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Ismail Yusuf College of Arts, Science & Commerce,

Department: Botany Teaching Plan: Year-2018-19

Class: F.Y.B.Sc.

Sr. No.	Topics	Month	Faculty name
1.	Paper-I U-I Algae Structure, *Nostoc*.	June-July	NDS
2.	Paper-I U-II Fungi Structure	June-July	SS
3.	Paper-I U-III Bryophyta General characters of Hepaticae	June-July	NDS
4.	Paper-II U-I Cell biology General structure of plant cell: cell wall	June-July	AYS
5.	Paper-II U-II Ecology Energy pyramids	June-July	PS
6.	Paper-II U-III Genetics Phenotype/Genotype	June-July	SC
7.	Paper-I U-I Algae life cycle and systematic position of *Nostoc*	July-August	NDS
8.	Paper-I U-II Fungi life cycle and systematic position of *Rhizopus*	July-August	SS
9.	Paper-I U-III Bryophyta Structure of *Riccia*	July-August	NDS
10.	Paper-II U-I Cell biology General structure of plant cell: Plasma membrane	July-August	PS
11.	Paper-II U-II Ecology energy flow in an ecosystem.	July-August	SS
12.	Paper-II U-III Genetics Mendelian Genetics- monohybrid, dihybrid	July-August	SC
13.	Paper-I U-I Algae Structure of *Spirogyra*	August-September	NDS
14.	Paper-I U-II Fungi	August-September	SS

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	life cycle and systematic position of *Aspergillus*		
15.	Paper-I U-III Bryophyta Lifecycle of *Riccia*	August-September	NDS
16.	Paper-II U-I Cell biology Ultra-structure and functions of the Endoplasmic reticulum	August-September	PS
17.	Paper-II U-II Ecology Aquatic ecosystem	August-September	SS
18.	Paper-II U-III Genetics Test cross, back cross ratios	August-September	SC
19.	Paper-I U-I Algae Economic importance of algae	September-October	NDS
20.	Paper-I U-II Fungi Economic importance of fungi and mode of nutrition in fungi	September-October	SS
21.	Paper-I U-III Bryophyta Systematic position of *Riccia*	September-October	NDS
22.	Paper-II U-I Cell biology Ultra-structure and functions of the chloroplast	September-October	PS
23.	Paper-II U-II Ecology Terrestrial ecosystem	September-October	SS
24.	Paper-II U-III Genetics Epistatic, non-epistatic interactions, multiple alleles	September-October	SC

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Semester-II

Sr. no.	Topics	Months	Faculty name
1.	Paper-I U-I Pteridophytes General characters	November-December	SS
2.	Paper-I U-II Gymnosperms General characters	November-December	SC
3.	Paper-I U-III Angiosperms General characters	November-December	NDS
4.	Paper-II U-I Anatomy Simple tissues	November-December	AYS
5.	Paper-II U-II Physiology Photosynthesis: Light reaction	November-December	PS
6.	Paper-II U-III Medicinal botany Concept of primary and secondary metabolites	November-December	AKR
7.	Paper-I U-I Pteridophytes Lifecycle of *Nephrolepis*	December-January	SS
8.	Paper-I U-II Gymnosperms Lifecycle of *Cycas*	December-January	SC
9.	Paper-I U-III Angiosperms Leaf: simple leaf, types of compound leaves, Incisions of leaf, venation, phyllotaxy, types of stipules, leaf apex, leaf margin, leaf base, leaf shapes.	December-January	NDS
10.	Paper-II U-I Anatomy complex tissues	December-January	AYS
11.	Paper-II U-II Physiology Photosynthesis: photolysis of water	December-January	PS
12.	Paper-II U-III Medicinal botany difference between primary and secondary metabolites	December-January	AKR
13.	Paper-I U-I Pteridophytes systematic position of *Nephrolepis*	January-February	SS

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14.	Paper-I U-II Gymnosperms systematic position of *Cycas*	January-February	SC
15.	Paper-I U-III Angiosperms Modifications of leaf: spine, tendril, hooks, phyllode, pitcher, Drosera or insectivorous plants.	January-February	NDS
16.	Paper-II U-I Anatomy Primary structure of dicot and monocot root, stem and leaf.	January-February	AYS
17.	Paper-II U-II Physiology Photosynthesis: photophosphorylation	January-February	PS
18.	Paper-II U-III Medicinal botany Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Oscimum sanctum, Adathoda vasica*	January-February	AKR
19.	Paper-I U-I Pteridophytes alternation of generations in *Nephrolepis*	February-March	SS
20.	Paper-I U-II Gymnosperms alternation of generations in *Cycas*	February-March	SC
21.	Paper-I U-III Angiosperms Inflorescence: Racemose: simple raceme, spike, catkin, spadix, panicle. Cymose: monochasial, dichasial, polychasial. Compound: corymb, umbel, cyathium, capitulum, verticellaster, hypanthodium.	February-March	NDS
22.	Paper-II U-I Anatomy Epidermal tissue system: types of hair	February-March	AYS
23.	Paper-II U-II Physiology Photosynthesis; carbon fixation	February-March	PS

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	Phase C3 & C4 cycle		
24.	Paper-II U-III Medicinal botany Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Zinziber officinale, Curcuma longa*	February-March	AKR
25.	Paper-I U-I Pteridophytes Stelar evolution	March-April	SS
26.	Paper-I U-II Gymnosperms Economic importance of Gymnosperms	March-April	SC
27.	Paper-I U-III Angiosperms Study of following families: Malvaceae, Amaryllidaceae.	March-April	NDS
28.	Paper-II U-I Anatomy Epidermal tissue system: monocot and dicot stomata.	March-April	AYS
29.	Paper-II U-II Physiology Photosynthesis: CAM pathways	March-April	PS
30.	Paper-II U-III Medicinal botany Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Santalum album, Aloe vera*	March-April	AKR

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Class: F.Y.B.Sc.

