Subject code : 25_USBOM501 to 25_USBOM505
25_USBOM601 to 25_USBOM605

R. P. Gogate College of Arts and Science
And
R. V. Jogalekar College of Commerce (Autonomous), Ratnagiri.

Syllabus for T.Y.B.Sc. (CBCS)

Semester : V & VI

Program : B.Sc. Course Botany

Under Choice Based Credit System (CBCS)
To be implemented from
Academic Year- 2025-2026

NEP structure T.Y.B.Sc. Botany (To be implemented from 25-26)

No. of Courses	Semester V	Credits		No. of Courses	Semester VI	Credits	
Discipline Specific Course (DSC)				***Discipline Specific Course (DSC)***			
Major Mandatory				**Major Mandatory**			
25_USBOM501	Plant Diversity III	02		**25_USBOM601**	Plant Diversity III	02	
25_USBOM502	Plant Diversity IV	02		**25_USBOM602**	Plant Diversity IV	02	
25_USBOM503	Form and Function III	02		**25_USBOM603**	Form and Function III	02	
25_USBOM504	Plant Diversity-Practical I	02		**25_USBOM604**	Plant Diversity-Practical I	02	
25_USBOM505	Tools and Techniques in Botany- Practical II	02		**25_USBOM605**	Tools and Techniques in Botany-Practical II	02	
Major Electives (Any one)				**Major Electives (Any one)**			
25_USBOE506	Horticulture and Gardening I	02	04	**25_USBOE606**	Horticulture and Gardening II	02	04
25_USBOE507	Horticulture and Gardening I Practical	02		**25_USBOE607**	Horticulture and Gardening II Practical	02	
OR				**OR**			
25_USBOE508	Landscape Gardening I	02	04	**25_US BOE608**	Landscape Gardening II	02	04
25_USBOE509	Landscape Gardening I Practical	02		**25_USBOE609**	Landscape Gardening II Practical	02	
VSC				**VSC**			
25_USBOV510	Basic Skills in Botany	02	04	**25_USBOV610**	Basic Skills in Botany	02	04
25_USBOV511	Basic Skills in Botany Practical	02		**25_USBOV 611**	Basic Skills in Botany Practical	02	
Field Project				**On Job Training**			
25_USBOF512	Field Project	04		**25_USBOJ612**	On Job Training	04	
Total Credits		**22**		**Total Credits**		**22**	

Name of Programme	**B. Sc.**
Level	UG
No of Semesters	05
Year of Implementation	2023-24
Programme Specific Outcomes (PSO)	**Students will be able to:-** 1. Understand details and information about the evolution, anatomy, morphology, systematics, genetics, physiology, ecology, and conservation of plants and all other forms of life such as Algae, Fungi, Bryophytes, Pteridophytes and Gymnosperms. 2. Recall details of the unique ecological and evolutionary features of the local and Indian flora. 3. Communicate effectively using oral and written communication skills. 4. Generate and test hypotheses, make observations, collect data, analyze and interpret results, derive conclusions, and evaluate their significance within a broad scientific context.
Relevance of PSOs to the local, regional, national, and global developmental needs (200 words)	After completion of the course students, will be able to understand the diversity of plants from local, regional and national level with respect to various groups like Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms. The knowledge of floral diversity gained by the students will be helpful for the sustainable livelihood which is useful from local to global level. The students will also gain knowledge regarding the ecological and economic importance of vegetation throughout the world. The knowledge acquired by the students, regarding cultivation and processing of different varieties of agricultural crops, fruits, vegetables and other plants of commercial importance will be helpful in setting up of small scale industries and seeking jobs which will lead to improve the local , regional and national economy.Study of phytochemical analysis, extraction of essential oils from plant resources and study of microbial technology will make the students able to use the techniques effectively in the industry The students will be able to analyze the local and regional environmental issues like pollution, waste disposal by studying ecology. The students will be able to establish the relationship between the modern and traditional and indigenous knowledge system of plants of the nation.

The performance of the learners shall be evaluated into two parts. The learner's performance shall be assessed by Internal Assessment with 40% marks in the first part and by conducting the Semester End Examinations with 60% marks in the second part.

The allocation of marks for the Internal Assessment and Semester End Examinations are as shown below-

A) Internal Assessment: 40 % (20 Marks)

Sr. No	Particulars	Marks
1.	**One Periodical Class Test / Online Examination**	**10**
2.	**Assignments**	**10**
	Question Paper Pattern for Periodical Class Test/ Online Examination: Maximum Marks: 10 Duration: 20 Minutes Long answer questions/ Multiple Choice Questions	

B) Semester End Examination: 60% (30 Marks)

Duration: The examination shall be of 1 hour duration. Question Paper Pattern

1. There shall be three questions.
2. All questions shall be compulsory with internal options.
3. Questions may be subdivided into sub-questions a, b, c… and the allocation of marks depends on the weightage of the unit.

Standard of Passing

The learner to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment and Semester End Examination. The learner shall obtain minimum of 40% marks (i.e. 08 out of 20) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 12 out of 30) separately, to pass the course and minimum of Letter Grade "P" in the project component, wherever applicable to pass a particular semester. A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.

Performance grading

Letter grades and grading points:

Semester GPA/ Program CGPA Semester/Program	% of Marks	Alpha-Sign / Letter Grade Result
9.00-10.00	90.0 -100	0 (Outstanding)
8.00 ≤ 9.00	80.0 ≤ 90.0	A+ (Excellent)
7.00 ≤ 8.00	70.0 ≤ 80.0	A (Very Good)
6.00 ≤ 7.00	60.0 ≤ 70.0	B+ (Good)
5.50 ≤ 6.00	55.0 ≤ 60.0	B (Above Average)
5.00 ≤ 5.50	50.0 ≤ 55.0	C (Average)
4.00 ≤ 5.00	40.0 ≤ 50.0	P (Pass)
Below 4.00	Below 40	F (Fail)
Ab (Absent)	-	Absent

Name of the Course	Botany I - Plant Diversity III
Course Code	25_USBOM501
Class	T. Y. B.Sc.
Semester	05
No of Credits	2.0
Nature	Theory
Type	Core

Nomenclature: PLANT DIVERSITY – III

Course Outcomes:

Students will be able to:

CO1: Understand the salient features of three major groups of algae, their life cycle patterns with a suitable example.

CO2: Learn general characteristics and classification of Basidiomycetes.

CO3: Identify and describe the life cycles of prescribed Bryophytes.

Curriculum:

Semester V Plant Diversity III

Unit	Title	Learning Points	No of Lectures
1.	**Algae**	**Division Rhodophyta**: Classification and general characters, distribution, cell structure, pigments, reserve food, range of thallus, Reproduction: asexual and sexual, Alternation of Generations, Economic Importance. **Structure, life cycle and systematic position of** ● *Polysiphonia* **Division Xanthophyta**: Classification and general characters,distribution, cell structure, pigments, reserve food, range of thallus, Reproduction: asexual and sexual, Alternation of Generations, Economic Importance. **Structure, life cycle and systematic position of** ●*Vaucheria.* **Division Bacillariophyta**: Classification and general characters, distribution, cell structure, pigments, reserve food, range of thallus, Reproduction: asexual and sexual, Alternation of Generations, Economic Importance. **Structure, life cycle and systematic position of** ● *Pinnularia.*	**10**
2.	**Fungi**	**Basidiomycetes:** Classification and general characters **Structure, life cycle and systematic position of** ● *Agaricus* **Structure, life cycle and systematic position of** ● *Puccinia*	**10**
3.	**Bryophyta & Applied**	Classification, general characters and Life cycle of *Marchantia* Classification, general characters and Life cycle of *Pellia* ● Ecology of Bryophytes. ● Evolution of Sporophyte and Gametophyte in Bryophytes.	**10**

Learning Resources recommended:

- Botany for Degree Students - Algae - B R Vasistha , S. Chand Publication, 2010.
- Botany for Degree Students - Fungi - B R Vasistha, S. Chand Publication, 2010.
- Plant Pathology, At A Glance - U K Bhattacharya, Kalyani publishers,2014.
- Botany for Degree Students: Bryophyta, B.R. Vashishta , 2010.
- Cryptogamic Botany Volume I and II , G M Smith Mc-Graw Hill Publications.

Evaluation Pattern

A) Internal Evaluation: Theory course - 20 Marks

Method	Marks
Internal Evaluation Test	10
Assignment	10

B) Semester End Examination: Maximum Marks: 30

Question No. and Sub questions	Unit and sub unit (with number and title)	Type of Question	Marks
1 A	I	Long answer questions (Any 1 out of 2)	06
1 B	I	Answer in brief (Any 1 out of 2)	04
2 A	II	Long answer questions (Any 1 out of 2)	06
2 B	II	Answer in brief (Any 1 out of 2)	04
3 A	III	Long answer questions (Any 1 out of 2)	06
3 B	III	Answer in brief (Any 1 out of 2)	04

Name of the Course	Botany II- Plant Diversity IV
Course Code	25_USBOM502
Class	T. Y. B. Sc.
Semester	05
No of Credits	2.0
Nature	Theory
Type	Core

Nomenclature: PLANT DIVERSITY – IV
Course Outcomes:
Students will be able to

CO1: Classify and describe the morphological and reproductive structures of prescribed families of angiosperms.

CO2: Identify the different examples of prescribed families of angiosperms.

CO3: Relate anomalies in stem structure with function and understand as well as differentiate between different types of the root-stem transition.

CO4: Understand pollen morphology and prescribed applications of palynology.

CO5: Understand the development of male and female gametophytes, embryonic structure and development in plants.

Curriculum: PLANT DIVERSITY – IV

Unit	Title	Learning Points	No of Lectures
1.	**Angiosperms I**	Bentham and Hooker system of classification with respect to the prescribed families , Merits and Demerits Study of following families with emphasis on the morphological peculiarities and economic importance of its members : ● Capparidaceae ● Umbelliferae ● Cucurbitaceae ● Rubiaceae ● Solanaceae ● Graminae	**10**
2.	**Anatomy I**	**Anomalous secondary growth in the Stems of** *Salvadora, Achyranthes, Dracaena.* Storage roots of Beet. ● Root stem transition ● Types of Stomata– Anomocytic, Anisocytic, Diacytic, Paracytic and Graminaceous ● Ecological anatomy Hydrophytes – submerged, floating, rooted Hygrophytes Mesophytes Sciophytes Halophytes Epiphytes Xerophytes	**10**
3.	**Palynology & Embryology**	**Pollen Morphology** **Pollen viability** – pollen storage **Pollen germination and growth of pollen tube** **Application of Palynology**: in honey industry, coal and oil exploration, Aerobiology and pollen allergies, forensic science. **Microsporogenesis -** **Megasporogenesis-** Development of monosporic type, examples of all embryo sacs Types of ovules Double fertilization Development of embryo–Capsella	**10**

Learning Resources recommended:

- Plant Systematics - Gurcharan Singh, Oxford and IBH Publ., 2018.
- Taxonomy of Vascular Plants - Lawrence George, H M, Oxford and IBH Publ. 2012.
- Pollen Morphology and Plant Taxonomy - G. Erdtman, Hafner Publ. Co., N.Y., 1967.
- A text Book of Palynology - K Bhattacharya, New Central Book Agency Pvt. Ltd. 2011.
- An introduction to Embryology of Angiosperms - P Maheshwari, McGraw Hill Book company,1950.
- Physiological Plant Anatomy - Haberlandt, Mac Millan and Company,1950.
- Plant Anatomy - B. P. Pandey, S. Chand Publication, 2018.
- The Embryology of Angiosperms - Bhojwani S.S. and Bhatnagar S.P.,Vikas Publication House Pvt. Ltd., New Delhi., 2011.

Evaluation Pattern

A) Internal Evaluation: Theory course - 20 Marks

Method	Marks
Internal Evaluation Test	10
Assignment	10

B) Semester End Examination: Maximum Marks: 30

Question No. and Sub questions	Unit and sub unit (with number and title)	Type of Question	Marks
1 A	I	Long answer questions (Any 1 out of 2)	06
1 B	I	Answer in brief (Any 1 out of 2)	04
2 A	II	Long answer questions (Any 1 out of 2)	06
2 B	II	Answer in brief (Any 1 out of 2)	04
3 A	III	Long answer questions (Any 1 out of 2)	06
3 B	III	Answer in brief (Any 1 out of 2)	04

Name of the Course	Botany III-Form and Function III
Course Code	25_USBOM503
Class	T. Y. B. Sc.
Semester	05
No of Credits	2.0
Nature	Theory
Type	Core

Nomenclature: FORM AND FUNCTIONS- III

Course Outcomes:

Students will be able to:

CO1: Understand structure and function of nucleus and Giant chromosome.

CO2: Understand functions and applications of enzymes.

CO3: Understand water relations of plants, inorganic and organic solute transport.

CO4: Gain knowledge about the latest molecular biology techniques used for isolation and characterization of genes.

CO5: Gain insight into recent molecular biology techniques for DNA analysis and amplification.

Curriculum: FORM AND FUNCTIONS- III

Unit	Title	Learning Points	No of Lectures
1.	**Cytology and Biochemistry**	● Structure and function of nucleus ● Structure and function of giant chromosomes ● **Enzymes:** Nomenclature, classification, mode of action, Enzyme kinetics, competitive, non-competitive and un-competitive inhibitors.	**10**
2.	**Plant Physiology I**	**Water relations:** Water Potential, osmosis, transpiration, imbibition, **Solute transport:** Transport of ions across cell membranes, active and passive transport, carriers, channels and pumps. **Pressure flow model (Munch's hypothesis):** Phloem loading and unloading, anatomy of sieve tube elements and mechanisms of sieve tube translocation.	**10**
3.	**Plant Biotechnology I and II**	Construction of genomic DNA libraries, Chromosome libraries and c- DNA libraries. Identification of specific cloned sequences in c-DNA libraries and Genomic libraries **Analysis of genes and gene transcripts** – Restriction enzyme, analysis of cloned DNA sequences, Hybridization (Southern Hybridization) **DNA sequence analysis**– Maxam – Gilbert Method and Sanger's method, Pyro Sequencing. Polymerase Chain Reaction (PCR).	**10**

Learning Resources recommended:

- Introduction to Plant Physiology - Noggle and Fritz, Prentice Hall Publishers,2002.
- Plant Physiology - Salisbury and Ross, CBS Publishers,1950.
- Plant Physiology - Taiz and Zeiger, Sinauer Associates Inc. Publishers,2002.
- A handbook of Ethnobotany - S.K. Jain, V. Mudgal, Messrs Bishen Singh Mahendra Pal Singh Publishers and Distributors, 1999.
- Genetics - Russel Peter Adison, Wesley Longman Inc.,2000.
- An introduction to Genetic analysis - J. F. Griffiths, Griffith Freeman and Company 2000.
- Lenhinger, Principles of biochemistry- David N Nelson and Michael cox.2010
- Molecular Biology and Biotechnology - K. Ramawat, S. Chand Publications , 2010.
- Comprehensive Biotechnology - K. Ramawat, S. Chand Publications, 2008.
- Biotechnology: Secondary Metabolites Plants and Microbes - K. G. Ramawat and J. M. Merillon, CRC Press, 2007.
- Comprehensive Biotechnology - K. Ramawat,S Chand publication 2004.

Evaluation Pattern

A) Internal Evaluation: Theory course - 20 Marks

Method	Marks
Internal Evaluation Test	10
Assignment	10

B) Semester End Examination: Maximum Marks: 30

Question No. and Sub questions	Unit and sub unit (with number and title)	Type of Question	Marks
1 A	I	Long answer questions (Any 1 out of 2)	06
1 B	I	Answer in brief (Any 1 out of 2)	04
2 A	II	Long answer questions (Any 1 out of 2)	06
2 B	II	Answer in brief (Any 1 out of 2)	04
3 A	III	Long answer questions (Any 1 out of 2)	06
3 B	III	Answer in brief (Any 1 out of 2)	04

Name of the Course	Plant Diversity-Practical I
Course Code	25_USBOM504
Class	T. Y. B. Sc.
Semester	05
No of Credits	2
Nature	Practical
Type	Core

Course outcomes:
Students will be able to:

CO2: Identify and classify the members from Rhodophyta, Xanthophyta and Bacillariophyta of Algae.

