SHIVAJI UNIVERSITY, KOLHAPUR.

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Accredited By NAAC

Revised Syllabus For

B. Sc. I Botany (DSC)

(Faculty of Science & Technology)

Paper –I, II - (Semester- I)

and

Paper -III, IV - (Semester-II)

NEP-2020 (2.0) Syllabus to be implemented from

June, 2024 onwards.

SHIVAJIUNIVERSITY,KOLHAPUR

NEP-2020 (2.0): Credit Framework for UG(B. Sc.) Programme under Faculty of Science and Technology

SEM (Level)	COURSES			OE	VSC/SEC	AEC/VEC/IKS	OJT/FP/CEP /CC/RP	Total Credits	Degree/Cum. Cr. MEME
	Course-1	**Course-2**	**Course-3**						
SEM I (4.5)	DSC-I(2) DSC-II (2) DSC P-I(2)	DSC-I(2) DSC-II (2) DSC P-I(2)	DSC-I(2) DSC-II (2) DSC P-I(2)	OE-1(2) (T/P)		IKS-I(2)		**22**	**UG Certificate 44**
SEM II (4.5)	DSC-III(2) DSC-IV (2) DSC P-II(2)	DSC-III(2) DSC-IV (2) DSC P-II(2)	DSC-III(2) DSC-IV (2) DSC P-II(2)	OE-2(2) (T/P)		VEC-I(2) (Democracy, Election and Constitution)		**22**	
Credits	**8(T)+4(P)=12**	**8(T)+4(P)=12**	**8(T)+4(P)=12**	**2+2=4 (T/P)**	**--**	**2+2=4**	**--**	**44**	**Exit Option:4 credits NSQF/Internship/Skill courses**

EQUIVALENCE IN ACCORDANCE WITH TITLES AND CONTENTS OFPAPERS- (FOR REVISED SYLLABUS)
(Introduced from June 2024 onwards)

Old Syllabus (Semester pattern)			**Revised Syllabus (Semester pattern)**	
Paper No.	**Title of Old Paper**	**Semester No**	**Paper No.**	**Title of New Paper**
I	Microbes, Algae and Biofertilizers	**I**	**DSC-I**	Phycology and Microbiology
II	Cell biology and Analytical Techniques	**I**	**DSC-II**	Biomolecules and Cell Biology
III	Mycology, Phyto pathologyand Mushroom Cultivation	**II**	**DSC-III**	Mycology and Phytopathology
I V	Archegoniate (Bryophytes, Pteridophytes and Gymnosperms)	**II**	**DSC-IV**	Archegoniate

13. SPECIAL INSTRUCTIONS, IF ANY. --- Nil

Semester- I

Botany Paper: DSC- I: Phycology and Microbiology

CREDIT: 2. LECTURE HOURS; 2 PER WEEK; MARKS: 50

MODULE	SUB-MODULE	TOPICS	LECTURE PERIOD
1	**Phycology**		
	1. Algae	i) General characteristics ii) Diversity with respect to habit and habitats iii) Economic importance iv) Classification (as per G. M. Smith, 1955) up to classes v)Life cycle (excluding developmental stages of sex organs) of the following types a) Cyanophyceae: *Nostoc* b) Chlorophyceae: *Spirogyra*	14
2	**Microbiology**		
	2.1 Viruses	i) Discovery and General characteristics ii) General structure of viruses: Helical, Icosahedral and Complex iii) Types of viruses- DNA viruses (T- Phage), RNA viruses (TMV) iv) Economic importance	08
	2.2 Bacteria	i) Discovery and General characteristics ii) Cell structure iii) Forms of bacteria based on shapes iv) Reproduction – vegetative, asexual and recombination (conjugation) vi) Economic importance	08
Total Lectures			**30**