Sr. No.	Topics	Month	Faculty name
1.	Paper-I U-I Algae Structure, *Nostoc.*	June-July	NDS
2.	Paper-I U-II Fungi Structure	June-July	SS
3.	Paper-I U-III Bryophyta General characters of Hepaticae	June-July	NDS
4.	Paper-II U-I Cell biology General structure of plant cell: cell wall	June-July	AYS
5.	Paper-II U-II Ecology Energy pyramids	June-July	PS
6.	Paper-II U-III Genetics Phenotype/Genotype	June-July	SC
7.	Paper-I U-I Algae life cycle and systematic position of *Nostoc*	July-August	NDS
8.	Paper-I U-II Fungi life cycle and systematic position of *Rhizopus*	July-August	SS
9.	Paper-I U-III Bryophyta Structure of *Riccia*	July-August	NDS
10.	Paper-II U-I Cell biology General structure of plant cell: Plasma membrane	July-August	PS
11.	Paper-II U-II Ecology energy flow in an ecosystem.	July-August	SS
12.	Paper-II U-III Genetics Mendelian Genetics- monohybrid, dihybrid	July-August	SC
13.	Paper-I U-I Algae Structure of *Spirogyra*	August-September	NDS
14.	Paper-I U-II Fungi	August-September	SS

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	life cycle and systematic position of *Aspergillus*		
15.	Paper-I U-III Bryophyta Lifecycle of *Riccia*	August-September	NDS
16.	Paper-II U-I Cell biology Ultra-structure and functions of the Endoplasmic reticulum	August-September	PS
17.	Paper-II U-II Ecology Aquatic ecosystem	August-September	SS
18.	Paper-II U-III Genetics Test cross, back cross ratios	August-September	SC
19.	Paper-I U-I Algae Economic importance of algae	September-October	NDS
20.	Paper-I U-II Fungi Economic importance of fungi and mode of nutrition in fungi	September-October	SS
21.	Paper-I U-III Bryophyta Systematic position of *Riccia*	September-October	NDS
22.	Paper-II U-I Cell biology Ultra-structure and functions of the chloroplast	September-October	PS
23.	Paper-II U-II Ecology Terrestrial ecosystem	September-October	SS
24.	Paper-II U-III Genetics Epistatic, non-epistatic interactions, multiple alleles	September-October	SC

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Semester-II

Sr. no.	Topics	Months	Faculty name
1.	Paper-I U-I Pteridophytes General characters	November-December	SS
2.	Paper-I U-II Gymnosperms General characters	November-December	SC
3.	Paper-I U-III Angiosperms General characters	November-December	NDS
4.	Paper-II U-I Anatomy Simple tissues	November-December	AYS
5.	Paper-II U-II Physiology Photosynthesis: Light reaction	November-December	PS
6.	Paper-II U-III Medicinal botany Concept of primary and secondary metabolites	November-December	AKR
7.	Paper-I U-I Pteridophytes Lifecycle of *Nephrolepis*	December-January	SS
8.	Paper-I U-II Gymnosperms Lifecycle of *Cycas*	December-January	SC
9.	Paper-I U-III Angiosperms Leaf: simple leaf, types of compound leaves, Incisions of leaf, venation, phyllotaxy, types of stipules, leaf apex, leaf margin, leaf base, leaf shapes.	December-January	NDS
10.	Paper-II U-I Anatomy complex tissues	December-January	AYS
11.	Paper-II U-II Physiology Photosynthesis: photolysis of water	December-January	PS
12.	Paper-II U-III Medicinal botany difference between primary and secondary metabolites	December-January	AKR
13.	Paper-I U-I Pteridophytes systematic position of *Nephrolepis*	January-February	SS

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14.	Paper-I U-II Gymnosperms systematic position of *Cycas*	January-February	SC
15.	Paper-I U-III Angiosperms Modifications of leaf: spine, tendril, hooks, phyllode, pitcher, Drosera or insectivorous plants.	January-February	NDS
16.	Paper-II U-I Anatomy Primary structure of dicot and monocot root, stem and leaf.	January-February	AYS
17.	Paper-II U-II Physiology Photosynthesis: photophosphorylation	January-February	PS
18.	Paper-II U-III Medicinal botany Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Oscimum sanctum, Adathoda vasica*	January-February	AKR
19.	Paper-I U-I Pteridophytes alternation of generations in *Nephrolepis*	February-March	SS
20.	Paper-I U-II Gymnosperms alternation of generations in *Cycas*	February-March	SC
21.	Paper-I U-III Angiosperms Inflorescence: Racemose: simple raceme, spike, catkin, spadix, panicle. Cymose: monochasial, dichasial, polychasial. Compound: corymb, umbel, cyathium, capitulum, verticellaster, hypanthodium.	February-March	NDS
22.	Paper-II U-I Anatomy Epidermal tissue system: types of hair	February-March	AYS
23.	Paper-II U-II Physiology Photosynthesis: carbon fixation	February-March	PS