CO3: Identify and classify the members from Basidiomycetes of Fungi.

CO4: Differentiate between stages in the life cycle of prescribed Algae and Fungi.

CO5: Learn about the prescribed fungal diseases.

CO6: Identify and classify the life cycles of prescribed Bryophytes.

CO7: Understand the economic importance of Bryophytes.

CO8: Describe the morphological features of flowers.

CO9: Understand the morphological peculiarities and economic importance of the members from prescribed families of angiosperms.

CO10: Gain proficiency in the use of keys and identification manuals for identification of unknown plants to species level.

CO11: Describe various types of pollen grains by prescribed method.

CO12: : Apply the knowledge of prescribed palynological data to grade the honey

CO13. Understand the development of male and female gametophytes, embryonic structure and development in plants.

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	25_USBOM504	L.	Cr.
		30	2
Sr. No.	**Plant Diversity-Practical I**		1.5
	Algae		
1.	Study of stages in the life cycle of the following Algae from fresh / preserved material and permanent slides ● *Polysiphonia* ● *Vaucheria* ● *Pinnularia*		
	Fungi		
2.	Study of stages in the life cycle of the following Fungi from fresh / preserved material and permanent slides ● *Agaricus* ● *Puccinia*		
	Bryophyta and Applied aspects		
3.	Study of stages in the life cycle of the following bryophytes from fresh /preserved material and permanent slides ● *Marchantia* ● *Pellia*		
4.	Economic importance of bryophytes.		
5.	Types of sporophytes in bryophytes (from permanent slides).		
	Angiosperms I		
6.	Morphology of Flower – All Parts of Flower (Calyx, corolla, androecium and gynoecium)		
7.	Study of one plant from each of the following Angiosperm families ● Capparidaceae ● Umbelliferae ● Cucurbitaceae ● Rubiaceae ● Solanaceae ● Graminae		
8.	Study of morphological peculiarities and economic importance of the members of the above-mentioned angiosperm families		
9.	Identification of the genus and species of a plant with the help of flora.		
	Palynology & Embryology		

10.	Study of pollen morphology (NPC Analysis) of the following by Chitale's Method : • *Hibiscus* • *Datura* • *Ocimum* • *Pancratium* • *Canna*		
11.	Determination of pollen viability.		
12.	Pollen analysis from honey sample – unifloral and multifloral honey.		
13.	Study of effect of varying concentration of sucrose on in vitro pollen germination		
14.	Study of various stages of Microsporogenesis, Megasporogenesis and Embryo Development with the help of permanent slides/photomicrographs.		
15.	Mounting of Monocot (Maize) and Dicot (Castor and Gram) embryo.		
16.	In vivo growth of pollen tube in *Portulaca*/*Vinca*.		

T.Y.B.SC. BOTANY SEMESTER V (25_USBOM504)

Plant Diversity-Practical I

Duration: 9:00 am to 11:00 am Max. Marks: 30

Q.1	Identify, Classify and Describe Specimens A, B and C .Sketch neat and labeled diagrams of Morphological / Microscopical structures seen in the specimens.	18
Q.2	Classify specimen 'D' up to their families giving reasons. Give the floral formula. Sketch neat and labelled diagrams of L. S. of flower and T.S. ovary.	06
Q.3	Field Report	06

KEY:

A- Algae.
B- Fungi
C-Bryophyta
D- Families

Evaluation Pattern

Internal Evaluation: Practical course
Total marks: 20
Continuous internal evaluation: 10 marks
Each practical will have 05 marks as continuous internal evaluation. The distribution of 05 marks is as follows:

01 mark: attendance, 02 marks: methodology, 02 marks: analysis and result.

The total marks of all practicals will be converted to 05 at the end of semester.

For the remaining 05 marks the distribution is as follows:

Practical paper I- Journal 05 marks

Internal Evaluation Test: 10 marks
Semester End Evaluation (Practical exam Pattern)

Practical Paper I:

Question No	Unit	Marks
1.	Based on Algae , Fungi and Bryophytes	**18**
2.	Based on Angiosperms	**06**
3.	Field Report	**06**

Name of the Course	Tools and Techniques in Botany- Practical II
Course Code	25_USBOM505
Class	T. Y. B. Sc.
Semester	05
No of Credits	02
Nature	Practical
Type	Core

Course outcomes:
Students will be able to:

CO1: Mount and identify Giant chromosomes in *Chironomous* larvae.

CO2: Make a Smear preparation from *Tradescantia* buds to study stages of meiosis.

CO3: Estimation of Phosphate Phosphorus (Plant acid extract).

CO4: Estimation of Iron (Plant acid extract).

CO5: To Study the effect of temperature on the activity of enzyme amylase.

CO6: To Study the effect of pH on the activity of enzyme amylase.

CO7: Study of effect of substrate variation on the activity of enzyme amylase.

CO8: Estimate Phosphate Phosphorus and Iron by using plant acid extract.

CO9: Growth curve of E. coli.

CO10: Understand technique for plasmid DNA isolation and their separation by AGE technique.

CO11: Study of anomalous secondary growth in the stems of the following plants using double staining technique: Bignonia, Salvadora, Achyranthes, Dracaena

CO12: Study of anomalous secondary growth in the roots of Beet

	Tools and Techniques in Botany- Practical II	L.	Cr.
	25_USBOM505	30	**2**
			1.5
CYTOLOGY AND BIOCHEMISTRY			
1.	Mounting of Giant chromosomes from *Chironomous* larvae		
2.	Smear preparation from *Tradescantia* buds to study stages of meiosis.		
PHYSIOLOGY			
3.	Estimation of Phosphate Phosphorus (Plant acid extract).		
4.	Estimation of Iron (Plant acid extract).		
5.	Study of effect of temperature on the activity of enzyme amylase.		
6.	Study of the effect of pH on the activity of enzyme amylase.		
7.	Study of effect of substrate variation on the activity of enzyme amylase.		
PLANT BIOTECHNOLOGY I & II			
	Growth curve of *E. coli.*		
8.	Plasmid DNA isolation and Separation of DNA using AGE.		
Anatomy – I			
9.	Study of anomalous secondary growth in the stems of the following plants using double staining technique: • *Bignonia* • *Salvadora* • *Achyranthes* • *Dracaena*		
10.	Study of anomalous secondary growth in the roots of Beet		

Evaluation Pattern

Internal Evaluation: Practical course

Total marks 20

Continuous internal evaluation: 10 marks

Each practical will have 05 marks as continuous internal evaluation. The distribution of 05 marks is as follows:

01 mark: attendance, 02 marks: methodology, 02 marks: analysis and result.

The total marks of all practicals will be converted to 05 at the end of semester.

For the remaining 05 marks the distribution is as follows:
Practical paper I- Journal 05 marks

Internal Evaluation Test: 10 marks

Semester End Evaluation (Practical exam Pattern)

Practical Paper II: Tools and Techniques in Botany- Practical II

Question No	Unit	Marks
1.	**Based on cytology ,Biochemistry and Biotechnology**	**08**
2.	**Based on Biochemistry**	**08**
3.	**Based on Physiology**	**08**
4.	**Based on Anatomy**	**06**

T.Y.B.SC. BOTANY SEMESTER V (25_USBOM505)

Tools and Techniques in Botany- Practical II

Duration: 9:00 am to 11:00 am Max. Marks: 30

Q.1	Make a smear preparation of material **'A'** and show the slide to the Examiner. Comment on your observation / Expose the giant chromosomes from the salivary glands of *Chironomous* larvae.	08
Q.2	Perform the experiment **'B'** allotted to you	08
Q.3	Make a temporary double stained preparation of T.S. specimen **'C'** and comment on the type of secondary growth	05
Q.4	Journal	05
Q.5	Viva	04

KEY

A-Meiosis/ Giant chromosomes from the salivary glands of *Chironomous*

larvae.

B–Physiology experiment.

C– Anatomy

Note:

1. A minimum of two field excursions for habitat studies are compulsory. Field work of not less than eight hours duration is equivalent to one period per week for a batch of fifteen students.

2. A candidate will be allowed to appear for the practical examinations only if he/she submits a certified journal of TYBSc Botany and the Field Report or a certificate from the Head of the Department/Institute to the effect that the candidate has completed the practical course of TYBSc Botany as per the minimum requirements. In case of loss of journal, a candidate must produce a certificate from the Head of the Department/ Institute that the practical for the academic year were completed by the student. However, such a candidate will be allowed to appear for the practical examination but the marks allotted for the journal will not be granted.

Name of the Course	**Botany I- Plant Diversity III**
Course Code	**25_USBOM601**
Class	**T. Y. B. Sc.**
Semester	**06**
No of Credits	**2.0**
Nature	**Theory**
Type	**Core**

Nomenclature: PLANT DIVERSITY – III Course Outcomes:

Students will be able to

CO1: Acquire knowledge of different fossil forms and understand evolution in plant groups.

CO2: Classify the prescribed classes of Pteridophytes and identify as well as describe the life cycles of one example from each class.

CO3: Study evolutionary aspects and economic utilization of Pteridophytes.

CO4: Identify, describe and study in detail the life cycles prescribed gymnosperms.

CO5: Describe the economic importance of gymnosperms.

Curriculum: PLANT DIVERSITY – III

Unit	Title	Learning Points	No of Lectures
1.	**Paleobotany**	● *Lepidodendron*– All form genera : root, stem, bark, leaf, and cone ● *Lyginopteris*– All form genera: root, stem, leaf, male and female fructification. ● *Pentoxylon*– All form genera.	**10**
2.	**Pteridophyta**	Calamophyta – Classification, general characters; Life cycle of *Equisetum* Pterophyta - Classification, general characters; Life cycle of *Adiantum* and *Marselia* Pteridophytes: Applied aspects ● Economic importance of Pteridophytes ● Diversity and distribution of Indian Pteridophytes	**10**
3.	**Gymnosperms**	● Classification, general characters and Life cycle of *Gnetum* ● Classification, general characters and Life cycle of *Ephedra.* ● Economic importance of Gymnosperms	**10**

Learning Resources recommended:

- A text Book of Palynology - K Bhattacharya, New Central Book Agency Pvt. Ltd. 2011.
- Botany for Degree Students: Pteridophyta, B.R. Vashishta ,2010.
- College Botany Volume I and II Gangulee, Das and Dutta , Central Education enterprises,Latest edition.
- Botany for Degree Students: Gymnosperms,Vashishta , 2010.
- Cryptogamic Botany Volume I and II , G M Smith Mc-Graw Hill Publications.

Evaluation Pattern

A) Continuous Internal Evaluation: Maximum Marks:20

Method	Marks
Class test	10
Assignment (Research methodology or review)	10

B) Semester End Examination: Maximum Marks: 30

Question No. and Sub questions	Unit and sub unit (with number and title)	Type of Question	Marks
1 A	I	Long answer questions (Any 1 out of 2)	06
1 B	I	Answer in brief (Any 1 out of 2)	04
2 A	II	Long answer questions (Any 1 out of 2)	06
2 B	II	Answer in brief (Any 1 out of 2)	04
3 A	III	Long answer questions (Any 1 out of 2)	06
3 B	III	Answer in brief (Any 1 out of 2)	04

Name of the Course	**Botany II- Plant Diversity IV**
Course Code	**25_USBOM602**
Class	**T. Y. B. Sc.**
Semester	**06**
No of Credits	**2.5**
Nature	**Theory**
Type	**Core**

Nomenclature: PLANT DIVERSITY – IV

Course Outcomes:

Students will be able to

CO1: Learn the contributions of botanical gardens and BSI to angiosperm study.

CO2: Describe the vegetative and reproductive structures of the members of prescribed families**.**

CO3: Learn about the plant sources of fats and oils and methods of extractions.

CO4: Deal with entrepreneurship in the field of science.

CO5: Gain knowledge and proficiency in preservation of plants and explore the possibility of entrepreneurship in the field.

Curriculum: PLANT DIVERSITY – IV

Unit	Title	Learning Points	No of Lectures
1	**Angiosperms II**	Major Botanic gardens of India– Indian Botanical Garden, Howrah; National Botanical Garden (NBRI) Lucknow; Lloyd Botanical Garden, Darjeeling; Lalbaugh Botanical Garden, Bangaluru. Botanical survey of India and regional branches of BSI. Bentham and Hooker's system of classification for flowering plants up to family with respect to the following prescribed families and economic importance, medicinal importance and fruit morphology for members of the families ● Rhamnaceae ● Combretaceae ● Asclepiadaceae ● Labiatae ● Euphorbiaceae ● Cannaceae Hutchinson's System of Classification: Brief Introduction, Outline, Merits and Demerits.	**08**
2	**Economic Botany**	• Essential Oils: Extraction, Perfumes, Perfume Oils, Oil of Rose, Sandalwood Oil , Patchouli, *Michelia champaca*, Grass Oils: Citronella, Vetiver. • Fatty oils: Drying oil (Linseed and Soyabean oil), Semi Drying oils(Cotton seed, Sesame oil) and Non-Drying oils (Olive oil and Peanut oil) • Vegetable Fats: Coconut and Palm oil	**10**
3	**Pharmacognosy and Medicinal Botany**	Monographs of drugs with reference to biological sources, geographical distribution, common varieties, macro and microscopic characters, chemical constituents, therapeutic uses, adulterants- *Strychnos* seeds, *Senna* leaves, Clove buds, *Allium sativum*, *Acorus calamus* and *Curcuma longa*	**10**

Learning Resources recommended:

- Pollen Morphology and Plant Taxonomy - G. Erdtman, Hafner Publ. Co., N.Y., 1967.
- An introduction to Embryology of Angiosperms - P Maheshwari, McGraw Hill Publications, 2020.
- The Embryology of Angiosperms - Bhojwani S.S. and Bhatnagar S.P.,Vikas Publication House Pvt. Ltd., New Delhi., 2011.
- Economic Botany: A Comprehensive Study by S. L. Kochhar
- Pharmacognosy - Kokate, Purohit and Gokhale, Nirali Publications, 2007.

Evaluation Pattern

A) Continuous Internal Evaluation: Maximum Marks:20

Method	**Marks**
Class test	**10**
Assignment (Research methodology or review)	**10**

B) Semester End Examination: Maximum Marks: 30

Question No. and Sub questions	**Unit and sub unit (with number and title)**	**Type of Question**	**Marks**
1 A	**I**	**Long answer questions (Any 1 out of 2)**	**06**
1 B	**I**	**Answer in brief (Any 1 out of 2)**	**04**
2 A	**II**	**Long answer questions (Any 1 out of 2)**	**06**
2 B	**II**	**Answer in brief (Any 1 out of 2)**	**04**
3 A	**III**	**Long answer questions (Any 1 out of 2)**	**06**
3 B	**III**	**Answer in brief (Any 1 out of 2)**	**04**

Name of the Course	**Botany III-Form And Function III**
Course Code	**25_USBOM603**
Class	**T. Y. B. Sc.**
Semester	**06**
No of Credits	**2.0**
Nature	**Theory**
Type	**Core**

Nomenclature: FORMS AND FUNCTION – III Course Outcomes:

Students will be able to

CO1: Gain knowledge about Nitrogen and plant hormone metabolism with applications of the same in agriculture and horticulture.

CO2: Understand principles of genetic mapping, mutations and solve problems based on them, gain knowledge of various metabolic disorders and their implications.

CO3: Gain insight into recent molecular biology techniques for DNA Barcoding techniques and applications therein.

CO4: Understand and apply tools of Bioinformatics for data retrieval and phylogenetic analysis.

CO5: Generate and test hypotheses, make observations, collect data, analyze and interpret results, derive conclusions.

CO6: Evaluate test hypotheses significance within a broad scientific context, using suitable statistical techniques.