SEMESTER –I

Botany Paper: DSC- II : Biomolecules and Cell Biology

CREDIT: 2. LECTURE HOURS; 2 PER WEEK; MARKS: 50

MODULE	SUB-MODULE	TOPICS	LECTURE PERIOD
1.	**Biomolecules**		
	1.1 Carbohydrates	Introduction**,** Nomenclature, classification and definition of Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides with one example	**04**
	1.2 Lipids	Introduction, Definition, Properties and Significance.	**03**
	1.3 Proteins	Introduction, Definition, Properties and Biological role of proteins.	**03**
	1.4 Nucleic acids	Introduction, Watson and Crick model of DNA, Types of RNA and Role of nucleic acids.	**05**
2.	**The cell**		
	2.1 Cell	Introduction, Structure of prokaryotic and eukaryotic cells.	**02**
	2.2 Cell wall and plasma membrane	Introduction, structure and function of Plant cell wall. Plasma membrane: fluid mosaic model.	**03**
	2.3 Cell division	Cell cycle, mitosis, meiosis and significance	**05**
	2.4. Cell Organelles	Structure and functions of Nucleus, Chloroplast, Mitochondria, Ribosomes, Peroxisomes, Glyoxisome	**05**
Total Lectures			**30**

SEMESTER –II
Botany Paper: DSC- III : Mycology and Phytopathology

CREDIT: 2. LECTURE HOURS; 2 PER WEEK; MARKS: 50

MODULE	SUB-MODULE	TOPICS	LECTURE PERIOD
1.	**Mycology**		
	1.1Fungi – A)	i) General characters of fungi ii) Classification of fungi up to class as per Ainsworth (1973). iii) Economic importance	**05**
	B)	Life cycle (excluding developmental stages of sex organs) of the following types- a) Zygomycotina: *Mucor* b) Ascomycotina: *Penicillium*	**10**
	1.2Lichens	i) Occurrence and General characters ii) Nature of association iii) Types of lichens (Crustose, Foliose and Fruticose) iv) Economic importance	**04**
2	**Phytopathology**		
	2.1 Concepts in Phytopathology	i) Introduction to phytopathology ii) Plant disease triangle components. iii) Koch's postulate iv) Terminology of plant Diseases - Localized, Systemic, Soil borne, Air borne, Seed borne, Endemic, Epidemic, Sporadic diseases. v) General symptoms of plant diseases- (Leaf spot, Blight, damping off, wilting, Dieback, Cankers, Chlorosis, Smut, Rust, Powdery mildew.	**06**
	2.2 Plant diseases	i) Study of following plant diseases with respect to symptoms and control measures- **a) Viral** – Yellow vein mosaic of Bhendi **b) Bacterial** – Citrus Canker **c) Fungal** – White rust of crucifers **d) Mycoplasma (MLO)-** Grassy shoot of sugarcane	**05**
Total Lectures			**30**

SEMESTER –II

Botany Paper: DSC- IV: Archegoniate

CREDIT: 2. LECTURE HOURS; 2 PER WEEK; MARKS: 50

MODULE	SUB-MODULE	TOPICS	LECTURE PERIOD
1.	**Archegoniate**		
	1.1 Bryophytes	i) General characters and importance ii) Diversity with respect to habitats iii) Classification as per G.M. Smith (1955) up to classes iv) Important features and life history (excluding developmental stages) of ***Funaria***	**10**
	1.2 Pteridophytes	i) General characters and importance ii)Classification as per G.M. Smith (1955) up to classes Morphology, anatomy (leaf and stem) and life cycle (excluding developmental stages sex organs) of ***Pteris***	**10**
	1.3 Gymnosperms	i) General characters and importance ii) Classification as per Sporne (1965) up to classes Important features and life history (excluding developmental stages) of ***Cycas***	**10**
Total Lectures			**30**

Nature of theory question paper and scheme of marking: Total 40 Marks/ Per paper

Q. 1. Multiple choices questions (8-questions). 8 Marks

Q. 2. Attempt any two of the following (out of three). 16 Marks

Q. 3. Write short notes any four of the following (out of six). 16 Marks

Follow the rules of Shivaji University Kolhapur regarding NEP-2020 syllabus and examination.

Semester I

Practical based on paper I and II (DSC-P I)

Total Marks 50

1. Study of compound and dissecting microscope.
2. Study of T-Phage and TMV viruses with the help of Electron microphotographs/models
3. Study of Bacterial forms (Temporary / permanent slides/ photographs).
4. Study of vegetative and reproductive structures of *Nostoc* and Spirogyra
5. Study of Qualitative tests for carbohydrates, lipids and proteins (Any two test of each)
6. Study of plant cell structure with the help of epidermal peel
7. Study of mitosis
8. Study of meiosis
9. Study of cell organelles with the help of microphotograph/model
10. Study the effect of organic solvent on permeability of plasma membrane.
11. Study the effect of temperature on the activity of peroxisome.
12. Botanical excursion.