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	Phase C3 & C4 cycle		
24.	Paper-II U-III Medicinal botany Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Zinziber officinale, Curcuma longa*	February-March	AKR
25.	Paper-I U-I Pteridophytes Stelar evolution	March-April	SS
26.	Paper-I U-II Gymnosperms Economic importance of Gymnosperms	March-April	SC
27.	Paper-I U-III Angiosperms Study of following families: Malvaceae, Amaryllidaceae.	March-April	NDS
28.	Paper-II U-I Anatomy Epidermal tissue system: monocot and dicot stomata.	March-April	AYS
29.	Paper-II U-II Physiology Photosynthesis: CAM pathways	March-April	PS
30.	Paper-II U-III Medicinal botany Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Santalum album, Aloe vera*	March-April	AKR

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Sr. No.	Topics	Month	Faculty name
1.	Paper-I U-I Algae Structure, *Nostoc*.	June-July	NDS
2.	Paper-I U-II Fungi Structure	June-July	SS
3.	Paper-I U-III Bryophyta General characters of Hepaticae	June-July	NDS
4.	Paper-II U-I Cell biology General structure of plant cell: cell wall	June-July	AYS
5.	Paper-II U-II Ecology Energy pyramids	June-July	PS
6.	Paper-II U-III Genetics Phenotype/Genotype	June-July	SC
7.	Paper-I U-I Algae life cycle and systematic position of *Nostoc*	July-August	NDS
8.	Paper-I U-II Fungi life cycle and systematic position of *Rhizopus*	July-August	SS
9.	Paper-I U-III Bryophyta Structure of *Riccia*	July-August	NDS
10.	Paper-II U-I Cell biology General structure of plant cell: Plasma membrane	July-August	PS
11.	Paper-II U-II Ecology energy flow in an ecosystem.	July-August	SS
12.	Paper-II U-III Genetics Mendelian Genetics- monohybrid, dihybrid	July-August	SC
13.	Paper-I U-I Algae Structure of *Spirogyra*	August-September	NDS
14.	Paper-I U-II Fungi	August-September	SS

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	life cycle and systematic position of *Aspergillus*		
15.	Paper-I U-III Bryophyta Lifecycle of *Riccia*	August-September	NDS
16.	Paper-II U-I Cell biology Ultra-structure and functions of the Endoplasmic reticulum	August-September	PS
17.	Paper-II U-II Ecology Aquatic ecosystem	August-September	SS
18.	Paper-II U-III Genetics Test cross, back cross ratios	August-September	SC
19.	Paper-I U-I Algae Economic importance of algae	September-October	NDS
20.	Paper-I U-II Fungi Economic importance of fungi and mode of nutrition in fungi	September-October	SS
21.	Paper-I U-III Bryophyta Systematic position of *Riccia*	September-October	NDS
22.	Paper-II U-I Cell biology Ultra-structure and functions of the chloroplast	September-October	PS
23.	Paper-II U-II Ecology Terrestrial ecosystem	September-October	SS
24.	Paper-II U-III Genetics Epistatic, non-epistatic interactions, multiple alleles	September-October	SC

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Semester-II

Sr. no.	Topics	Months	Faculty name
1.	Paper-I U-I Pteridophytes General characters	November-December	SS
2.	Paper-I U-II Gymnosperms General characters	November-December	SC
3.	Paper-I U-III Angiosperms General characters	November-December	NDS
4.	Paper-II U-I Anatomy Simple tissues	November-December	AYS
5.	Paper-II U-II Physiology Photosynthesis: Light reaction	November-December	PS
6.	Paper-II U-III Medicinal botany Concept of primary and secondary metabolites	November-December	AKR
7.	Paper-I U-I Pteridophytes Lifecycle of *Nephrolepis*	December-January	SS
8.	Paper-I U-II Gymnosperms Lifecycle of *Cycas*	December-January	SC
9.	Paper-I U-III Angiosperms Leaf: simple leaf, types of compound leaves, Incisions of leaf, venation, phyllotaxy, types of stipules, leaf apex, leaf margin, leaf base, leaf shapes.	December-January	NDS
10.	Paper-II U-I Anatomy complex tissues	December-January	AYS
11.	Paper-II U-II Physiology Photosynthesis: photolysis of water	December-January	PS
12.	Paper-II U-III Medicinal botany difference between primary and secondary metabolites	December-January	AKR
13.	Paper-I U-I Pteridophytes systematic position of *Nephrolepis*	January-February	SS