FORMS AND FUNCTION – III

Unit	Title	Learning Points	No of Lectures
1.	**Plant Physiology II**	Nitrogen Metabolism: Nitrogen cycle, root nodule formation,and leghaemoglobin, nitrogenase activity, assimilation of nitrates,(NR, NiR activity), assimilation of ammonia, (amination and transamination reactions), nitrogen assimilation and carbohydrate utilization.	**10**
2.	**Genetics**	Genetic mapping in eukaryotes: discovery of genetic linkage,gene recombination, construction of genetic maps, three- point crosses and mapping chromosomes, problems based on the same. Gene mutations: definition, types of mutations, causes of mutations, induced mutations, the Ame's test Metabolic disorders– enzymatic and non-enzymatic: Gene control of enzyme structure Garrod's hypothesis of inborn errors of metabolism, Phenyl ketone urea.	**10**
3.	**Bioinformatics & Biostatistics**	Organization of biological data, databases Exploration of databases, retrieval of desired data, BLAST. Protein structure analysis and application Multiple sequence analysis and phylogenetic analysis. DNA barcoding: Basic features, present status of barcoding in plants. Biostatistics Test of significance student's t-test – Paired and Unpaired. Regression. ANOVA (one way).	**10**

Learning Resources recommended:

- Plant Physiology - Salisbury and Ross,CBS Publishers,2005.
- Plant Physiology -Taiz and Zeiger Sinauer Associates,Inc. Publishers, 2002.
- Lenhinger, Principles of biochemistry- David N Nelson and Michael cox.2010
- Bioinformatics - Sunder Rajan,Himalaya publication,2014.
- Instant Notes on Bioinformatics by Westhead ,Taylor Francis Publications,2002.
- Bioinformatics -Ignasimuthu,Alpha Science International.2005.
- Introduction to Biostatistics - P K Banerjee, Chand Publication.Dec 2007.
- Fundamentals of Biostatistics - Rastogi, Ane Books Pvt. Ltd,2009.

Evaluation Pattern

A) Continuous Internal Evaluation: Maximum Marks: 20

Method	Marks
Class test	10
Assignment (Research methodology or review)	10

B) Semester End Examination: Maximum Marks: 30

Question No. and Sub questions	Unit and sub unit (with number and title)	Type of Question	Marks
1 A	I	Long answer questions (Any 1 out of 2)	06
1 B	I	Answer in brief (Any 1 out of 2)	04
2 A	II	Long answer questions (Any 1 out of 2)	06
2 B	II	Answer in brief (Any 1 out of 2)	04
3 A	III	Long answer questions (Any 1 out of 2)	06
3 B	III	Answer in brief (Any 1 out of 2)	04

Name of the Course	**Plant Diversity –Practical I**
Course Code	**25_USBOM604**
Class	**T. Y. B. Sc.**
Semester	**06**
No of Credits	**6**
Nature	**Theory**
Type	**Core**

Course outcomes:

Students will be able to

CO1: Learn and differentiate between study of the following form genera with the help of permanent slides/ photomicrographs of Lepidodendron, Lyginopteris and Pentoxylon.

CO2: Learn and differentiate between pteridophytes, gymnosperms and angiosperms.

CO3: Identify and classify prescribed pteriodophytes and gymnosperms.

CO4: Get knowledge and identify the members of prescribed angiosperm families.

CO5: Understand the economic importance of pteridophytes, gymnosperms and angiosperms.

CO6: Separate the components of a mixture using paper chromatography technique.

	25_USBOM604	L.	Cr
		60	3
	Plant Diversity –Practical I		
Sr. No.	**PRACTICAL Paper I – PLANT DIVERSITY III**		
	Paleobotany		
1.	Study of the following form genera with the help of permanent slides/ photomicrographs. ● *Lepidodendron* ● *Lyginopteris* ● *Pentoxylon*		
	Pteridophyta and Pteridophytes: Applied aspects		
2.	Study of stages in the life cycles of the following pteridophytes from fresh / preserved material and permanent slides ● *Equisetum* ● *Adiantum* ● *Marselia* ● Economic importance of pteridophytes.		
	Gymnosperms		
3.	Study of stages in the life cycles of the following gymnosperms from fresh / preserved material and permanent slides ● *Gnetum* ● *Ephedra* ● Economic importance of gymnosperms		
	Angiosperms II		
4.	Study of one plant from each of the following angiosperm families as per Bentham and Hooker's system of classification. ● Rhamnaceae ● Combretaceae ● Asclepiadaceae ● Labiatae ● Euphorbiaceae ● Cannaceae Morphological peculiarities and economic importance of the members of the above-mentioned angiosperm families.		
	Economic Botany		
5.	Thin layer chromatography of essential oil of Patchouli and Citronella.		

Evaluation Pattern

Continuous internal evaluation: 10 marks

Each practical will have 05 marks as continuous internal evaluation. The distribution of 05 marks is as follows:

01 mark: attendance, 02 marks: methodology, 02 marks: analysis and result

The total marks of all practicals will be converted to 05 at the end of semester.
For the remaining 05 marks the distribution is as follows:

Viva 05 marks

Internal Evaluation Test: 10 marks per paper

Semester End Evaluation (Practical exam Pattern)

Plant Diversity Practical I

Question No	Unit	Marks
1.	Based on Pteridophytes	08
2.	Based on Gymnosperms	08
3.	Based on Angiosperms	08
4.	Based on Economic botany	06

T.Y.B.SC. BOTANY SEMESTER VI

Plant Diversity - Practical I paper (25_USBOM604)

Duration: 9:00 am to 1.00 pm Max. Marks:30

Q.1	Identify, classify and describe specimen 'A' and 'B'. Sketch neat and labeled diagrams of morphological/microscopical structures seen in the specimens.	12
Q.2	Classify specimen 'C' up to its family giving reasons. Give floral formula. Sketch neat and labelled diagrams of L.S. of flower and T.S. ovary.	06
Q.3	Perform the experiment 'D' allotted to you.	07
Q.4	Field Report	05

KEY

A-Pteridophytes: *Equisetum*, *Adiantum* & *Marsilea*

B-Gymnosperm: *Thuja*, *Gnetum* & *Ephedra*

C-Families of T.Y.B.Sc Sem – VI only

D– TLC of Patchouli or Citronella

Name of the Course	**Tools and Techniques in Botany-Practical II**
Course Code	**25_USBOM605**
Class	**T. Y. B. Sc.**
Semester	**06**
No of Credits	**6**
Nature	**Theory**
Type	**Core**

Course outcomes:

Student will be able to:-

CO1: Study of estimation of proteins by Biuret method.

CO2: Get knowledge about the estimation of reducing sugar by DNSA method.

CO3: Get knowledge about the estimation of alpha-amino nitrogen.

CO4: Understand the effect of GA on seed germination

CO5: Identify the types of mutation in prescribed DNA sequences.

CO6: Differentiate various stages in mitosis using pre-treated root tips of *Allium.*

CO7: Perform prescribed bioinformatics experiments by solving problems.

	Tools and Techniques in Botany- Practical II 25_USBOM605	L.	Cr
		60	3
Plant Biochemistry			
Sr. No.	**PRACTICAL Paper I – PLANT DIVERSITY III**		
Biochemistry			
1.	Estimation of proteins by Biuret method.		
2.	Estimation of reducing sugars by DNSA method.		
Plant Physiology II			
3.	Estimation of alpha-amino nitrogen.		
4.	Study of effect of GA on seed germination.		
Genetics			
5.	Problems based on three-point crosses, construction of chromosome maps.		
6.	Identification of types of mutations from given DNA sequences.		
7.	Study of mitosis using pre-treated root tips of *Allium.*		
Bioinformatics			
8.	BLAST: nBLAST, pBLAST		
9.	Multiple sequence alignment		
10.	Phylogenetic analysis		
11.	RASMOL		
12.	t-test (paired and unpaired).		
13.	Problems based on regression analysis.		
14.	ANOVA (One Way)		

Evaluation Pattern

Continuous internal evaluation: 10 marks

Each practical will have 05 marks as continuous internal evaluation. the distribution of 05 marks is as follows:

01 mark: attendance, 02 marks: methodology, 02 marks: analysis and result
The total marks of all practicals will be converted to 05 at the end of semester.
For the remaining 05 marks the distribution is as follows:

Viva 05 marks

Internal Evaluation Test: 10 marks per paper

Semester End Evaluation (Practical exam Pattern)

Practical Paper II:

Question No	Unit	Marks
1	Practical based on Plant Physiology & Biochemistry	14
2	Practical based on Biostatistics Experiment.	07
3	Journal	05
4	Viva	04

UNIVERSITY OF MUMBAI
T.Y.B.Sc. BOTANY
SEMESTER VI 25_USBOM605
Tools and Techniques in Botany- Practical II

Duration: 9:00 am to 01.00 pm **Max. Marks: 30**

Q.1	Perform the experiment 'A' & 'B' allotted to you.	14
Q.2	From the given data/ material 'C' determine test of significance using students t-test/ Regression Analysis /ANOVA	07
Q.3	Journal	05
Q.4	Viva	04

KEY
A– Plant Biochemistry Experiment.
B– Plant Physiology Experiment.
C– Biostatistics

Note:
1. A minimum of two field excursions for habitat studies are compulsory. Field work of not less than eight hours duration is equivalent to one period per week for a batch of fifteen students.

2. A candidate will be allowed to appear for the practical examinations only if he/she submits a certified journal of TYBSc Botany and the Field Report or a certificate from the Head of the Department/Institute to the effect that the candidate has completed the practical course of TYBSc Botany as per the minimum requirements. In case of loss of journal, a candidate must produce a certificate from the Head of the Department/ Institute that the practical for the academic year were completed by the student. However, such a candidate will be allowed to appear for the practical examination but the marks allotted for the journal will not be granted.

R. P. Gogate College of Arts and Science and R. V. Jogalekar College of Commerce (Autonomous) Ratnagiri
Board of Studies in Botany
Syllabus for T. Y. B. Sc. Botany effective from the year 2023-24

Scheme of Practical examination:

1. Two Practical exams for botany at the end of semester consisting of practical I: 30 marks, Practical II-30 marks passing combined out of 60 and Practical III-30 marks, Practical IV-30 marks passing combined out of 60.
2. Two short field excursions for habitat studies are compulsory.
3. Field work of not less than eight hours' duration is equivalent to one period per week for a batch of 15 students.
4. A candidate will be allowed to appear for the practical examinations if he/she submits a certified journal of T.Y.B.Sc. Botany or a certificate from the Head of the department / Institute to the effect that the candidate has completed the practical course of T.Y.B.Sc. Botany as per the minimum requirements.
5. In case of loss of journal, a candidate must produce a certificate from the Head of the department /Institute that the practicals for the academic year were completed by the student. However, such a candidate will be allowed to appear for the practical examination, but the marks allotted for the journal will not be granted.
6. HOD's decision, in consultation with the Principal, shall remain final and abiding to all.

Date: 16/04/24
Place: Ratnagiri

Signature
Chairperson and HoD

Subject code : 25_USBOE506 & 25_USBOE507
25_USBOE606 & 25_USBOE607

R. P. Gogate College of Arts and Science
And
R. V. Jogalekar College of Commerce (Autonomous), Ratnagiri.

Syllabus for T.Y.B.Sc. (CBCS)

Semester : V & VI

Program : B.Sc. Course Botany

Course Name: OE-Horticulture and Gardening

Under Choice Based Credit System (CBCS)
To be implemented from
Academic Year- 2025-2026

NEP structure T.Y.B.Sc. Botany (To be implemented from 25-26)

The performance of the learners shall be evaluated into two parts. The learner's performance shall be assessed by Internal Assessment with 40% marks in the first part and by conducting the Semester End Examinations with 60% marks in the second part.

The allocation of marks for the Internal Assessment and Semester End Examinations are as shown below-

A) Internal Assessment: 40 % (20 Marks)

Sr. No.	Particulars	Marks
1.	**One Periodical Class Test / Online Examination**	**10**
2.	**Assignments**	**10**
	Question Paper Pattern for Periodical Class Test/ Online Examination: Maximum Marks: 10 Duration: 20 Minutes Long answer questions/ Multiple Choice Questions	

B) Semester End Examination: 60% (30 Marks)

Duration: The examination shall be of 1 hours duration. Question Paper Pattern

1. There shall be four questions.
2. All questions shall be compulsory with internal options.
3. Questions may be subdivided into sub-questions a, b, c… and the allocation of marks depends on the weightage of the unit.

Standard of Passing

The learner to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment and Semester End Examination. The learner shall obtain minimum of 40% marks (i.e. 08 out of 20) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 12 out of 30) separately, to pass the course and minimum of Letter Grade "P" in the project component, wherever applicable to pass a particular semester. A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.

Performance grading
Letter grades and grading points:

Semester GPA/ Program CGPA Semester/Program	% of Marks	Alpha-Sign / Letter Grade Result
9.00-10.00	90.0 -100	0 (Outstanding)
8.00 ≤ 9.00	80.0 ≤ 90.0	A+ (Excellent)
7.00 ≤ 8.00	70.0 ≤ 80.0	A (Very Good)
6.00 ≤ 7.00	60.0 ≤ 70.0	B+ (Good)
5.50 ≤ 6.00	55.0 ≤ 60.0	B (Above Average)
5.00 ≤ 5.50	50.0 ≤ 55.0	C (Average)
4.00 ≤ 5.00	40.0 ≤ 50.0	P (Pass)
Below 4.00	Below 40	F (Fail)
Ab (Absent)	-	Absent

Name of the Course	Horticulture and Gardening I
Course Code	25_USBOE506
Class	T. Y. B. Sc.
Semester	06
No of Credits	2
Nature	Theory
Type	Core

Nomenclature: HORTICULTURE AND GARDENING –I

Course Outcomes:

Students will be able to

CO1: Understand importance and objectives of Horticulture, branches of horticulture.

CO2: Learn important manures, horticultural plant diseases and their control measures.

CO3: Understand an important Horticulture Research Institutes in India and about the government schemes.

CO4: Learn methods of plant propagation practices.

CO5: Enhance entrepreneurship by knowing horticulture consultancy and its importance.

Curriculum: HORTICULTURE AND GARDENING –I

Unit	Title	Learning Points	No of Lectures	No. of Credits
			60	**02**
1	**INTRODUCTION TO HORTICULTURE**	Definition, importance and objectives of Horticulture, branches of Horticulture, Pomology, Olericulture, Landscape Gardening, Nurseries and development ● Allied branches – Apiculture – Bee box, honey bee life cycle and role of apiculture in pollination, Sericulture – Silkworm life cycle, different types with host plant, Social Forestry, Exhibition: aims and objectives. ● Important Horticulture Research Institutes and Government Schemes for strategy plantations ● Konkan Krishi Vidyapeeth – Dapoli ● National Research Centre for grapes. ● Regional Fruit Research center Pune ● Horticulture Training Centre (H.T.C.) – Talegaon. ● Central Potato Tuber Research Institute (CPTRI) – Shimla ● Horticulture Consultancy ● Strategy plantation – Lakhibaug Yojana	**15**	
2	**GARDEN OPERATIONS FOR HORTICULTURE**	Selection of site, Preparation of soils for garden ● Mulching, top- dressing, blanching ● Sowing, transplanting, tree transplanting, ● Irrigation, - Overhead, Surface, Underground ● Weeding and pruning, - Principles, Objectives and general technique. ● Water management and conservation through horticulture.	**15**	
3.	**LANDSCAPE GARDENING AND**	**LANDSCAPE GARDENING** Principles of landscaping & garden design. ● Indoor plants & Indoor gardens- Hydroponics, Terrarium/ Bottle garden, Dish garden. ● Important garden features- Paths & Avenues, Hedges & Edges, Lawn, Flower Beds, Arches & Pergolas, Fencing, Water bodies, Rock garden & Plants suitable for different locations & climates. ● Lawn- Purpose of preparation of lawn, Method of preparation of lawn, management of lawn & lawn plants. ● Soil manipulation for plantation of desirable varieties. ● Mughal, Buddist, Botanical garden, Vertical wall garden & Theme park ● Important Gardens of India—Shalimar (Srinagar), Vrindavan(Mysore),Veer Jijamata Udyan(Mumbai)	**15**	

Learning Resources recommended:

- Basic Horticulture - Jitendra singh (First edition) Kalyani publication,2008.
- Propagation practices - M K Sadhu,New age international,1989.
- Floriculture in India - G S Randhawa and A. Mukhopadhyan ,Allied publishers private limited,2015.
- Indoor gardening - S C Dey,Agrobios (india),2003.
- Plant propagation and nursery management -Dr. Arun kumar singh,Arun kumar,S k Kataria and sons publication,2023.
- Instant horticulture- S N Gupta,Jain Brothers,2023.
- Introductory ornamental horticulture and landscape gardening,Rajneesh Singh,Bijendra Kumar Singh,Bio green Books,2020
- Basics of horticulture - K.V.Peter,New India Publishing Agency (NIPA),2021.