Semester II

Practical based on paper III and IV (DSC-P II)

Total Marks 50

1. Study of *Mucor*
2. Study of *Penicillium*
3. Study of types of Lichens
4. Study of any four general symptoms on plant diseases (As per theory)
5. Study of bacterial plant disease – Citrus canker
6. Study of Viral plant disease – Yellow vein mosaic of Bhendi
7. Study of Mycoplasmal plant disease – Grassy Shoot of Sugarcane
8. Study of fungal plant disease – White rust of Crucifers
9. Study of vegetative and reproductive structures of *Funaria*
10. Study of vegetative and reproductive structures of *Pteris*
11. Study of vegetative and reproductive structures of *Cycas*
12. Submission of plant diseases.

Course Outcomes

CO1. Students will able to recognize the structure , types and multiplication of viruses.

CO2. Students will able to understand the bacterial types, structure and mode reproduction

CO3. Students will able to identify the different types of algae and their importance in day today life.

CO4. Students will able develop the skills for the production of different type of Bio fertilizers ,

CO5. Students will able to distinguish the prokaryotic and eukaryotic organisms and acquire the knowledge of different plant cell organelles and its role in the plant body.

CO6. Students will able to understand the different types of cell division and it's phases.

CO7. Students will able to handle all types of microscope.

CO8. Students will able to develop a skill in the chromatography techniques.

CO9. Students will able to identify and classify the different fungi and also realize the economic importance of fungi.

CO10. Students will able to identify the lichens on the basis of morphology and to know the medicinal value of the lichens.

CO11. Students will be able to recognize the different plant diseases and their management.

CO12. Students will able to develops the soft skill technique in the Mushroom Cultivation and realize the commercial status of the mushrooms.

CO13. Students will able to identify the bryophytes their importance.

CO14. Students will able to recognize the characters and ecological importance of pteridophytes.

CO15. Students will be able to identify, classify the gymnosperms and understand the Economic importance of gymnosperms.

List of Books Recommended for B. Sc. I Botany

Algae –

1. Introductory Phycology. Kumar, H. D. 1988, Affiliated East-West Press Ltd., New York.
2. Algae - Kumar H. D. and H. N. Singh (1991)
3. Algae - Sharma O. P. (1986)
4. Algae - Pandey B. P. (1994)
5. A Text book of Algae - Chopra G. L. (1969)
6. A Text book of Algae - Kumar H. D., Singh H. N. (1977)
7. A Text book of Botany - V. Singh, P. C. Pandey, Jain D. K. (1999)
8. A Text book of Botany Vol. I – Pandey S. N., S. P. Misra, P. S. Trivedi (1.982)
9. A Treatise on Algae - K. N. Bhatia (1980)

Fungi –

1. A Hand book of Lichens - D. D. Awasthi (2000)
2. An Introduction to Fungi - Dube H. C. (1990)
3. Morphology of Plants and Fungi --Blod, H.C., Aloxopoulos, G. J. and Delevoryas, T. 1980. (4th Edition) Harper and Foul Co., New York.
4. An Introduction to Fungi.--Dube, H. C. 1990. Vikas Publishing House Pvt. Ltd.,Delhi.
5. Cryptogamic Botany Vol. I & II (2nd Edition), Gilbert, M. S. 1985. Tata McgrawHill Publishing Co., Ltd New Delhi.
6. Fungi- Vashishtha B. R. (1996)
7. Fungi- Pandey B. P. (1994)
8. Introduction to Fungi - Sundrarajan (2001)

9. Introductory Mycology - C. J. Alexopoulos, C. W. Mims, M. Blackwell
10. Cryptogamic Botany Vol. I - Algae and Fungi - G. M. Smith (1974)
11. Plant diseases –Singh R. S. (1963).
12. Manual of plant pathology –Padoley S. K. & Mistry P. B.
13. Hand book of field crop diseases- Ny. Vall (1979).
14. Experiments in Microbiology, Plant pathology and Tissue culture- Aneja K. R. (1993).
15. Plant pathology- R. S. Mehrotra, (1980) Dean, Faculty of science, Kurkshetra University, Kurukshetra.
16. Plant Diseases- F.T. Brooks, periodical Expert book Agency, D-42, VivekVihar, Delhi 1100032.
17. Plant diseases –RajaniShrma, Campus books international, 4831/24 Prahlad Street, An sari Road, Daryaganj, New Dehli-110002.
18. Diseases of crop plant in India –Dr. Rangaswami.
19. Plant diseases –R.S. Singh
20. Modern plant pathology – R. S. Bilgrami and H. C. Dube.