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14.	Paper-I U-II Gymnosperms systematic position of *Cycas*	January-February	SC
15.	Paper-I U-III Angiosperms Modifications of leaf: spine, tendril, hooks, phyllode, pitcher, Drosera or insectivorous plants.	January-February	NDS
16.	Paper-II U-I Anatomy Primary structure of dicot and monocot root, stem and leaf.	January-February	AYS
17.	Paper-II U-II Physiology Photosynthesis: photophosphorylation	January-February	PS
18.	Paper-II U-III Medicinal botany Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Oscimum sanctum, Adathoda vasica*	January-February	AKR
19.	Paper-I U-I Pteridophytes alternation of generations in *Nephrolepis*	February-March	SS
20.	Paper-I U-II Gymnosperms alternation of generations in *Cycas*	February-March	SC
21.	Paper-I U-III Angiosperms Inflorescence: Racemose: simple raceme, spike, catkin, spadix, panicle. Cymose: monochasial, dichasial, polychasial. Compound: corymb, umbel, cyathium, capitulum, verticellaster, hypanthodium.	February-March	NDS
22.	Paper-II U-I Anatomy Epidermal tissue system: types of hair	February-March	AYS
23.	Paper-II U-II Physiology Photosynthesis: carbon fixation	February-March	PS

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	Phase C3 & C4 cycle		
24.	Paper-II U-III Medicinal botany Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Zinziber officinale, Curcuma longa*	February-March	AKR
25.	Paper-I U-I Pteridophytes Stelar evolution	March-April	SS
26.	Paper-I U-II Gymnosperms Economic importance of Gymnosperms	March-April	SC
27.	Paper-I U-III Angiosperms Study of following families: Malvaceae, Amaryllidaceae.	March-April	NDS
28.	Paper-II U-I Anatomy Epidermal tissue system: monocot and dicot stomata.	March-April	AYS
29.	Paper-II U-II Physiology Photosynthesis: CAM pathways	March-April	PS
30.	Paper-II U-III Medicinal botany Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Santalum album, Aloe vera*	March-April	AKR

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Class: F.Y.B.Sc.

Sr. No.	Topics	Month	Faculty name
1.	Paper-I U-I Algae Structure, *Nostoc*.	June-July	NDS
2.	Paper-I U-II Fungi Structure	June-July	SS
3.	Paper-I U-III Bryophyta General characters of Hepaticae	June-July	NDS
4.	Paper-II U-I Cell biology General structure of plant cell: cell wall	June-July	AYS
5.	Paper-II U-II Ecology Energy pyramids	June-July	PS
6.	Paper-II U-III Genetics Phenotype/Genotype	June-July	SC
7.	Paper-I U-I Algae life cycle and systematic position of *Nostoc*	July-August	NDS
8.	Paper-I U-II Fungi life cycle and systematic position of *Rhizopus*	July-August	SS
9.	Paper-I U-III Bryophyta Structure of *Riccia*	July-August	NDS
10.	Paper-II U-I Cell biology General structure of plant cell: Plasma membrane	July-August	ST
11.	Paper-II U-II Ecology energy flow in an ecosystem.	July-August	SS
12.	Paper-II U-III Genetics Mendelian Genetics- monohybrid, dihybrid	July-August	SC
13.	Paper-I U-I Algae Structure of *Spirogyra*	August-September	NDS
14.	Paper-I U-II Fungi	August-September	SS

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	life cycle and systematic position of *Aspergillus*		
15.	Paper-I U-III Bryophyta Lifecycle of *Riccia*	August-September	NDS
16.	Paper-II U-I Cell biology Ultra-structure and functions of the Endoplasmic reticulum	August-September	PS
17.	Paper-II U-II Ecology Aquatic ecosystem	August-September	SS
18.	Paper-II U-III Genetics Test cross, back cross ratios	August-September	SC
19.	Paper-I U-I Algae Economic importance of algae	September-October	NDS
20.	Paper-I U-II Fungi Economic importance of fungi and mode of nutrition in fungi	September-October	SS
21.	Paper-I U-III Bryophyta Systematic position of *Riccia*	September-October	NDS
22.	Paper-II U-I Cell biology Ultra-structure and functions of the chloroplast	September-October	PS
23.	Paper-II U-II Ecology Terrestrial ecosystem	September-October	SS
24.	Paper-II U-III Genetics Epistatic, non-epistatic interactions, multiple alleles	September-October	SC

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Semester-II

Sr. no.	Topics	Months	Faculty name
1.	Paper-I U-I Pteridophytes General characters	November-December	SS
2.	Paper-I U-II Gymnosperms General characters	November-December	SC
3.	Paper-I U-III Angiosperms General characters	November-December	NDS
4.	Paper-II U-I Anatomy Simple tissues	November-December	AYS
5.	Paper-II U-II Physiology Photosynthesis: Light reaction	November-December	ST
6.	Paper-II U-III Medicinal botany Concept of primary and secondary metabolites	November-December	AKR
7.	Paper-I U-I Pteridophytes Lifecycle of *Nephrolepis*	December-January	SS
8.	Paper-I U-II Gymnosperms Lifecycle of *Cycas*	December-January	SC
9.	Paper-I U-III Angiosperms Leaf: simple leaf, types of compound leaves, Incisions of leaf, venation, phyllotaxy, types of stipules, leaf apex, leaf margin, leaf base, leaf shapes.	December-January	NDS
10.	Paper-II U-I Anatomy complex tissues	December-January	AYS
11.	Paper-II U-II Physiology Photosynthesis: photolysis of water	December-January	PS
12.	Paper-II U-III Medicinal botany difference between primary and secondary metabolites	December-January	AKR
13.	Paper-I U-I Pteridophytes systematic position of *Nephrolepis*	January-February	SS