Teaching Plan:			
Unit No.	**Unit Title**	**Teaching Methods**	**No. of Lectures**
1	**INTRODUCTION TO HORTICULTURE**	**Presentation, Chalk and talk**	**10**
2	**GARDEN OPERATIONS FOR HORTICULTURE**	**Presentation, Chalk and talk**	**10**
3	**LANDSCAPE GARDENING**	**Presentation, Chalk and talk**	**10**

Evaluation Pattern

A) Continuous Internal Evaluation: Maximum Marks:20

Method	Marks
Class test	**10**
Assignment	**10**

B) Semester End Examination: Maximum Marks: 30

Question No. and Sub questions	Unit and sub unit (with number and title)	Type of Question	Marks
1 A	**I**	**Long answer questions (Any 1 out of 2)**	**06**
1 B	**I**	**Answer in brief (Any 1 out of 2)**	**04**
2 A	**II**	**Long answer questions (Any 1 out of 2)**	**06**
2 B	**II**	**Answer in brief (Any 1 out of 2)**	**04**
3 A	**III**	**Long answer questions (Any 1 out of 2)**	**06**
3 B	**III**	**Answer in brief (Any 1 out of 2)**	**04**

Name of the Course	Horticulture and gardening I Practical
Course Code	USBOE507
Class	T. Y. B. Sc.
Semester	05
No of Credits	2
Nature	Practical
Type	Core

Course Outcomes:

Students will be able to

CO1: Understand garden implements and their uses.
CO2: Identify prescribed horticultural plant diseases, insects and pests.
CO3: Acquire the skills of plant propagation by studying prescribed methods of propagation.
CO4: Get knowledge about different types of pots used for plantation.
CO5: Identify prescribed types of fertilizers, manures and biofertilizers.
CO6: Prepare natural insecticides such as neem arka, dashparni arka, tobacco extract, sitaphal powder
CO7: start a small scale nursery.

Semester V USBOE507 PRACTICAL		L 60	Cr. 2
1.	Study of garden implements and their use. for different purposes. ● Implements for digging and soil preparation ● Implements for weeding ● Implements for pruning ● Implements for budding ● Implements for watering ● Implements for Spraying ● Implements for harvesting		
2.	Different types of pots & Potting medium , Potting and repotting		
3.	Propagation practices by seed, Vegetative propagation, cutting ,layering , budding, grafting .		
4.	**Identification of Fertilizers** – Identification by physical and chemical methods – Urea, Ammonium sulphate , Potassium sulphate, super phosphate . **Manures –** Identification of plants as green manure – Glyricidia, Crotolaria, Leucaena . **Biofertilizers –** Identification (material as slides) VAM, Nostoc ,Rhizobium .		
5.	Soil pH, Use of soil testing Kit, electrical conductivity, pH of water, liquid fertilizers .		
6.	**Diseases and pests** Fungal – Powdery mildew ,Rust ,Wilt, Blight, Smut, Bacterial – Canker ,Wilt Viral – Leaf curl ,yellow vein Mosaic Insects – Sucking, Biting, Chewing, Borers & Ants . Non Insects pests- Nematodes, Rodents.		
7.	**Field Visit** – Each student should individually present a project related to any topic related to Horticulture. It should be duly certified and presented at the time of practical examination. Project presentation college level is compulsory.		

T.Y.B.Sc. Open Elective (OE)
(Horticulture and Gardening I)

Duration- 3.5 hrs. **Maximum marks 30**

Note- Show all the preparations to the examiner.

Q.1	Demonstrate the propagation techniques ---------- and ---------- using specimen **A** and **B.**	06
Q.2	Identify the given fertilizers **C** and **D** with the help of physical and chemical tests.	06
Q.3 A	Estimate the pH of given sample **E.**	04
	OR	
Q.3 B	Identify and comment on the preparation and use of the given natural insecticide **E**.	
Q.4 A	Identify and comment on garden implements **F, G, H.**	06
Q.4 B	Identify and comment on the specimens **I, J,**	04
Q.6	Journal	04

****

Key:-

A and B –
Vegetative propagation- runner, suckers, bulb, tuber, rhizome
Cutting- stem, leaf cutting
Layering- air layering
Grafting - Whip/ whip and tongue
Budding- T budding (any one in random order)

C and D - Urea,Super Phosphate ,Ammonium Sulphate ,Potassium Sulphate (Any two)
E –
Plant pathology- Citrus canker/ papaya leaf curl/ Fusarium wilt of banana/Yellow vein mosaic in Lady finger/ White rust/ Colocasia blight (Any one in random order)
H- Insects
Rhinoceros beetle, Mango stem borer, Grasshopper, Aphids, weevil (Any one in random order)
I, J, K- Garden implements
Spade, Shovel, Pickaxe, Garden shear,Secateur, Hand fork, garden rake, Watering can, Sprayer, Harvester, Tree Pruner, Scythe. (Any one in random order)

Evaluation Pattern

Internal Evaluation: Practical course

Total marks 20

Continuous internal evaluation: 10 marks per paper

Each practical will have 10 marks as continuous internal evaluation. The distribution of 10 marks is as follows:

02 marks: attendance

06 marks: methodology

02 marks: analysis and result

The total marks of all practicals will be converted to 10 at the end of semester.

Internal Evaluation Test: 10 marks per paper

Semester End Evaluation (Practical exam Pattern)

Practical Paper: 30 marks

Practical Paper- Applied component (Horticulture and gardening) I:

Question No	Unit	Marks
1	**A and B –** Vegetative propagation/Cutting/Layering/Grafting/Budding	06
2	Identification of fertilizers	06
3	Identification and comment on natural insecticides/ Estimate the pH	04
4	Identification of Biofertilizers /Green manure /garden implements/plantpathology/insects	10
5	journal	04

Horticulture and Gardening II

Name of the Course	Horticulture and Gardening II
Course Code	25_USBOE606
Class	T. Y. B. Sc.
Semester	06
No of Credits	2
Nature	Theory
Type	Core

Nomenclature: HORTICULTURE AND GARDENING –II
Course Outcomes:

Students will be able to
CO1: Understand important garden features and three important gardens of India.
CO2: Learn greenhouse technology of plants, floriculture, its scope and importance.
CO3: Understand the commercial production in relation to propagation, post plantation care, harvesting, post-harvest management and varieties of prescribed crops.
CO4: Learn fruit and vegetable preservation technology, horticulture business, management and entrepreneurship development.
CO5: Enhance the ways of increasing the market value and shelf life of horticultural produce.

Curriculum: HORTICULTURE AND GARDENING –II

Unit	Title	Learning Points	No of Lectures
1	**HORTICULTURE PRODUCE**	● **High–tech Horticultural production-** Green house technology- Meaning, types, layout & construction, irrigation systems. Care & attention. Hardening of plants. Space gardens. ● **Floriculture –** Scope & importance, soil and climatic requirement and cultivation practices and Economics of greenhouse production of *Gerbera*, Carnation, Roses, Orchids. ● Propagation techniques, packing and marketing, enhancing and delaying the period of bloom by special methods. Floral decoration, Florist shop management. **COMMERCIAL PRODUCTION** Commercial production of the following – in relation to propagation, post plantation care, harvesting, post-harvest management & varieties. ● Tubers- potato ● Vegetables- Tomato ● Fruits- Mango, Grapes & Coconut- products like coco peat/ Coir etc. ● Spices/condiments- Chilly ● Medicinal plants- *Aloe vera, Stevia rebaudiana* (Madura) ● Aromatic plant- *Citronella, Patchouli*	**15**
2	**POST HARVEST TECHNOLOGY**	**Post-Harvest Technology** ● Storage of Plant Produce –Preservation of Fruits and Vegetables ● Drying (Dehydration) – Natural conditions – Sun drying, ● Artificial Drying – Hot Air Drying, Vacuum Drying,	**15**

		● Osmotically Dried Fruits, Crystallized or Candied Fruits, ● Fruit Leather, Freeze Drying ● Freezing - Cold Air Blast System, Liquid Immersion method, Plate Freezers, Cryogenic Freezing, Dehydro-Freezing, Freeze Drying ● Canning ● Pickling - in brine, in vinegar, Indian Pickles. ● Sugar Concentrates - Jams, Jellies, Fruit juices. **Food Preservatives.** ● Use of Antioxidants in Preservation.	
3	**MANURES, BIOFERTILIZERS AND PESTS**	Manures: Definition, importance, important manures FYM (compost), oil cakes, green manure, organic manures and vermicompost. • **Biofertilizers:** Bacteria, Cyanobacteria, Mycorrhiza, Sea weeds. • **Pests** – common pests on horticultural crops – Aphids, beetle, stem borer, caterpillars and rats. • **Friends of farmers:** Earthworm, snakes and predaceous fungi.	**15**

Learning Resources recommended:

- Basic Horticulture - Jitendra singh (First edition) Kalyani publication,2008.
- Propagation practices - M K Sadhu,New age international,1989.
- Floriculture in India - G S Randhawa and A. Mukhopadhyan ,Allied publishers private limited,2015.
- Indoor gardening - S C Dey,Agrobios (india),2003.
- Plant propagation and nursery management -Dr. Arun kumar singh,Arun kumar,S k Kataria and sons publication,2023.
- Instant horticulture- S N Gupta,Jain Brothers,2023.
- Introductory ornamental horticulture and landscape gardening,Rajneesh Singh,Bijendra Kumar Singh,Bio green Books,2020
- Basics of horticulture - K.V.Peter,New India Publishing Agency (NIPA),2021.

Teaching Plan:			
Unit No.	**Unit Title**	**Teaching Methods**	**No. of Lectures**
1	**HORTICULTURE PRODUCE**	**Presentation, Chalk and talk**	**10**
2	**POST HARVEST TECHNOLOGY**	**Presentation, Chalk and talk**	**10**
3	**MANURES, BIOFERTILIZERS AND PESTS**	**Presentation, Chalk and talk**	**10**

Evaluation Pattern

A. Continuous Internal Evaluation: Maximum Marks:20

Method	Marks
Class test	**10**
Assignment	**10**

B. Semester End Examination: Maximum Marks: 30

Question No. and Sub questions	Unit and sub unit (with number and title)	Type of Question	Marks
1 A	**I**	**Long answer questions (Any 1 out of 2)**	**06**
1 B	**I**	**Answer in brief (Any 1 out of 2)**	**04**
2 A	**II**	**Long answer questions (Any 1 out of 2)**	**06**
2 B	**II**	**Answer in brief (Any 1 out of 2)**	**04**
3 A	**III**	**Long answer questions (Any 1 out of 2)**	**06**
3 B	**III**	**Answer in brief (Any 1 out of 2)**	**04**

Name of the Course	Horticulture and Gardening II Practical
Course Code	25_USBOE607
Class	T. Y. B. Sc.
Semester	06
No of Credits	2
Nature	Practical
Type	Core

Course Outcomes:

Students will be able to

CO1: Prepare garden plan.

CO2: Identify the plant suitable for garden location.

CO3: Understand methods of propagation. Make flower arrangements of different types.

CO4: Get acquainted with different diseases and pests of horticulture plants.

CO5: Able to prepare different natural insecticides.

	Semester VI 25_USBOE607 PRACTICAL	L 30	Cr. 2
1.	Flower arrangements –Indian (Gajara, Veni, Garland , bouquet - Baskets, hand, torch type, table floral arrangement), Japanese and western all type		
2.	Study types of weeds and its management in Garden 1. *Cynadon dactylon* 2. *Oxalis corniculta* 3. *Pepromia pellucida* 4. *Portulaca oleracea* 5. *Mimosa pudica* 6. *Phyllanthus amarus* 7. *Celosia argentia* 8. *Euphorbia hirta* 9. *Boerhavia diffusa* 10. *Alternanthera sessilies*		
3.	Method of preparing bonsai, Bottle Garden / Terrarium, Hanging baskets, Dish garden.		
4.	Identification of plants as green manure – *Glyricidia, Crotolaria, Leucaena.*		
5.	Identification of Biofertilizers (material as slides) VAM, Nostoc, Rhizobium.		
6.	**Identification of insects and pests:** ● Insects – Sucking, Biting, Chewing, Borers & Ants. ● Non Insects pests- Nematodes, Rodents.		
7.	**Preparation of natural insecticides** – Neem arka		
8.	**Preparation of natural insecticides** – Dashparni arka		
9.	**Preparation of natural insecticides-** Tobacco extracts		
10.	**Preparation of natural insecticides-** Seetaphal powder		

Learning resources recommended:

- Basic Horticulture - Jitendra singh (First edition), Kalyani publication
- Propagation practices - M K Sadhu,New age international publication,2008.
- Floriculture in India - G S Randhawa and A. Mukhopadhya, Allied publishers private limited, 2015.
- Textbook of Horticulture - K. Manibhushan Rao, Laxmi Publications Pvt Ltd, 2021.
- Horticulture-Principles and Practices - George Acquaah, Prentice Hall India Learning Private Limited, 2009.
- Instant Horticulture- S.N. Gupta,21st Edition, ,Jain Brothers Publication,2023
- Introduction to Horticulture - Kumar N, CBS Publisher and distributors Pvt.Ltd.2020.

Semester VI 25_USBOE607

Duration: 2 Hours **Max Marks: 30**

Q.1	Prepare an appropriate garden plan for the given area **A**. Suggest at least 2 names for each location.	06
Q.2	Use the given materials **B** to make a Bonsai / Bottle Garden / Terrarium / Hanging Basket /Dish Garden.	06
Q.3	a) Identify the horticulture plants **C, D** and **E**. Comment on their importance. b) Identify the green house plant **F**. Comment on its propagation and requirements for growth.	12
Q.4	Field report	06

Evaluation Pattern

Internal Evaluation: Practical course

Total marks 20

Continuous internal evaluation: 10 marks per paper

Each practical will have 10 marks as continuous internal evaluation. the distribution of 10 marks is as follows:
02 marks : attendance
06 marks: methodology
02 marks: analysis and result
The total marks of all practicals will be converted to 10 at the end of semester.

Internal Evaluation Test: 10 marks per paper

Semester End Evaluation (Practical exam Pattern)

Practical Paper: 30 marks

Practical Paper- Applied component (Horticulture and gardening) II:

Question No	Unit	Marks
1	Garden plan	**06**
2	Bottle garden / dish garden	**06**
3	Identify and describe horticultural plants Green house plant	**08** **04**
4	Field report	**06**

Scheme of Practical examination:

1. One Practical exam for OE at the end of semester consisting of practical : 30 marks.

2. One short field visit for the horticulture institute/ horticulture unit/Industry.

3. Field work of not less than eight hours' duration is equivalent to one period per week for a batch of 15 students.

4. A candidate will be allowed to appear for the practical examinations if he/she submits a certified journal of T.Y.B.Sc. OE (Horticulture and Gardening) or a certificate from the Head of the department / Institute to the effect that the candidate has completed the practical course of T.Y.B.Sc. OE as per the minimum requirements.

