmnop.
vi) Xyzabcdefghijklmnop.

B. Sc. I Practical Examination in Botany (NEP 2020)
2023-2024
DSC03BOT19: PRACTICAL-I

Date- **Total marks-25**

Time: 11.00 am onwards

Instructions-

1*) Draw neat labeled sketches wherever necessary.*

2) Do not write theoretical points, unless asked specifically.

3) Record your observations carefully and neatly wherever asked.

Q	Identify the specimen '**A**' & 'B' and make one slide of each specimen.	10 M
	(No Written Answer)	
Q. 2	Identify the specimen '**C**' and describe its structure. (**Written Answer)**	10 M
Q. 3	a) Certified journal	03 M
	b) Tour report	02 M

B. Sc. I Practical Examination in Botany (NEP 2020)
2023-2024
OEC03PLP19: PRACTICAL
"Agri based Microenterprises"

Date- **Total marks-25**

Time: 11.00 am onwards

Instructions-

1) ***Draw neat labeled sketches wherever necessary.***

2) Do not write theoretical points, unless asked specifically.

3) Record your observations carefully and neatly wherever asked.

Q. 1	Study of soil sample '**A**' and '**B**' with reference to pH/ WHC. **(Written Answer)**	10 M
Q. 2	Identification. **(Written Answer) (02 Marks Each)** i) Identify and describe the experiment – **C** ii) Identify and comment on specimen/slide – **D** iii) Identify and describe the experiment – **E** iv) Identify and comment on implement – **F** v) Identify and comment on instrument – **G**	10 M
Q. 3	a) Certified journal	03 M
	b) Project report	02 M