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14.	Paper-I U-II Gymnosperms systematic position of *Cycas*	January-February	SC
15.	Paper-I U-III Angiosperms Modifications of leaf: spine, tendril, hooks, phyllode, pitcher, Drosera or insectivorous plants.	January-February	NDS
16.	Paper-II U-I Anatomy Primary structure of dicot and monocot root, stem and leaf.	January-February	AYS
17.	Paper-II U-II Physiology Photosynthesis: photophosphorylation	January-February	PS
18.	Paper-II U-III Medicinal botany Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Oscimum sanctum, Adathoda vasica*	January-February	AKR
19.	Paper-I U-I Pteridophytes alternation of generations in *Nephrolepis*	February-March	SS
20.	Paper-I U-II Gymnosperms alternation of generations in *Cycas*	February-March	SC
21.	Paper-I U-III Angiosperms Inflorescence: Racemose: simple raceme, spike, catkin, spadix, panicle. Cymose: monochasial, dichasial, polychasial. Compound: corymb, umbel, cyathium, capitulum, verticellaster, hypanthodium.	February-March	NDS
22.	Paper-II U-I Anatomy Epidermal tissue system: types of hair	February-March	AYS
23.	Paper-II U-II Physiology Photosynthesis: carbon fixation	February-March	PS

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	Phase C3 & C4 cycle		
24.	Paper-II U-III Medicinal botany Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Zinziber officinale, Curcuma longa*	February-March	AKR
25.	Paper-I U-I Pteridophytes Stelar evolution	March-April	SS
26.	Paper-I U-II Gymnosperms Economic importance of Gymnosperms	March-April	SC
27.	Paper-I U-III Angiosperms Study of following families: Malvaceae, Amaryllidaceae.	March-April	NDS
28.	Paper-II U-I Anatomy Epidermal tissue system: monocot and dicot stomata.	March-April	AYS
29.	Paper-II U-II Physiology Photosynthesis: CAM pathways	March-April	PS
30.	Paper-II U-III Medicinal botany Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Santalum album, Aloe vera*	March-April	AKR

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Class: F.Y.B.Sc.

Sr. No.	Topics	Month	Faculty name
1.	Paper-I U-I Algae Structure, *Nostoc.*	June-July	NDS
2.	Paper-I U-II Fungi Structure	June-July	SS
3.	Paper-I U-III Bryophyta General characters of Hepaticae	June-July	NDS
4.	Paper-II U-I Cell biology General structure of plant cell: cell wall	June-July	AYS
5.	Paper-II U-II Ecology Energy pyramids	June-July	PS
6.	Paper-II U-III Genetics Phenotype/Genotype	June-July	ST
7.	Paper-I U-I Algae life cycle and systematic position of *Nostoc*	July-August	NDS
8.	Paper-I U-II Fungi life cycle and systematic position of *Rhizopus*	July-August	SS
9.	Paper-I U-III Bryophyta Structure of *Riccia*	July-August	NDS
10.	Paper-II U-I Cell biology General structure of plant cell: Plasma membrane	July-August	PS
11.	Paper-II U-II Ecology energy flow in an ecosystem.	July-August	SS
12.	Paper-II U-III Genetics Mendelian Genetics- monohybrid, dihybrid	July-August	SC
13.	Paper-I U-I Algae Structure of *Spirogyra*	August-September	NDS
14.	Paper-I U-II Fungi	August-September	SS

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	life cycle and systematic position of *Aspergillus*		
15.	Paper-I U-III Bryophyta Lifecycle of *Riccia*	August-September	NDS
16.	Paper-II U-I Cell biology Ultra-structure and functions of the Endoplasmic reticulum	August-September	PS
17.	Paper-II U-II Ecology Aquatic ecosystem	August-September	SS
18.	Paper-II U-III Genetics Test cross, back cross ratios	August-September	SC
19.	Paper-I U-I Algae Economic importance of algae	September-October	NDS
20.	Paper-I U-II Fungi Economic importance of fungi and mode of nutrition in fungi	September-October	SS
21.	Paper-I U-III Bryophyta Systematic position of *Riccia*	September-October	NDS
22.	Paper-II U-I Cell biology Ultra-structure and functions of the chloroplast	September-October	PS
23.	Paper-II U-II Ecology Terrestrial ecosystem	September-October	SS
24.	Paper-II U-III Genetics Epistatic, non-epistatic interactions, multiple alleles	September-October	SC

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Semester-II

Sr. no.	Topics	Months	Faculty name
1.	Paper-I U-I Pteridophytes General characters	November-December	SS
2.	Paper-I U-II Gymnosperms General characters	November-December	SC
3.	Paper-I U-III Angiosperms General characters	November-December	NDS
4.	Paper-II U-I Anatomy Simple tissues	November-December	AYS
5.	Paper-II U-II Physiology Photosynthesis: Light reaction	November-December	PS
6.	Paper-II U-III Medicinal botany Concept of primary and secondary metabolites	November-December	AKR
7.	Paper-I U-I Pteridophytes Lifecycle of *Nephrolepis*	December-January	SS
8.	Paper-I U-II Gymnosperms Lifecycle of *Cycas*	December-January	SC
9.	Paper-I U-III Angiosperms Leaf: simple leaf, types of compound leaves, Incisions of leaf, venation, phyllotaxy, types of stipules, leaf apex, leaf margin, leaf base, leaf shapes.	December-January	NDS
10.	Paper-II U-I Anatomy complex tissues	December-January	AYS
11.	Paper-II U-II Physiology Photosynthesis: photolysis of water	December-January	PS
12.	Paper-II U-III Medicinal botany difference between primary and secondary metabolites	December-January	AKR
13.	Paper-I U-I Pteridophytes systematic position of *Nephrolepis*	January-February	SS