5. In case of loss of journal, a candidate must produce a certificate from the Head of the department /Institute that the practicals for the academic year were completed by the student. However, such a candidate will be allowed to appear for the practical examination, but the marks allotted for the journal will not be granted.

6. HOD's decision, in consultation with the Principal, shall remain final and abiding to all.

R. P. Gogate College of Arts and Science and R. V. Jogalekar College of Commerce (Autonomous) Ratnagiri
Board of Studies in Botany
Syllabus for T. Y. B. Sc. Botany effective from the year 2023-24

Scheme of Practical examination:

1. Two Practical exams for botany at the end of semester consisting of practical I: 30 marks, Practical II-30 marks passing combined out of 60 and Practical III-30 marks, Practical IV-30 marks passing combined out of 60.
2. Two short field excursions for habitat studies are compulsory.
3. Field work of not less than eight hours' duration is equivalent to one period per week for a batch of 15 students.
4. A candidate will be allowed to appear for the practical examinations if he/she submits a certified journal of T.Y.B.Sc. Botany or a certificate from the Head of the department / Institute to the effect that the candidate has completed the practical course of T.Y.B.Sc. Botany as per the minimum requirements.
5. In case of loss of journal, a candidate must produce a certificate from the Head of the department /Institute that the practicals for the academic year were completed by the student. However, such a candidate will be allowed to appear for the practical examination, but the marks allotted for the journal will not be granted.
6. HOD's decision, in consultation with the Principal, shall remain final and abiding to all.

Date: 16/04/24
Place: Ratnagiri

Signature
Chairperson and HoD

Subject code : 25_USBOM508 to 25_USBOM509
25_USBOM608 to 25_USBOM609

R. P. Gogate College of Arts and Science
And
R. V. Jogalekar College of Commerce (Autonomous), Ratnagiri.

Syllabus for T.Y.B.Sc. (CBCS)
Semester : V & VI
Program : OE Landscape Gardening

Under Choice Based Credit System (CBCS)
To be implemented from
Academic Year- 2025-2026

NEP structure T.Y.B.Sc. Botany (To be implemented from 25-26)

The performance of the learners shall be evaluated into two parts. The learner's performance shall be assessed by Internal Assessment with 40% marks in the first part and by conducting the Semester End Examinations with 60% marks in the second part.

The allocation of marks for the Internal Assessment and Semester End Examinations are as shown below-

A) Internal Assessment: 40 % (20 Marks)

Sr. No.	Particulars	Marks
1.	**One Periodical Class Test / Online Examination**	**10**
2.	**Assignments**	**10**
	Question Paper Pattern for Periodical Class Test/ Online Examination: Maximum Marks: 10 Duration: 20 Minutes Long answer questions/ Multiple Choice Questions	

B) Semester End Examination: 60% (30 Marks)

Duration: The examination shall be of 1 hours duration. Question Paper Pattern

1. There shall be four questions.
2. All questions shall be compulsory with internal options.
3. Questions may be subdivided into sub-questions a, b, c… and the allocation of marks depends on the weightage of the unit.

Standard of Passing

The learner to pass a course shall have to obtain a minimum of 40% marks in aggregate for each course where the course consists of Internal Assessment and Semester End Examination. The learner shall obtain minimum of 40% marks (i.e. 08 out of 20) in the Internal Assessment and 40% marks in Semester End Examination (i.e. 12 out of 30) separately, to pass the course and minimum of Letter Grade "P" in the project component, wherever applicable to pass a particular semester. A learner will be said to have passed the course if the learner passes the Internal Assessment and Semester End Examination together.

Performance grading
Letter grades and grading points:

Semester GPA/ Program CGPA Semester/Program	% of Marks	Alpha-Sign / Letter Grade Result
9.00-10.00	90.0 -100	0 (Outstanding)
8.00 ≤ 9.00	80.0 ≤ 90.0	A+ (Excellent)
7.00 ≤ 8.00	70.0 ≤ 80.0	A (Very Good)
6.00 ≤ 7.00	60.0 ≤ 70.0	B+ (Good)
5.50 ≤ 6.00	55.0 ≤ 60.0	B (Above Average)
5.00 ≤ 5.50	50.0 ≤ 55.0	C (Average)
4.00 ≤ 5.00	40.0 ≤ 50.0	P (Pass)
Below 4.00	Below 40	F (Fail)
Ab (Absent)	-	Absent

Name of the Course	Landscape and Gardening I
Course Code	25_USBOE508
Class	T. Y. B. Sc.
Semester	06
No of Credits	2
Nature	Theory
Type	Core

Nomenclature: HORTICULTURE AND GARDENING –I
Course Outcomes:

Students will be able to

CO1: Understand importance and objectives of Landscape and Gardening

CO2: Learn important manures, horticultural plant diseases and their control measures.

CO3: Understand an important Horticulture Research Institutes in India and about the government schemes.

CO4: Learn methods of plant propagation practices.

CO5: Enhance entrepreneurship by knowing horticulture consultancy and its importance.

Curriculum: LANDSCAPE AND GARDENING –I

Unit	Title	Learning Points	No of Lectures	No. of Credits
			30	02
1	FUNDAMENTALS OF LANDSCAPE GARDENING	**Introduction to Landscape Gardening** ● Definition, scope, and importance ● History of landscape design: global and regional perspectives ● Types of gardens (formal, informal, naturalistic, and thematic gardens) **Principles of Landscape Design** ● Principles: Unity, balance, proportion, scale, harmony ● Design elements: Line, form, texture, color, and space **Plant Material for Landscaping** ● Selection criteria for plants (climate, soil, function, aesthetics) ● Types: Trees, shrubs, climbers, ground covers, annuals, and perennials ● Indigenous vs. exotic species	10	
2	HARDSCAPE AND SOFTSCAPE DESIGN	**Hardscaping Elements** ● Pathways, patios, decks, pergolas, gazebos ● Water features: Ponds, fountains, waterfalls ● Rock gardens and sculptures **Soft scaping Components** ● Turfgrass selection and management ● Flower beds and borders ● Vertical gardens and green roofs **Garden Accessories and Features** ● Lighting, furniture, signage ● Irrigation systems and drainage considerations **Tools and Equipment in Landscape Gardening** ● Types of tools and their functions ● Safety protocols in equipment usage	10	
3.	ENVIRONMENTAL AND ECOLOGICAL ASPECTS	**Sustainable Landscape Practices** ● Water conservation techniques (xeriscaping, rain gardens) ● Waste management and composting in gardens ● Native plant landscaping **Urban Green Spaces** ● Importance of green belts, parks, and community gardens ● Urban biodiversity conservation **Climate-Resilient Gardening**	10	

		● Designing for drought, flood, and extreme weather ● Role of gardens in mitigating urban heat islands		

Learning Resources recommended:

- Basic Horticulture - Jitendra singh (First edition) Kalyani publication,2008.
- Propagation practices - M K Sadhu,New age international,1989.
- Floriculture in India - G S Randhawa and A. Mukhopadhyan ,Allied publishers private limited,2015.
- Indoor gardening - S C Dey,Agrobios (india),2003.
- Plant propagation and nursery management -Dr. Arun kumar singh,Arun kumar,S k Kataria and sons publication,2023.
- Instant horticulture- S N Gupta,Jain Brothers,2023.
- Introductory ornamental horticulture and landscape gardening,Rajneesh Singh,Bijendra Kumar Singh,Bio green Books,2020
- Basics of horticulture - K.V.Peter,New India Publishing Agency (NIPA),2021.
- A handbook of Landscape: CPWD
- Horticulture in India: D. C. Bansil
- Complete gardening in India: Gopalaswamiengar
- Floriculture in India: G. S. Randhawa
- Handbook of Agriculture: ICAR
- Ornamental gardening in India: Misra
- Home gardening: P. P. Trivedi
- Horticulture Nursery Management: YCMOU

Evaluation Pattern

A) Continuous Internal Evaluation: Maximum Marks:20

Method	Marks
Class test	10
Assignment	10

B) Semester End Examination: Maximum Marks: 30

Question No. and Sub questions	Unit and sub unit (with number and title)	Type of Question	Marks
1 A	I	Long answer questions (Any 1 out of 2)	06
1 B	I	Answer in brief (Any 1 out of 2)	04
2 A	II	Long answer questions (Any 1 out of 2)	06
2 B	II	Answer in brief (Any 1 out of 2)	04
3 A	III	Long answer questions (Any 1 out of 2)	06
3 B	III	Answer in brief (Any 1 out of 2)	04

Name of the Course	Landscape and GardeningI Practical I
Course Code	25_USBOE509
Class	T. Y. B. Sc.
Semester	05
No of Credits	2
Nature	Practical
Type	Core

Course Outcomes:

Students will be able to

CO1: Understand garden implements and their uses.

CO2: Identify prescribed horticultural plant diseases, insects and pests.

CO3: Acquire the skills of plant propagation by studying prescribed methods of propagation.

CO4: Get **knowledge** about different types of pots used for plantation.

CO5: Identify prescribed types of fertilizers, manures and biofertilizers.

CO6: Prepare natural insecticides such as neem arka, dashparni arka, tobacco extract, sitaphal powder

CO7: start a small scale nursery.

Semester V 25_USBOE509 PRACTICAL		L 60	Cr. 2
1.	Constructing the landscape design, Preparation of garden layout Formal and Informal Garden.		
2.	Identification of Physical Elements in Landscape (Hardscape).		
3.	Exploring Line, Form, and Texture in the Garden.		
4.	Identification of Water and Rock features in the Garden.		
5.	Identification of soft-soaping components of garden.		
6.	Propagation practices by layering- Simple, compound and air layering.		
7.	Propagation practices by budding- T budding and .grafting- Whip / Whip and tongue grafting.		
8.	**Identification of important horticultural plants** 1. Herbs – foliage any 2 and flowering any 2 2. Shrubs – foliage any 2 flowering any 2 3. Trees – foliage any 2 and flowering any 2 4. Climbers – any 2 5. Lianas – any 2 6. Epiphytes – any 2 7. Creepers –any 2 8. Trailers – any 2 9. Aquatic plants – any 3 (preferably various habitat) 10. Succulents – any 2 11. Weeds –any 10		
9.	**Budget and estimation (Hardscaping and soft scaping)**		
10.	**Project** – Each student should individually present a project related to any topic related to Landscape Gardening. It should be duly certified and presented at the time of practical examination. Project presentation college level is compulsory.		

T.Y.B.Sc. Open Elective (OE)

(Landscape and Gardening practical I)

Duration- 2 hrs **Maximum marks 30**

Note- Show all the preparations to the examiner.

Q.1	Construct the landscape design and Prepare garden layout A and B.	06
Q.2	Identify and sketch physical elements C.	05
Q.3	Demonstrate the given layering method D. Simple / Compound / Air	05
Q.4 a	Identify and classify plant specimens E, F and G.	06
b	Prepare a simple budget and estimate for hardscaping OR soft scaping component H.	04
Q.5	Field Report	04

****

Key:-

A and B- Formal and Informal Garden.
C- Hardscape
D- Layering- Simple, compound and air layering.
E, F and G-
Any three plants from given below in random order.
1. Herbs – foliage any 2 and flowering any 2
2. Shrubs – foliage any 2 flowering any 2
3. Trees – foliage any 2 and flowering any 2
4. Climbers – any 2
5. Lianas – any 2
6. Epiphytes – any 2
7. Creepers –any 2
8. Trailers – any 2
9. Aquatic plants – any 3 (preferably various habitat)
10. Succulents – any 2
11. Weeds –any 10

H- Budget and estimation (Hardscaping and soft scaping)

Evaluation Pattern

Internal Evaluation: Practical course

Total marks 20

Continuous internal evaluation: 10 marks per paper

Each practical will have 10 marks as continuous internal evaluation. the distribution of 10 marks is as follows:

02 marks : attendance

06 marks: methodology

02 marks: analysis and result

The total marks of all practicals will be converted to 10 at the end of semester.

Internal Evaluation Test: 10 marks per paper

Semester End Evaluation (Practical exam Pattern)

Practical Paper :30 marks

Practical Paper- Applied component (Landscape and Gardening**) I:**

Question No	**Unit**	**Marks**
1	Propagation techniques	05
2	Physical and chemical tests	05
3	pH of soil / natural insecticide	04
4	Identify and describe	06
5	Project	10

Landscape and Gardening II

Name of the Course	Landscape and Gardening II
Course Code	**25_USBOE608**
Class	T. Y. B. Sc.
Semester	06
No of Credits	2
Nature	Theory
Type	Core

Nomenclature: Landscape and Gardening II

Course Outcomes:
Students will be able to

CO1: Understand important garden features and three important gardens of India.

CO2: Learn greenhouse technology of plants , floriculture, its scope and importance.

CO3: Understand the commercial production in relation to propagation, post plantation care, harvesting, post harvest management and varieties of prescribed crops.

CO4: Learn fruit and vegetable preservation technology ,horticulture business, management and entrepreneurship development.

CO5: Enhance the ways of increasing the market value and shelf life of horticultural produce.

Curriculum : HORTICULTURE AND GARDENING –II

Unit	Title	Learning Points	No of Lectures
1	**LANDSCAPE CONSTRUCTION AND MAINTENANCE**	**Landscape Construction Techniques** ● Site analysis and survey ● Earthwork and grading techniques ● Installation of irrigation and lighting systems **Maintenance of Landscapes** ● Lawn care: Mowing, fertilization, pest management ● Pruning, deadheading, and plant care practices ● Seasonal upkeep and renovation of gardens **Diseases and pests** Fungal – Powdery mildew ,Rust ,Wilt, Blight, Smut, Bacterial – Canker ,Wilt Viral – Leaf curl ,yellow vein Mosaic Insects – Sucking, Biting, Chewing, Borers & Ants . Non Insects pests- Nematodes, Rodents.	**15**
2	**LANDSCAPE PLANNING AND DESIGNING PROJECTS**	**Garden Layout and Design** ● Reading and creating landscape plans ● Computer-aided design (CAD) software for landscaping **Thematic Garden Designs** ● Types: Japanese, Mughal, Persian, Zen gardens ● Cultural and aesthetic considerations **Case Studies and Field Visits** ● Analysis of existing gardens/parks ● Documentation and presentation of findings	**15**
3	**RESEARCH AND TRENDS IN LANDSCAPE GARDENING**	**Advances in Landscape Architecture** ● Role of technology in landscape gardening ● Innovations in materials and methods **Emerging Trends** ● Edible landscaping ● Therapeutic and sensory gardens	**15**

		● Wildlife-friendly landscaping **Research Methodology in Landscape Studies** ● Designing experiments and surveys ● Data collection and analysis ● Reporting and presentation	

Learning Resources recommended:

- Basic Horticulture - Jitendra singh (First edition) Kalyani publication,2008.
- Propagation practices - M K Sadhu,New age international,1989.
- Floriculture in India - G S Randhawa and A. Mukhopadhyan ,Allied publishers private limited,2015.
- Indoor gardening - S C Dey,Agrobios (india),2003.
- Plant propagation and nursery management -Dr. Arun kumar singh,Arun kumar,S k Kataria and sons publication,2023.
- Instant horticulture- S N Gupta,Jain Brothers,2023.
- Introductory ornamental horticulture and landscape gardening,Rajneesh Singh,Bijendra Kumar Singh,Bio green Books,2020
- Basics of horticulture - K.V.Peter,New India Publishing Agency (NIPA),2021.
- A handbook of Landscape: CPWD
- Horticulture in India: D. C. Bansil
- Complete gardening in India: Gopalaswamiengar
- Floriculture in India: G. S. Randhawa
- Handbook of Agriculture: ICAR
- Ornamental gardening in India: Misra
- Home gardening: P. P. Trivedi
- Horticulture Nursery Management: YCMOU

Teaching Plan:			
Unit No.	**Unit Title**	**Teaching Methods**	**No. of Lectures**
1	**HORTICULTURE PRODUCE**	**Presentation, Chalk and talk**	**10**

2	**POST HARVEST TECHNOLOGY & ENTREPRENEUR- – SHIP IN HORTICULTURE**	**Presentation, Chalk and talk**	**10**
3	**MANURES, FERTILIZERS AND DISEASES**	**Presentation, Chalk and talk**	**10**

Evaluation Pattern

A. Continuous Internal Evaluation: Maximum Marks:20

Method	Marks
Class test	**10**
Assignment	**10**

B. Semester End Examination: Maximum Marks: 30

Question No. and Sub questions	Unit and sub unit (with number and title)	Type of Question	Marks
1 A	**I**	**Long answer questions (Any 1 out of 2)**	**06**
1 B	**I**	**Answer in brief (Any 1 out of 2)**	**04**
2 A	**II**	**Long answer questions (Any 1 out of 2)**	**06**
2 B	**II**	**Answer in brief (Any 1 out of 2)**	**04**
3 A	**III**	**Long answer questions (Any 1 out of 2)**	**06**
3 B	**III**	**Answer in brief (Any 1 out of 2)**	**04**

Name of the Course	Horticulture and Gardening II Practical
Course Code	USBOE609

Class	T. Y. B. Sc.
Semester	06
No of Credits	2
Nature	Practical
Type	Core

Course Outcomes:

Students will be able to

CO1: Prepare garden plan .