Bryophytes –

1. Bryophytes. Puri, P. 1985. Amarm& Sons, Delhi.
2. College Botany - S. Sundararajan (1999)
3. College Botany Vol. I - Gangulee H. C., Das K. S. and Datta C. T. (1991)
4. College Botany Vol. II - Gangulee H. C., Kar A. K. (1999)
5. College Botany Vol. III -- S. K. Mukharji (1990)
6. Cryptogamic Botany Vol. I- G. M. Smith (1955)
7. Cryptogamic Botany: Bryophytes and Pteridophytes - Smith G. C. (1955)

Pteridophytes—

1. An Introduction to Pteridophytes - Rashid A. (1978)
2. An Introduction to Pteridophyta (Diversity and Differentiation) -A. Rashid (1976)
3. A Text book of Pteridophyte – S. N. Pandey, P. S. Trivedi, S. P. Misra (1995)
4. An Introduction to Embryophyta - Parihar N. S. (1961)
5. Morphology and Evolution of Vascular Plants Gifford, E. M. and Foster, A. S. 1989. W.H. Freeman & Co., New York.
6. Morphology of vascular Plant (lower groups) -- A. J. Eames.
7. Illustrated Manual of Ferns of Assam -S. K. Borthakur, P. Deka, K. K. Nath (2000)
8. Pteridophyta – Vascular Cryptogams - P. C. Vashishta (1972)
9. Botany for Degree Students- Pteridophyta (Vascular Cryptogams) - P. C. Vashishta, A. K. Sinha, Anil Kumar – S Chad –Multicolour Illustrative Revised Edition- 2006.

Gymnosperms –

1. Botany for Degree Students- Gymnosperms (Vascular Cryptogams) - P. C. Vashishta, A. K. Sinha, Anil Kumar – S Chad –Multicolour Illustrative Revised Edition- 2006.
2. The Morophology of Gymmosperms. -- Sporne, K. R. 1991. B. I. PublicationsPvt., Bombay, Calcutta, Delhi.
3. Morphology of Gymnosperms -- J. M. Coulter and C. J. Chamberlain.
4. Gymnosperms – Structure & Evolution.--C. J. Chamberlain
5. Morphology of Gymnosperms.--K. R. Sporne.

6. Gymnosperms- Vashishta P. C. (1976)
7. Gymnosperms- C. J. Chamberlein (1966)
8. Indian Gymnosperms in Time and Space - Ramanujan C. G. K. (1979)
9. Origin and Evolution of Gymnosperms - Ed Charles B. Beck (2002)
10. Phylogeny and form in the plant Kingdom - H. C. Dittmer (1964)

Cytology, Microbiology and Analytical Techniques-

1. Plant Cell Biology –Structure and function-Gunning B.E.S and Steer M.W. (1996).
2. Plant Cell Biology-A practical approach.-Harris N. and Oparka K. J. (1994). (IRL-Press of oxford University UK.).
3. Cell Biology- De. Robert et.al. (1982), (Publ. Sundar and Company).
4. Cell Biology –C. B. Powar (1992), Himalaya Publ. House, Delhi.
5. Plant Biochemistry-Cell-Sumps P.K. and Connie's. (1981).
6. Molecular Cell Biology-Albert's B. Bray D. Lewis J. Faff M. Robert K. & Watson J.D. (1999). (Publ. Garlands publishing co-In, New York U.S.A.)
7. Text Book of cell and molecular biology –Gupta P.K. (1999), Rastogi publication, Meerat.
8. Molecular and Cellular Biology-Wolfe S.L. (1993), Wadsworth publishing Company, California, U.S.A.
9. Applied Microbiology- Vinita Kale and Kishore Bhusari (2007) Himalaya Publishing House, Mumbai.
10. Virology- Saravanan P. MJP, Publishers, Chennai. 600005.
11. Chromatographic Methods- Stock, R. and C. B. F. Rince (1978).
12. Biological Techniques- Srivastava, H. S. (1999).