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14.	Paper-I U-II Gymnosperms systematic position of *Cycas*	January-February	SC
15.	Paper-I U-III Angiosperms Modifications of leaf: spine, tendril, hooks, phyllode, pitcher, Drosera or insectivorous plants.	January-February	NDS
16.	Paper-II U-I Anatomy Primary structure of dicot and monocot root, stem and leaf.	January-February	AYS
17.	Paper-II U-II Physiology Photosynthesis: photophosphorylation	January-February	PS
18.	Paper-II U-III Medicinal botany Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Oscimum sanctum, Adathoda vasica*	January-February	AKR
19.	Paper-I U-I Pteridophytes alternation of generations in *Nephrolepis*	February-March	SS
20.	Paper-I U-II Gymnosperms alternation of generations in *Cycas*	February-March	SC
21.	Paper-I U-III Angiosperms Inflorescence: Racemose: simple raceme, spike, catkin, spadix, panicle. Cymose: monochasial, dichasial, polychasial. Compound: corymb, umbel, cyathium, capitulum, verticellaster, hypanthodium.	February-March	NDS
22.	Paper-II U-I Anatomy Epidermal tissue system: types of hair	February-March	AYS
23.	Paper-II U-II Physiology Photosynthesis: carbon fixation	February-March	PS

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	Phase C3 & C4 cycle		
24.	Paper-II U-III Medicinal botany Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Zinziber officinale, Curcuma longa*	February-March	AKR
25.	Paper-I U-I Pteridophytes Stelar evolution	March-April	SS
26.	Paper-I U-II Gymnosperms Economic importance of Gymnosperms	March-April	SC
27.	Paper-I U-III Angiosperms Study of following families: Malvaceae, Amaryllidaceae.	March-April	NDS
28.	Paper-II U-I Anatomy Epidermal tissue system: monocot and dicot stomata.	March-April	AYS
29.	Paper-II U-II Physiology Photosynthesis: CAM pathways	March-April	PS
30.	Paper-II U-III Medicinal botany Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Santalum album, Aloe vera*	March-April	AKR

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Sr. No.	Topics	Month	Faculty name
1.	Paper-I U-I Algae Structure, *Nostoc.*	June-July	NDS
2.	Paper-I U-II Fungi Structure	June-July	SS
3.	Paper-I U-III Bryophyta General characters of Hepaticae	June-July	NDS
4.	Paper-II U-I Cell biology General structure of plant cell: cell wall	June-July	AYS
5.	Paper-II U-II Ecology Energy pyramids	June-July	PS
6.	Paper-II U-III Genetics Phenotype/Genotype	June-July	SC
7.	Paper-I U-I Algae life cycle and systematic position of *Nostoc*	July-August	NDS
8.	Paper-I U-II Fungi life cycle and systematic position of *Rhizopus*	July-August	SS
9.	Paper-I U-III Bryophyta Structure of *Riccia*	July-August	NDS
10.	Paper-II U-I Cell biology General structure of plant cell: Plasma membrane	July-August	PS
11.	Paper-II U-II Ecology energy flow in an ecosystem.	July-August	SS
12.	Paper-II U-III Genetics Mendelian Genetics- monohybrid, dihybrid	July-August	SC
13.	Paper-I U-I Algae Structure of *Spirogyra*	August-September	NDS
14.	Paper-I U-II Fungi	August-September	SS

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	life cycle and systematic position of *Aspergillus*		
15.	Paper-I U-III Bryophyta Lifecycle of *Riccia*	August-September	NDS
16.	Paper-II U-I Cell biology Ultra-structure and functions of the Endoplasmic reticulum	August-September	PS
17.	Paper-II U-II Ecology Aquatic ecosystem	August-September	SS
18.	Paper-II U-III Genetics Test cross, back cross ratios	August-September	SC
19.	Paper-I U-I Algae Economic importance of algae	September-October	NDS
20.	Paper-I U-II Fungi Economic importance of fungi and mode of nutrition in fungi	September-October	SS
21.	Paper-I U-III Bryophyta Systematic position of *Riccia*	September-October	NDS
22.	Paper-II U-I Cell biology Ultra-structure and functions of the chloroplast	September-October	PS
23.	Paper-II U-II Ecology Terrestrial ecosystem	September-October	SS
24.	Paper-II U-III Genetics Epistatic, non-epistatic interactions, multiple alleles	September-October	SC