CO2: Identify the plant suitable for garden location.

CO3: Understand methods of propagation.make flower arrangements of different types.

CO4: Get acquainted with different diseases and pests of horticulture plants .

CO5: Able to prepare different natural insecticides.

Semester VI 25_USBOE609 **PRACTICAL**		**L30**	**Cr.2**
1.	Types of Bonsai and technique		

2.	Determination of Soil texture properties (temp, pH and texture)		
3.	Demonstration of Vermi-composting and Bio-composting		
4.	Study types of weeds and its management in Garden 1. *Cynadon dactylon* 2. *Oxalis corniculta* 3. *Pepromia pellucida* 4. *Portulaca oleracea* 5. *Mimosa pudica* 6. *Phyllanthus amarus* 7. *Celosia argentia* 8. *Euphorbia hirta* 9. *Boerhavia diffusa* 10. *Alternanthera sessilies*		
5.	Flower arrangment and Ikebana		
6.	Kokodama		
7.	Designing of Tray Landscape and Designing of Terrarium		
8.	Reading of CAD Drawings		
9.	Case study based on landscape design		
10.	**Project** – Each student should individually present a project related to any topic related to Landscape Gardening.It should be duly certified and presented at the time of practical examination. Project presentation at college level is compulsory.		

Learning resources recommended :

- Basic Horticulture - Jitendra singh (First edition), Kalyani publication
- Propagation practices - M K Sadhu,New age international publication,2008.

- Floriculture in India - G S Randhawa and A. Mukhopadhya ,Allied publishers private limited,2015.
- Textbook of Horticulture - K. Manibhushan Rao , Laxmi Publications Pvt Ltd,2021.
- Horticulture-Principles and Practices - George Acquaah ,Prentice Hall India Learning Private Limited, 2009.
- Instant Horticulture- S.N. Gupta,21st Edition, ,Jain Brothers Publication,2023
- Introduction to Horticulture - Kumar N, CBS Publisher and distributors Pvt.Ltd.2020.

Semester VI 25_USBOE609

Duration : 2 Hours
Time : **Max Marks: 30**

Q.1	Prepare an appropriate garden plan for the given area **A**. Suggest at least 2 names for each location.	06
Q.2	Use the given materials **B** to make a Bonsai	08
Q.3	Use the given materials **C** to make a Bottle Garden / Terrarium /Kokodama	08
Q.4	Use the given material **D** to create a flower arrangement - Ikebana	08

Key:-

A- Garden plan

B- Bonsai

C – Bottle Garden / Terrarium /Kokodama

D - Ikebana

Evaluation Pattern

Internal Evaluation: Practical course

Total marks 20

Continuous internal evaluation: 10 marks per paper

Each practical will have 10 marks as continuous internal evaluation. the distribution of 10 marks is as follows:
02 marks : attendance
06 marks: methodology
02 marks: analysis and result
The total marks of all practicals will be converted to 10 at the end of semester.
Internal Evaluation Test: 10 marks per paper

Semester End Evaluation (Practical exam Pattern)

Practical Paper :30 marks

Practical Paper- Applied component (Horticulture and gardening) II:

Question No	Unit	Marks
1	Garden plan	**06**
2	Bonsai	**08**
3	Bottle Garden / Terrarium /Kokodama	**08**
4	Ikebana	**08**

Scheme of Practical examination:

1. One Practical exam for OE at the end of semester consisting of practical : 30 marks,
2. One short field visit for the horticulture institute/ horticulture unit/Industry.
3. Field work of not less than eight hours' duration is equivalent to one period per week for a batch of 15 students.

4. A candidate will be allowed to appear for the practical examinations if he/she submits a certified journal of T.Y.B.Sc. OE(Horticulture and Gardening) or a certificate from the Head of the department / Institute to the effect that the candidate has completed the practical course of T.Y.B.Sc. OE as per the minimum requirements.
5. In case of loss of journal, a candidate must produce a certificate from the Head of the department /Institute that the practicals for the academic year were completed by the student. However, such a candidate will be allowed to appear for the practical examination, but the marks allotted for the journal will not be granted.
6. HOD's decision, in consultation with the Principal, shall remain final and abiding to all.

R. P. Gogate College of Arts and Science and R. V. Jogalekar College of Commerce (Autonomous) Ratnagiri
Board of Studies in Botany
Syllabus for T. Y. B. Sc. Botany effective from the year 2023-24

Scheme of Practical examination:

1. Two Practical exams for botany at the end of semester consisting of practical I: 30 marks, Practical II-30 marks passing combined out of 60 and Practical III-30 marks, Practical IV-30 marks passing combined out of 60.
2. Two short field excursions for habitat studies are compulsory.
3. Field work of not less than eight hours' duration is equivalent to one period per week for a batch of 15 students.
4. A candidate will be allowed to appear for the practical examinations if he/she submits a certified journal of T.Y.B.Sc. Botany or a certificate from the Head of the department / Institute to the effect that the candidate has completed the practical course of T.Y.B.Sc. Botany as per the minimum requirements.
5. In case of loss of journal, a candidate must produce a certificate from the Head of the department /Institute that the practicals for the academic year were completed by the student. However, such a candidate will be allowed to appear for the practical examination, but the marks allotted for the journal will not be granted.
6. HOD's decision, in consultation with the Principal, shall remain final and abiding to all.

Date: 16/04/24
Place: Ratnagiri

Signature
Chairperson and HoD

Subject code : 25_USBOE506 & 25_USBOE507
25_USBOE606 & 25_USBOE607

R. P. Gogate College of Arts and Science
And
R. V. Jogalekar College of Commerce (Autonomous), Ratnagiri.

Syllabus for T.Y.B.Sc. (CBCS)

Semester : V & VI

Program : B.Sc. Course Botany

Course Name: VSC Basic Skills in Botany

Under Choice Based Credit System (CBCS)
To be implemented from
Academic Year- 2025-2026

NEP structure T.Y.B.Sc. Botany (To be implemented from 25-26)

Format for Submission of Curriculum to BoS
Vocational skill course I (VSC I)

Name of Programme	**B. Sc.**
Level	UG
No of Semesters	06
Year of Implementation	2025 -26
Programme Specific Outcomes (PSO)	1. Provides in-depth knowledge of coastal and marine ecosystems. 2. Focuses on mangroves, marine algae, and bioremediation techniques. 3. Covers the definition, distribution, and ecological significance of Indian mangroves (East and West coasts). 4. Explains the salient features of major mangrove plant families: Rhizophoraceae Sonneratiaceae Avicenniaceae Acanthaceae 5. Imparts knowledge about natural and artificial regeneration methods in mangroves. 6. Introduces marine algal research in India and the role of key research centres. 7. Explores bioremediation: principles, microbial populations, and influencing factors. 8. Teaches phytoremediation techniques for treating metal and organic pollutants using plants.
Relevance of PSOs to the local, regional, national, and global developmental needs (200 words)	● The PSOs align with local and regional environmental conservation efforts, especially in coastal zones vulnerable to climate change and pollution. ● Nationally, they support India's commitment to biodiversity conservation and sustainable development goals (SDGs). ● Globally, they contribute to the understanding of blue carbon ecosystems, marine pollution control, and climate resilience. ● This knowledge base is essential for careers in environmental science, marine biology, and sustainable coastal development.

Name of the Course	Basic Skills in Botany
Course Code	25_USBOV510
Class	T. Y. B. Sc.
Semester	05
No of Credits	02
Nature	Theory
Type	Core

Course outcomes:

Students will be able to

CO1: Understand the concept and biogeography of mangroves in India.
CO2: Identify and describe key mangrove plant families.
CO3: Comprehend regeneration mechanisms in mangrove ecosystems
CO4: Gain knowledge about marine algal research in India.
CO5: Explore mangrove research infrastructure and contributions in India.
CO6: Explain the principles and processes of bioremediation.
CO7: Understand phytoremediation and its application in pollution control.

Unit	Title	25_USBOV510 Learning Points	No of Lectures
1	**Biodiversity of Mangroves**	• Definition of 'Mangrove", distribution- biogeography of Indian Mangroves, east and west coast mangroves and Mangrove forests. • Salient features of important mangrove families such as Rhizophoraceae, Sonneratiaceae, Avicenniaceae, and Acanthaceae.	**10**
2	**Mangroves-Regeneration, Research in India**	• **Regeneration in Mangroves** – methods of natural and artificial regeneration in mangroves. • **Marine Algal Research in India** :- Important Research centres in India and their work. • **Mangrove Research in India** :- Major research centres in India and their contribution.	**10**
3	**Environmental Botany**	• **Bioremediation**: Principles, factors responsible and microbial population in bioremediation. • **Phytoremediation**: Metals and Organic Pollutants	**10**

References :-

1. Chapman VJ (1976). Coastal Vegetation. Iind edition.Pergamon Press. New York.
2. Desikachary, T.V. (1975). Marine Plants. N.C.E.R.T. New Delhi.
3. Kumar H.D. Introduction to Phycology.
4. Ranade, D. R. and Gadre, R.V. (1988). Microbial Aspects of Anaerobic Digestion. Laboratory Manual. M.A.C.S. Pune.
5. Sambamurthy, A.V.S.S.(2005). A Text Book of Algae.
6. Sen Neera and Kumudranjan Naskar, (2003). Algal Flora of Sunderbans.
7. Sharma O. P. (1986) A Text Book of Algae Tata McGraw Hill Publication Publications
8. Stein, J.R.(1973). Handbook of Phycological Methods. Cambridge University Press.
9. Vashishta, B.R.(1995). Algae. S. Chand and Co.Ltd. New Delhi.
10. Chapman, V.J. (1976) : Coastal Vegetation. IInd edition. Pergamon Press. New York.
11. Ring, M. (1982) : The biology of Marine Plants. Edward Arnold Publishers, London.
12. Lobban, C.S. and Harrison, P.J. (1985) : Seaweed Ecology and Physiology. Cambridge University Press.
13. Stein, J.R. (1973) : Handbook of Phycology and Biochemistry.
14. Stewart, W.D. (1974) : Algal Physiology and Biochemistry.
15. Waisel,Y. (1972) : Biology of Halophytes. Academic Pres, London and New York.

Name of the Course	Basic Skills in Botany Practical
Course Code	25_USBOV511
Class	T. Y. B. Sc.
Semester	05
No of Credits	02
Nature	Practical
Type	VSC

	Semester V 25_USBOV511	L.	Cr.
Sr. No.		30	1
1.	Type study of mangroves from Rhizophoraceae.		
2.	Type study of mangroves from Sonneratiaceae.		
3.	Type study of mangroves from Avicenniaceae.		
4.	Type study of mangroves from Acanthaceae.		
5.	Estimation of proline from saline and non-saline species.		
6.	Estimation of tannins from bark/stems of different mangroves		
7.	Estimation of the following in given water sample • Dissolved oxygen demand • Biological oxygen demand • Salinity and Chlorinity		

Evaluation Pattern

Internal Evaluation: Practical course

Total marks 40

Continuous internal evaluation: 10 marks per paper

Each practical will have 05 marks as continuous internal evaluation. The distribution of 05 marks is as follows:

01 mark: attendance, 02 marks: methodology, 02 marks: analysis and result

The total marks of all practicals will be converted to 05 at the end of semester.

Additionally for practical paper I Journal will carry 05 marks

Internal Evaluation Test: 10 marks

Semester End Evaluation Vocational Skill Course **exam Pattern)**

Practical Paper I:30 marks

a. Practical Vocational Skill Course:

Question No	Unit	Marks
1	Type study of mangroves from Rhizophoraceae, Avicenniaceae, Sonneratiaceae and Acanthaceae.	**10**
2	Estimation of proline from saline and non-saline species. Estimation of tannins from bark/stems of different mangroves	**10**
3	Estimation of the following in given water sample • Dissolved oxygen demand • Biological oxygen demand • Salinity and Chlorinity	**10**

T.Y.B.SC. BOTANY SEMESTER V (25_USBOV511)

Practical Paper – VSC

Duration: 9:00 am to 11:00 am **Max. Marks:30**

Q.1	Type study of mangroves from specimen 'A'	**10**
Q.2	Perform the experiment 'B' allotted to you.	**10**
Q.3	Perform the experiment 'C' allotted to you.	**10**

KEY

A- Rhizophoraceae/ Avicenniaceae /Sonneratiaceae/Acanthaceae.
B- proline from saline and non-saline species/tannins from bark/stems of different mangroves
C- Dissolved oxygen demand/Biological oxygen demand/ Salinity and Chlorinity.

Name of the Course	Basic Skills in Botany
Course Code	25_USBOV610

Class	T. Y. B. Sc.
Semester	06
No of Credits	02
Nature	Theory
Type	Core

Course outcomes:

Students will be able to

CO1: Understand the various types, sources, and impacts of marine pollution.
CO2: Evaluate the importance and strategies for mangrove ecosystem conservation.
CO3: Learn methods for collection and preservation of marine algae.
CO4: Gain insights into commercial seaweed cultivation practices.
CO5: Explore the diverse applications and economic importance of seaweeds.

Unit	Title	Learning Points SEM VI 25_USBOV610	No of Lectures
1	**Marine Pollution & Conservation**	• Marine Pollution; types, sources and impact. Toxic metal pollution, oil, sewage, pesticide, radioactive pollution and effect of waste disposal on marine ecosystem.	**10**

	of Mangrove Ecosystem	• Conservation of mangrove ecosystem; need for conservation, human impact, role of global institutions and NGO's in India.	
2	**Collection, Cultivation, Applications and Uses**	Methods of Collection and Preservation of Marine Algae– Collection, chemical preservation, herbarium technique, storage of specimens. Commercial Cultivation of Seaweeds; Traditional and recent methods.	**10**
3	**Utilization of Marine Algae**	Utilization of Seaweeds, species used as food and fodder, application to soil as a fertilizer or manure, medicinal uses, source for iodine. Industrial application of seaweeds.	**10**

References:-

1. Riley,J.P.and Chester,R (1981).Introduction to marine chemistry,.
2. Daves,C.J.(1985). Marine Botany, Physiology and Ecology of Seaweeds.
3. Dawson (1960) Marine Botany.
4. Lobban,C.S. and Harrison,P.J. (1985) Seaweed ecology and physiology. Cambridge University Press.
5. Naskar, Kumundrajan and Rathindranath Mandal (1999). Ecology and Biodiversity of Indian Mangroves.
6. Pandey,B.P, (1994) Algae S. Chand New Delhi.
7. Bhosale,L.J.(2005). Mangroves of Maharashtra. (Field Guide). Shivaji University, Kolhapur.
8. Krishnamurthy,V.(1985). Marine Plants, (A.G. Untawale, Asso. Editor), Seaweed research and Utilization Association, Madras.
9. Tein,J.R.(1973). Handbook of Phycological Methods. Cambridge University Press.
10. Stoemer,E.F. and Smol, J.P. The Diatoms. Applications for Environment and Earth Sciences.
11. Swaminathan,M.S. Research Foundation (2003). Bioresources Status in Selected Coastal Location. National Bioresource Development Board(Dept of Biotechnology) Govt. of India.

Name of the Course	Basic Skills in Botany Practical
Course Code	25_USBOV611
Class	T. Y. B. Sc.
Semester	06

No of Credits	02
Nature	Practicals
Type	Core

	Semester VI 25_USBOV611	**L.**	**Cr**.
Sr. No.		30	1
1.	Estimation of pigments from marine algae – chl *a,b,c,d*, carotenoids, phycobilins.		
2.	Estimation of total carbohydrates from marine algae.		
3.	Determination of BOD of polluted sea water.		
4.	Study of salt glands and trichomes in mangroves.		
5.	Study of herbarium technique in marine algae.		
6.	Identification of Mangroves.		

Evaluation Pattern

Internal Evaluation: Practical course

Total marks 40

Continuous internal evaluation: 10 marks per paper
Each practical will have 05 marks as continuous internal evaluation. The distribution of 05 marks is as follows:
01 mark: attendance, 02 marks: methodology, 02 marks: analysis and result
The total marks of all practicals will be converted to 05 at the end of semester.
Additionally for practical paper I Journal will carry 05 marks
Internal Evaluation Test: 10 marks

Semester End Evaluation Vocational Skill Course **exam Pattern)**

Practical Paper I:30 marks

b. Practical Vocational Skill Course:

Question No	Unit	Marks
1	Estimation of pigments from marine algae – chl a,b,c,d, carotenoids and phycobilins. Estimation of total carbohydrates from marine algae.	**10**
2	Determination of BOD of polluted sea water. Study of salt glands and trichomes in mangroves.	**10**
3	Study of herbarium technique in marine algae. Identification of Mangroves	**10**

T.Y.B.SC. BOTANY SEMESTER VI (25_USBOV611)

Practical Paper – VSC

Duration: 9:00 am to 11:00 am **Max. Marks:30**

Q.1	Perform the experiment **'A'** allotted to you.	**10**
Q.2	Perform the experiment **'B'** allotted to you.	**10**
Q.3	Identify and describe specimen **'C'** and **'D'**.	**10**

KEY

A- Pigments from marine algae – chl a,b,c,d, carotenoids and phycobilins./Estimation of total carbohydrates from marine algae.
B–BOD of polluted sea water./Study of salt glands and trichomes in mangroves.
C –Herbarium technique in marine algae./Identification of Mangroves.

T.Y.B.Sc.

(To be implemented from Academic Year- 2025-26)

Course Code	Semester V	Credits	Course Code	Semester V	Credits
Field Project			**On Job Training**		
25_USBOF512	Field Project	**04**	25_USBOJ612	On Job Training	**04**

Introduction:

Inclusion of On Job Training/ Field Project in the course curriculum of the B.Sc. programme is one of the ambitious aspects in the programme structure. The main objective of inclusion of On Job Training/ Field Project is to inculcate ability to interpret particular aspect of the study in his/ her own words.

Name of the Course	Field Project
Course Code (refer to student handbook)	25_USBOF512
Class	T.Y.B.Sc.
Semester	VI
No of Credits	4
Nature	Practical
Type (applicable to NEP only)	Field Project
Highlight revision specific to employability/ entrepreneurship/ skill development	It bridges the gap between theoretical knowledge and the practical requirements for doing any research. Projects often present unique challenges, fostering critical thinking and innovative solutions. They can develop specific technical skills, lab techniques. Successful project outcomes can be showcased in a portfolio, demonstrating competence to potential employers. Gaining exposure to practical skills can make students more knowledgeable and adaptable in job roles.

R.E. SOCIETY'S

R. P. GOGATE COLLEGE OF ARTS AND SCIENCE

&

R. V. JOGALEKAR COLLEGE OF COMMERCE (AUTONOMOUS), RATNAGIRI

Syllabus of Courses of B.A. /B.Com./B. Sc. Programme at

Semester III & V with Effect from the Academic Year 2025-2026

Field Project (FP)

Name of the Course	Field Project (FP)
Course Code	
Class	B.A./ B.Com./ B. Sc.
Semester	III and V
No of Credits	2 (Sem III; B. A. and B.Com.) 2 (Sem V; B. A. and B.Com.) 4 (Sem V; B. Sc.)
Nature	Practical
Type	Field Project (FP)

Guidelines and Evaluation pattern for Field Project (FP)

The field project is designed for undergraduate courses to give students the opportunity to participate in hands-on, field-based projects under faculty supervision. A field project allows students to apply their theoretical knowledge to real-world situations by conducting observations, surveys, interviews, and other activities outside the classroom. This experience

helps students gain practical skills and develop their communication, innovative thinking, and teamwork abilities.

Course Outcomes:

By the end of the course, students should be able to:

1. Enhance interpersonal skills by working in teams.
2. Improve written and verbal communication by preparing reports, presentations, and discussions on project findings.
3. Develop critical thinking through observations.
4. Apply theoretical concepts learned in the classroom to real-world situations in their respective fields.

Course Duration:

Learners have to work 60 hours (for 2-credits) in a semester for field Project OR

Learners have to work 120 hours (for 4-credits) in semester for field Project.

15 hours (for 2-credits) or 30 hours (for 4-credits) for classroom activities

- Project planning and preparation for the field project.
- Preparation of report etc.

45 hours (for 2-credits) or 90 hours (for 4-credits) for out-of-class activities

- Implement the planned fieldwork activities according to the project schedule.
- Collect data through interviews, surveys, observations, etc.

Project Report should be of minimum 20-40 pages or as per the guidelines of the concerned department.

Report Structure:

The students will be required to submit a comprehensive report at the end of the Field Project (FP). A project report has to be brief in content and must include the following aspects:

1. **Title Page:**

Mentioning the title of the FP, name of the student, programme, institution, month and year.

2. **Certificate of Completion:**
   A certificate issued by the supervisor appointed from the department confirming the successful completion of the FP.
3. **Acknowledgments:**
   Recognizing individuals or organizations that provided support, guidance during the FP.
4. **Table of Contents:**
   Providing a clear outline of the report's sections and page numbers.
5. **Introduction:**
   Background information about the FP and its significance. Objectives and scope of the project.
6. **Preparation for the FP:** Description of planning for data collection, such as interviews, survey etc.
7. **Field Visits and Observations:**
   Detailed accounts of the field visits, including locations, dates, and observations made during the visits. Photographs or visual aids to support the observations.
8. **Conclusion & Summary:**
   Summary of the key findings and outcomes of the FP. Reflections on the overall experience and learning during the project.

Broad guidelines for project report:

The field project report shall be prepared as per the broad guidelines given below**:**

- Font type and size: Times New Roman; size:12 for content and 14 for title; for Marathi kokil; size:16 for content and 18 for title; mangal; size:12 for content and 14 for title
- Line Space: 1.5 cm for content and 1 cm for in table work
- Paper Size: A4
- Margin: in Left-1.5cm, Up-Down-Right-1cm.

Assessment Pattern 30:20 / 60:40

Sr. No	Field Project work	Distribution of Marks
1	External: Field work and report	30 /60
2	Internal Evaluation	
	Presentation / Viva-Voce	20 /40

Sr. No.	***Subjects for Field Project***
1	Analyze pH, heavy metals, and pollutants in water.
2	Analyze pH, heavy metals, and pollutants in soil.
3	Extract and analyze dyes from plants for eco-friendly alternatives.
4	Check for contaminants in milk, spices, or vegetables.
5	Study pollutants in urban and rural environments.
6	Study the impact of climate change on local biodiversity.
7	Document traditional uses of medicinal plants in a local area.
8	Identify and analyze medicinal properties of local plants.
9	Study how air/water pollution affects plant health.
10	Study bird diversity in different habitats.
11	Study how artificial light affects animal behavior.
12	Investigate how plastics affect marine life.
13	Compare different solar panel materials.
14	Measure noise pollution levels in different city zones.
15	Identify bacteria in drinking and wastewater.
16	Investigate how different microbes affect fermentation.
17	Analyze microbes in soil samples and their role in plant health.
18	Develop and test biodegradable plastic.
19	Develop a simple AI model for real-time traffic analysis.
20	Collect and analyze folk songs, stories, or riddles from rural areas.
21	Analyze how youth use Marathi online.
22	Translate a short Marathi literary work into another language and analyze the process.
23	Document and interpret ancient Sanskrit inscriptions.
24	Conduct surveys on use of languages in schools and colleges.
25	Comparison of Sanskrit Grammar with Other Languages – Study similarities with Hindi, Marathi, or English.
26	Visit archives and analyze ancient Sanskrit manuscripts.
27	Study the impact of digital media on Hindi journalism.
28	Assess how education impacts career opportunities in different communities.
29	Study and document historical buildings.
30	Compare price variations of essential commodities in different areas.
31	Study how online shopping affects small shops.
32	Assess how well small business owners manage finances.
33	Study how the introduction of GST has affected pricing and profits.
34	Compare the use of Tally, QuickBooks, and SAP in small and medium enterprises.
35	Analyze how students save and invest money.
36	Study the adoption of UPI, Paytm, and other digital payment methods.
37	Consumer Behavior Towards Online vs. Offline Shopping – Compare why people prefer one over the other.
38	Analyze why people stick to specific brands (e.g., Apple vs. Samsung).
39	Study how packaging influences product perception.
40	Any other subjects of your choice and get it approved by the field project guide

Format for the report

Title page

Title of the Field Project

A Project Submitted

To

R. P. Gogate college of Arts & Science and
R.V. Jogalekar College of Commerce (Autonomous), Ratnagiri

under

University of Mumbai

S. Y./ T. Y B. A./ B. Com./ B. Sc.

Semester III/V

Name of the student

Name of the supervisor
Gogate Jogalekar College (Autonomous), Ratnagiri

Month and Year

On separate page

R. P. Gogate College of Arts and Science and
R. V. Jogalekar College of Commerce (Autonomous), Ratnagiri
Certificate

This is to certify that [Student's Full Name] [Student's Roll Number], has successfully completed field project entitled, "_____" under my supervision.

I further certify that the entire work has been done by the learner under my guidance and that no part of it has been submitted previously for any Degree or Diploma of any University.

It is her/his own work and facts reported by her/his personal findings and investigations.

Name and Signature of supervisor

Date of submission:

On separate page

Acknowledgment

(Model structure of the acknowledgement)

I thank the R. P. Gogate college of Arts & Science and R.V. Jogalekar College of Commerce (Autonomous), Ratnagiri & University of Mumbai for giving me opportunity to do this Field Project.

I would like to thank my Principal, Prof. Dr M. R. Sakhalkar for providing the necessary facilities required for completion of this project.

I take this opportunity to thank our Vice Principal _____ and Head of the department

_____, for his/her moral support and guidance.

I would also like to express my sincere gratitude towards my project supervisor _____whose guidance and care made the project successful.

I would like to thank my College Library, for having provided various reference books and magazines related to my project.

Lastly, I would like to thank each and every person who directly or indirectly helped me in the completion of the project especially my Parents and Peers who supported me throughout my project.

[Name of the learners]

R.E. Society's
R. P. Gogate College of Arts and Science and R. V. Jogalekar College of Commerce, Ratnagiri (Autonomous)

Name of the Course	On Job Training
Course Code	
Class	UG
Semester	VI
No of Credits	4
Nature	Practical
Type	On Job Training
Relevance with Employability/ Entrepreneurship/ Skill development	On the job training provides learner with the opportunity to acquire hands on experience and practical skills required for specific job roles. It bridges the gap between theoretical knowledge and the practical requirements of the job. Learner can gain valuable insights into the industry practice, company culture, this experience makes them confident and competent candidate when applying for the position increasing the employability prospects. OJT is instrumental in skill development as it focuses on practical job specific competencies like technical skills, soft skills. Overall OJT enhances employability, foster entrepreneurship by providing valuable exposure in various field.

Guidelines and Evaluation pattern for On Job Training
(100 Marks)

Introduction:
Inclusion of On Job Training in the course curriculum of the PG and UG programme is one of the ambitious aspects in the programme structure. The main objective of inclusion of On Job Training is to inculcate ability to interpret particular aspect of the study in his/ her own words.

Guidelines for On Job Training:
Students will be required to undertake a designated project or tasks in an organization or industry relevant to their field of study. The course aims to provide students with practical exposure and hands-on experience in a professional work environment related to their field of study.

Course Objectives:

By the end of the course, students should be able to:

1. Gain exposure to real-world insights and apply theoretical knowledge to practical situations
2. Enhance skills regarding problem-solving, decision-making, and communication skills.
3. Understand organizational dynamics and work culture.
4. Build industry connections and networking opportunities.

Course Duration:

Minimum **120 hours** of On Job Training with an Organization /Private firm.

- The theme of the OJT should be based on any study area of the Major course.
- Project Report should be of minimum 30 pages.
- Experience Certificate is Mandatory.

Report Structure:

The students will be required to submit a comprehensive report at the end of the On-the-Job Training. A project report has to be brief in content and must include the following aspects:

a) **Title Page:**
   Mentioning the title of the report, name of the student, program, institution, and the period of training.
b) **Certificate of Completion:**
   A certificate issued by the organization or supervisor confirming the successful completion of the training.
c) **Declaration:**
   A statement by the student declaring that the report is their original work and acknowledging any assistance or references used.
d) **Acknowledgments:**
   Recognizing individuals or organizations that provided support, guidance, or resources during the training.
e) **Table of Contents:**
   Providing a clear outline of the report's sections and page numbers.
f) **Executive Summary:**
   A bird’s eye view of your entire presentation has to be precisely offered under this category.
g) **Introduction on the Company:**
   A concise representation of company/ organization defining its scope, products/ services and its SWOT analysis.
h) **Your Role in the Organization during the On Job Training:**

The key aspects handled, the department under which you were deployed and brief Summary report duly acknowledged by the reporting head.

i) **Challenges and overcoming of challenges:**
The challenges confronted while churning out theoretical knowledge into practical world.

j) **Conclusion:**
A brief overview of your experience and suggestions to bridge the gap between theory and practice.

k) **Appendix:**
1.1 Appendix I: OJT Undertaking
1.2 Appendix II: Draft Resume Template
1.3 Appendix III: Organization Outreach Letter
1.4 Appendix IV(A/B): A) Relieving Letter of Student (for fulltime OJT) B)Relieving Letter of Student (for parttime OJT)
1.5 Appendix V**:** Relieving Letter of Student from organization
1.6 Appendix VI: Student Diary (Log) Recording Format
1.7 Appendix VII: Attendance Sheet
1.8 Appendix VIII: Supervisor Evaluation of Intern
1.9 Appendix IX: Student Feedback of OJT
1.10 Appendix X: Performance for Evaluation of OJT by Institute

Broad guidelines for project report:

The project report based on On Job Training shall be prepared as per the broad guidelines given below**:**

- Font type: Times New Roman / for Marathi kokil (Font size :16)/ mangal (Font size :12)
- Font size: 12-For content, 14-for Title
- Line Space: 1.5-for content and 1-for in table work
- Paper Size: A4
- Margin: in Left-1.5, Up-Down-Right-1
- The Project Report shall be bounded.

Course Outcomes:

1. Apply theoretical knowledge and concepts acquired during the academic program to real-world work scenarios.
2. Develop practical skills and competencies necessary for successful professional engagement.
3. Demonstrate effective problem-solving, decision-making, and critical thinking abilities in a work environment.
4. Adapt to and navigate organizational dynamics and work culture in the chosen industry.
5. Prepare a comprehensive report documenting the training/project experience, findings, and recommendations.