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Semester-II

Sr. no.	Topics	Months	Faculty name
1.	Paper-I U-I Pteridophytes General characters	November-December	SS
2.	Paper-I U-II Gymnosperms General characters	November-December	SC
3.	Paper-I U-III Angiosperms General characters	November-December	NDS
4.	Paper-II U-I Anatomy Simple tissues	November-December	AYS
5.	Paper-II U-II Physiology Photosynthesis: Light reaction	November-December	PS
6.	Paper-II U-III Medicinal botany Concept of primary and secondary metabolites	November-December	AKR
7.	Paper-I U-I Pteridophytes Lifecycle of *Nephrolepis*	December-January	SS
8.	Paper-I U-II Gymnosperms Lifecycle of *Cycas*	December-January	SC
9.	Paper-I U-III Angiosperms Leaf: simple leaf, types of compound leaves, Incisions of leaf, venation, phyllotaxy, types of stipules, leaf apex, leaf margin, leaf base, leaf shapes.	December-January	NDS
10.	Paper-II U-I Anatomy complex tissues	December-January	AYS
11.	Paper-II U-II Physiology Photosynthesis: photolysis of water	December-January	PS
12.	Paper-II U-III Medicinal botany difference between primary and secondary metabolites	December-January	AKR
13.	Paper-I U-I Pteridophytes systematic position of *Nephrolepis*	January-February	SS

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14.	Paper-I U-II Gymnosperms systematic position of *Cycas*	January-February	SC
15.	Paper-I U-III Angiosperms Modifications of leaf: spine, tendril, hooks, phyllode, pitcher, Drosera or insectivorous plants.	January-February	NDS
16.	Paper-II U-I Anatomy Primary structure of dicot and monocot root, stem and leaf.	January-February	AYS
17.	Paper-II U-II Physiology Photosynthesis: photophosphorylation	January-February	PS
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19.	Paper-I U-I Pteridophytes alternation of generations in *Nephrolepis*	February-March	SS
20.	Paper-I U-II Gymnosperms alternation of generations in *Cycas*	February-March	SC
21.	Paper-I U-III Angiosperms Inflorescence: Racemose: simple raceme, spike, catkin, spadix, panicle. Cymose: monochasial, dichasial, polychasial. Compound: corymb, umbel, cyathium, capitulum, verticellaster, hypanthodium.	February-March	NDS
22.	Paper-II U-I Anatomy Epidermal tissue system: types of hair	February-March	AYS
23.	Paper-II U-II Physiology Photosynthesis: carbon fixation	February-March	PS

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	Phase C3 & C4 cycle		
24.	Paper-II U-III Medicinal botany Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Zinziber officinale, Curcuma longa*	February-March	AKR
25.	Paper-I U-I Pteridophytes Stelar evolution	March-April	SS
26.	Paper-I U-II Gymnosperms Economic importance of Gymnosperms	March-April	SC
27.	Paper-I U-III Angiosperms Study of following families: Malvaceae, Amaryllidaceae.	March-April	NDS
28.	Paper-II U-I Anatomy Epidermal tissue system: monocot and dicot stomata.	March-April	AYS
29.	Paper-II U-II Physiology Photosynthesis: CAM pathways	March-April	PS
30.	Paper-II U-III Medicinal botany Grandma's pouch: Following plants have to be studies with respect to botanical source, part of the plant used, active constituents present and medicinal uses: *Santalum album, Aloe vera*	March-April	AKR

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Sr. No.	Topics	Month	Faculty name
1.	Paper-I U-I Thallophyta (Algae) & Bryophyta General Characters of Division Phaeophyta: Distribution, Cell structure, range of thallus, Economic Importance.	June-July	NDS
2.	Paper-II U-I Cell Biology Ultra-Structure and functions of the following cell organelles: o Mitochondrion (membranes, cristae, F1 particles and matrix)	June-July	AYS
3.	Paper-III U-I Pharmacognosy and phytochemistry Introduction to pharmacopoeia	June-July	AKR
4.	Paper-I U-II Angiosperms Systematics: Objectives and Goals of Plant systematic • Plant Nomenclature	June-July	NDS
5.	Paper-II U-II Cytogenetics Variation in Chromosome structure (Chromosomal Aberrations) Definition, Origin, Cytological and Genetic Effects of the following: Deletions	June-July	SC
6.	Paper-III U-II Forestry and Economic Botany Forestry: Outline of types of forest in India	June-July	SS
7.	Paper-I U-III Modern Techniques to Study Plant Diversity Preservation methods: Dry and Wet method	June-July	PS
8.	Paper-II U-III Molecular Biology DNA replication: Modes of Replication, Messelson and Stahl Experment,	June-July	SC
9.	Paper-III U-III Industry based on plant products Aromatherapy- Introduction, Uses with few examples. Jojoba, lemon	June-July	AKR

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10.	Paper-I U-I Thallophyta (Algae) & Bryophyta • Structure, life cycle and systematic position of Sargassum	July-August	NDS
11.	Paper-II U-I Cell Biology Ultra Structure and functions of the following cell organelles: Peroxisomes and Glyoxysomes o Ribosomes (prokaryotic, eukaryotic and subunits)	July-August	AYS
12.	Paper-III U-I Pharmacognosy and phytochemistry Indian pharmacopoeia, Indian Herbal Pharmacopoeia and Ayurvedic Pharmacopoeia	July-August	AKR
13.	Paper-I U-II Angiosperms Taxonomy in relation to Anatomy Palynology Chemical constituents	July-August	NDS
14.	Paper-II U-II Cytogenetics Variation in Chromosome structure (Chromosomal Aberrations) Definition, Origin, Cytological and Genetic Effects of the following: Duplications, Inversions and Translocations.	July-August	SC
15.	Paper-III U-II Forestry and Economic Botany Forestry: Agro-forestry, Urban forestry, organic farming, Silviculture	July-August	SS
16.	Paper-I U-III Modern Techniques to Study Plant Diversity Microscopy – Principle and working of Light, and electron microscope.	July-August	PS
17.	Paper-II U-III Molecular Biology DNA replication in prokaryotes and eukaryotes- enzymes involved and molecular mechanism of replication.	July-August	SC
18.	Paper-III U-III Industry based on plant products Aromatherapy- Botanical and nutraceuticals -Spirulina, Vanillin, Garcinia indica/ Garcinia cambogia	July-August	AKR
19.	Paper-I U-I Thallophyta (Algae) & Bryophyta	August-September	NDS