Rubric for Evaluation of 'On the Job Training' Project

Criteria	Marks	Description
Project Report (60 Marks)		
a) Title Page	02	Properly formatted with title, student name, program, institution, and training period.
b) Certificate of Completion	05	Inclusion of a valid certificate from the organization/supervisor.
c) Declaration	01	A clear statement of originality and acknowledgment of assistance.
d) Acknowledgments	02	Proper recognition of support and guidance received.
e) Table of Contents	05	Clear and accurate outline of the report's sections with page numbers.
f) Executive Summary	05	Concise overview of the entire presentation.
g) Introduction on the Company	05	Detailed representation of the company/organization including its scope, products, and services.
h) Role in the Organization	10	Comprehensive description of key aspects handled, department deployment, and summary report acknowledged by the reporting head.
i) Challenges and Overcoming Challenges	05	Insightful analysis of challenges faced and methods used to overcome them.
j) conclusion	05	Brief overview of the experience with suggestions to bridge the gap between theory and practice.
Appendix:		
Appendix I: OJT Undertaking	15	Mandatory inclusion
Appendix II: Draft Resume Template		Mandatory inclusion
Appendix III: Organization Outreach Letter		Mandatory inclusion
Appendix IV: Relieving Letter of Student		Mandatory inclusion
Appendix V: Student Diary (Log) Recording Format		Mandatory inclusion
Appendix VI: Attendance Sheet		Mandatory inclusion

Appendix VII: Supervisor Evaluation of Intern		Mandatory inclusion
Appendix VIII: Student Feedback of OJT		Mandatory inclusion
Appendix IX: Performance for Evaluation of OJT by Institute		Mandatory inclusion
Documentation and Presentation (40 Marks)		
Quality and effectiveness of presentation	10	Assesses the clarity, engagement, and overall impact of the presentation in conveying the report objectives and outcomes.
Depth of knowledge and demonstrated skills	10	Evaluates the understanding and practical application of key concepts, techniques, and skills relevant to the report.
Relevance of learning experience	05	Measures how well the training experience aligns with the trainee's career goals and the industry's practical requirements.
Practical applications	10	Assesses the trainee's ability to effectively apply learned skills and knowledge to real tasks and challenges during the training project.
Understanding of Organizational Dynamics	05	Insight into organizational structure, culture, and dynamics.
Total Marks	**100**	

Appendices

Appendix I: OJT Undertaking

1. Student Name:	
2. Class	
3. Roll No	
4. UID	
5. ABC ID	
6. Current Address	
7. Residence Address	
8. Email id	
9. Mobile Nos.	
10. Aadhar Number	
11. Mode of OJT	Online /Offline
I confirm that I agree with the terms, conditions, and requirements of the OJT Policy Student Signature: Date:	
I confirm that the student has attended the OJT orientation and has met all paperwork and process requirements to participate in the OJT program, and has received approval from his/her mentor. Sign of Department Faculty Coordinator Date:	

Appendix II: Draft Resume Template

Name:
Contact Number and Email ID:
Education:

(HEI / COLLEGE) Name: Year:
Degree:
Specialization:
SGPA:(PG SEMESTER I)
College Name: <bachelor's degree> Year:
Degree:
Specialization:
CGPA:
OJT / Work Experience – Yes / No

If YES
Organization: Year:
Project:
Brief:
Academic Experience:

Other Achievements and Personal Interests

- List other achievements also in reverse chronological order
- Leadership positions held outside of your formal work environment
- Personal interests and accomplishments that will distinguish you from other applicants
- Volunteer service/Social Work

Appendix III: Organization Outreach Letter

< (HEI) /College Name Letter Head>

To,

The (Manager, HR) .....

.....

Subject: Request for 120 hours OJT of Students pursuing < >

Dear Sir,

The college (HEI) name established in <year>, < (HEI /college name) >, Maharashtra reflects the vision of leading industrialists and educationalists. Institute is accredited with '< >' grade by NAAC in [Month year]. The HEI /college name has been recognized about it's over all academic excellence and infrastructure.

In view of the above, I request your good self to allow our following (no. of students) students for practical raining in your esteemed organization. Kindly accord your permission and give at least one-week time for students to join training after confirmation.

Sr. No.	Name	Roll no.	Year	Department

The resumes of these students are attached with this letter. If vacancies exist, kindly do plan for Interviews for the students in above branches.

A line of confirmation will be highly appreciated.

Yours sincerely,

Nodal Officer/TPO

< HEI /college name and Date>

Appendix IV: A) Relieving Letter of Student (for fulltime OJT)

< HEI /college name Letter Head>

To,

The General Manager (HR) .....

.....

Subject: Relieving letter of student

Dear Sir,

Kindly refer your letter/e-mail dated ----------on the above cited subject. As permitted by your good self the following students will undergo Industrial OJT in your esteemed organization under your sole guidance and direction.

Sr. No.	Name	Roll no.	Year	Department

This training being an essential part of the curriculum, the following guidelines have been prescribed in the curriculum for the training. You are therefore, requested to please issue following guidelines to the concerned student mentor.

- OJT schedule may be prepared and a copy of the same may be sent to us.
- Each student is required to prepare OJT diary and report.
- Kindly check the OJT diary of the student daily.
- Issue instruction regarding working hours during training and maintenance of the attendance record

You are requested to evaluate the student's performance on the basis of grading i.e. Excellent, Very Good, Satisfactory and Non-Satisfactory on the below mentioned factors:

- Attendance and general behavior
- Relation with workers and supervisors
- Initiative and efforts in learning
- Knowledge and skills improvement
- Contribution to the organization

The performance report may please be forwarded to the undersigned on completion of training in sealed envelope.

Your efforts in this regard will positively enhance knowledge and practical skills of the students, your cooperation will be highly appreciated, and we shall feel obliged.

The students will abide by the rules and regulation of the organization and will maintain a proper discipline with keen interest during their OJT. The students will report to you on dated _____along with a copy of this letter.

Yours sincerely,

Nodal Officer/TPO

< HEI /college name and Date>

Appendix IV: B) Relieving Letter of Student (for parttime OJT)

< HEI /college name Letter Head>

To,

The General Manager (HR) .....

.....

Subject: Relieving letter of student

Dear Sir,

Kindly refer your letter/e-mail dated ----------on the above cited subject. As permitted by your good self the following students will undergo Industrial OJT in your esteemed organization under your sole guidance and direction. The students will attend their OJT after completing their daily college work as part of their academic curriculum.

Sr. No.	Name	Roll no.	Year	Department

This training being an essential part of the curriculum, the following guidelines have been prescribed in the curriculum for the training. You are therefore, requested to please issue following guidelines to the concerned student mentor.

- OJT schedule may be prepared and a copy of the same may be sent to us.
- Each student is required to prepare OJT diary and report.
- Kindly check the OJT diary of the student daily.
- Issue instruction regarding working hours during training and maintenance of the attendance record

You are requested to evaluate the student's performance on the basis of grading i.e. Excellent, Very Good, Satisfactory and Non-Satisfactory on the below mentioned factors:

- Attendance and general behavior
- Relation with workers and supervisors
- Initiative and efforts in learning
- Knowledge and skills improvement
- Contribution to the organization

The performance report may please be forwarded to the undersigned on completion of training in sealed envelope.

Your efforts in this regard will positively enhance knowledge and practical skills of the students, your cooperation will be highly appreciated, and we shall feel obliged.

The students will abide by the rules and regulation of the organization and will maintain a proper discipline with keen interest during their OJT. The students will report to you on dated _____along with a copy of this letter.

Yours sincerely,

Nodal Officer/TPO

< HEI /college name and Date>

Appendix V: Relieving Letter of Student from organization

<Organization Letter Head>

To,
The Principal
[College Name]
[College Address]

Subject: Relieving Letter for Student

Dear Sir,

This is to certify that the following students from your esteemed institution have successfully completed their Industrial OJT in our organization as per the guidelines provided:

Sr. No.	Name	Roll no.	Year	Department

The students were under the supervision and guidance of our mentors and were engaged in various projects/tasks as part of their training. They have followed the rules and regulations of our organization and maintained a proper discipline throughout the OJT period.

Performance Evaluation:
The performance of the students has been evaluated based on the following criteria:

- Attendance and General Behavior
- Relation with Workers and Supervisors
- Initiative and Efforts in Learning
- Knowledge and Skills Improvement
- Contribution to the Organization

We have provided each student with feedback on their performance, which we hope will assist in their continued academic and professional growth. The detailed performance reports are enclosed in sealed envelopes for your reference.
We appreciate the opportunity to collaborate with your institution in providing practical exposure to the students and look forward to future engagements.

Yours sincerely,
[Signature]
[Name]
General Manager (HR)
[Company Name]
[Date]

Appendix VI: Student Diary (Log) Recording Format

Week (Dates during the week)	Task Assigned	Activities Performed	Key Learnings	Additional Remarks

Signature of Industry Supervisor

Appendix VII: Attendance Sheet

<Organization Letter Head>

Name & Address of Organization

_____
_____
_____

Name of the Student	
Roll Number	
Name of Course	
Date of Commencement of Training	
Date of Completion of Training	

Month and Year:

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

- Attendance Sheet should remain affixed in Daily Training Diary. Do not remove or tear it off.
- Holidays should be marked in Red Ink in attendance column. Absent should be marked as 'A' in Red Ink.

Name and Signature with date of OJT Supervisor _____

Appendix VIII: Supervisor Evaluation of Intern

<Organization Letter Head>

Student Name: _____ Date: _____

Work Supervisor: _____ Title: _____

Organization: _____

OJT Address: _____ Dates

of OJT: From _____To _____

Please evaluate intern by indicating the frequency with which you observed the following behaviours:

Parameters	Needs Improvement	Satisfactory	Good	Excellent
1. Behaviours				
2. Performs in a dependable manner				
3. Cooperates with co-workers and supervisors				
4. Shows interest in work				
5. Learns quickly				
6. Shows initiative				
7. Produces high quality work				
8. Accepts responsibility				
9. Accepts criticism				
10. Demonstrates organizational skills				
11. Uses technical knowledge and expertise				
12. Shows good judgment				
13. Demonstrates creativity/originality				
14. Analyzes problems effectively				
15. Is self-reliant				
16. Communicates well				
17. Writes effectively				
18. Has a professional attitude				
19. Gives a professional appearance				
20. Is punctual				
21. Uses time effectively				

Overall performance of student intern (circle one):
(Needs improvement / Satisfactory / Good / Excellent)
Additional comments, if any: _____
Signature of Industry supervisor: _____
Manager: _____

Appendix IX: Student Feedback of OJT

(To be filled by Students after OJT completion)

Student Name: _____ Date: _____
Industrial Supervisor: _____Title: _____
Supervisor Email: _____OJT is: ____Paid ____Unpaid_____
Organization: _____
OJT Address:_____
Faculty Coordinator: _____Department: _____
Dates of OJT: From _____ To _____

Give a brief description of your OJT work (title and tasks for which you were responsible): Was your OJT experience related to your major area of study?

- Yes, to a large degree
- Yes, to a slight degree
- No, not related at all

Indicate the degree to which you agree or disagree with the following statements.

This experience has:	Strongly Agree	Agree	No opinion	Disagree	Strongly Disagree
1. Given me the opportunity to explore a career field					
2. Allowed me to apply classroom theory to practice					
3. Helped me develop my decision-making and problem-solving skills					
4. Expanded my knowledge about the work world prior to permanent employment					
5. Helped me develop my written and oral communication skills					
6. Provided a chance to use leadership skills (influence others, develop ideas with others, stimulate decision-making and action)					
7. Expanded my sensitivity to the ethical implications of the work involved					
8. Made it possible for me to be more confident in new situations					
9. Given me a chance to improve my interpersonal skills					
10. Helped me learn to handle responsibility and use my time wisely					

11. Helped me discover new aspects of myself that I didn't know existed before					
12. Helped me develop new interests and abilities					
13. Helped me clarify my career goals					
14. Provided me with contacts which may lead to future employment					
15. Allowed me to acquire information and/ or use equipment not available at my Institute					

- In the Institute OJT program, faculty members are expected to be mentors for students. Do you feel that your faculty coordinator served such a function? Why or why not?

- How well were you able to accomplish the initial goals, tasks and new skills that were set down in your learning contract? In what ways were you able to take a new direction or expand beyond your contract? Why were some goals not accomplished adequately?
- In what areas did you most develop and improve?

- What has been the most significant accomplishment or satisfying moment of your OJT?

- What did you dislike about the OJT?

- Considering your overall experience, how would you rate this OJT? (Circle one).
- -Satisfactory/ Good/ Excellent

- Give suggestions as to how your OJT experience could have been improved. (Could you have handled added responsibility? Would you have liked more discussions with your professor concerning your OJT? Was closer supervision needed? Was more of an orientation required?)

<Signature of Student>
<Name, Roll number, Date>

Appendix X: Performa for Evaluation of OJT by Institute

< HEI /college name Letter Head>

1. Name of Student: _____
2. Mob. No.: _____
3. Roll No.: _____
4. Branch/Semester: _____
5. Period of Training: _____
6. Home Address with contact No. _____
7. Address of Training Site: _____
8. Address of Training Providing Agency: _____
9. Name/Designation of Training In- charge: _____
10. Type of Work: _____
11. Date of Evaluation: _____
12. Please rate the following: _____

Sr.no.	**Particular**	**Marks**
1	Project Report	60 Marks
2	Documentation and Presentation	40 Marks

Overall Marks: _____.

Additional Remarks:_____.

Signature of Faculty Mentor: _____

Format

1 st page (Main Page)

Title of the Report

a Project Submitted

To

R. P. Gogate college of Arts & Science and

R.V. Jogalekar College of Commerce, Ratnagiri (Autonomous)

Under

University of Mumbai

For partial completion of the degree

of

Master of Science/ Commerce/ Arts

Under the Faculty of Science/ Commerce/ Arts

By

Name of Student

Under the Guidance

of

Name of the Guiding Teacher

R. P. Gogate college of Arts & Science and

R.V. Jogalekar College of Commerce, Ratnagiri (Autonomous)

Near District Court

Month and Year

On separate page

Index

[Company/Institution Logo]

CERTIFICATE OF COMPLETION

This is to certify that [Student's Full Name] [Student's Roll Number], has successfully completed the Academic On-the-Job Training Programme at [Company/Institution Name]

This training covered a period of 120 hours, during which [he/she] actively participated and demonstrated excellent dedication and commitment to learning.

The following work was performed by [him/her]:

- [Brief description of the work performed during the training period]

This training has provided [him/her] with valuable insights and practical experience in [relevant field/industry]. [He/She] has exhibited commendable skills, enthusiasm, and a keen interest in learning.

Certifying Authority:

_____

[Name and

Designation]

[Company/Institutio

n Name] [Contact

Information] [Date]

[Seal/Signature]

On separate page

Declaration by learner

I the undersigned Miss/Mr. _____
[Name of the learner] here by, declare that work embodied in this project work titled _____forms my own contribution to project work carried out under the guidance of [Name of the guiding teacher]

I, here by further declare that all information of this document has been obtained and presented in accordance with academic rules and ethical conduct.

Name and Signature of the learner

Certified by
Name and signature of the Guiding Teacher

On separate page

Acknowledgment

(Model structure of the acknowledgement)

To list who all have helped me is difficult because they are so numerous and the depth is so enormous.

I would like to acknowledge the following as being idealistic channels and fresh dimensions in the completion of this project.

I thank the **R. P. Gogate college of Arts & Science and R.V. Jogalekar College of Commerce, Ratnagiri (Autonomous)** for giving me opportunity to do this project.

I would like to thank my Principal, Prof. Dr M.R. Sakhalkar Sir for providing the necessary facilities required for completion of this project.

I take this opportunity to thank our Coordinator (Name of VP or HOD) for his/her moral support and guidance.

I would also like to express my sincere gratitude towards my project guide
_____whose guidance and care made the project successful.

I would like to thank my College Library, for having provided various reference books and magazines related to my project.

Lastly, I would like to thank each and every person who directly or indirectly helped me in the completion of the project especially my Parents and Peers who supported me throughout my project.