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	General Account of Class Anthocerotae and Musci		
20.	Paper-II U-I Cell Biology Cell Division and its significance o Cell Cycle, structure of Interphase Nucleus (nuclear envelop, chromatin network, nucleolus and nucleoplasm) o Mitosis & Meiosis o Differences between Mitosis and Meiosis	August-September	AYS
21.	Paper-III U-I Pharmacognosy and phytochemistry Secondary Metabolites: Sources, properties, uses and adulterants, regional and seasonal variations	August-September	AKR
22.	Paper-I U-II Angiosperms Taxonomy in relation to Anatomy Embryology Cytology Ecology	August-September	NDS
23.	Paper-II U-II Cytogenetics Sex determination, Sex linked, sex influenced and sex limited traits: Sex determination- Chromosomal Methods: heterogametic males and heterogametic females. Sex determination in monoecious and dioecious plants. Genic Balance Theory of sex determination in Drosophila, Lyon's Hypothesis of X chromosome inactivation. Sex linked- eye colour in Drosophila, Haemophilia, colour blindness Sex influenced- baldness in man	August-September	SC
24.	Paper-III U-II Forestry and Economic Botany Economic Botany: • Types of fibers: Jute and cotton, • Current trends in Fiber industries	August-September	SS
25.	Paper-I U-III Modern Techniques to Study Plant Diversity Chromatography- Principles and techniques in paper and thin layer chromatography.	August-September	PS
26.	Paper-II U-III Molecular Biology Protein Synthesis: o Central dogma of	August-September	SC

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	Protein synthesis		
27.	Paper-III U-III Industry based on plant products Enzymes industry: Cellulases, Papain, Bromelain	August-September	AKR
28.	Paper-I U-I Thallophyta (Algae) & Bryophyta Lichens- Classification, Structure, Method of Reproduction, Economic Importance and Ecological Significance of Lichens.	September-October	NDS
29.	Paper-II U-I Cell Biology Differences between Mitosis and Meiosis • Nucleic Acids: Types, structure and functions of DNA and RNA	September-October	AYS
30.	Paper-III U-I Pharmacognosy and phytochemistry Adulterants: Saraca asoca, Polyalthia longifolia Terminalia arjuna, Terminalia tomentosa Bacopa monnieri, Centella asiatica Abrus, Glycyrrhiza Phyllanthus amarus (Bhuiamla)	September-October	AKR
31.	Paper-I U-II Angiosperms With the help of Bentham and Hooker's system of Classification for flowering plants study the vegetative, floral characters and economic importance of the following families: o Leguminosae o Asterace o Amaranthaceae o Palmae	September-October	NDS
32.	Paper-II U-II Cytogenetics Extranuclear Genetics Organelle heredity- o Chloroplast determines heredity - Plastid transmission in plants, Streptomycin resistance in Chlamydomonas. o Male sterility in maize	September-October	SC
33.	Paper-III U-II Forestry and Economic Botany Community ecology- Characters of community - Quantitative characters and qualitative characters	September-October	SS
34.	Paper-I U-III	September-October	PS

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	Modern Techniques to Study Plant Diversity Principles and techniques of Horizontal and Vertical electrophoresis		
35.	Paper-II U-III Molecular Biology Transcription in prokaryotes and eukaryotes: promoter sites, initiation, elongation and termination. o RNA processing: Adenylation & Capping.	September-October	SC
36.	Paper-III U-III Industry based on plant products • Biofuels.	September-October	AKR

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Semester-IV

Sr. No.	Topics	Month	Faculty name
1.	Paper-I U-I Thallophyta: Fungi, Plant Pathology and Lichens Fungi • General characters of Ascomycetae	November-December	NDS
2.	Paper-II U-I Anatomy • Normal Secondary Growth in Dicotyledonous stem and root.	November-December	AYS
3.	Paper-III U-I Horticulture and Gardening Introduction to Horticulture: Branches of Horticulture	November-December	AKR
4.	Paper-I U-II Thallophyta: Fungi, Plant Pathology and Lichens Fungi Salient features and classification upto orders (with examples of each) of Psilophyta and Lepidophyta (G M Smith's system of classification to be followed)	November-December	NDS
5.	Paper-II U-II Plant Physiology and Plant Biochemistry • Respiration: Aerobic: Glycolysis, TCA Cycle, ETS & Energetic of respiration; Anaerobic respiration.	November-December	PS
6.	Paper-III U-II Biotechnology • Introduction to plant tissue culture o Laboratory organization and techniques in plant tissue culture	November-December	SC
7.	Paper-I U-III Gymnosperms • Salient features, classification up to orders (with examples of each) and economic importance of Coniferophyta (Chamberlain's system of classification to be followed)	November-December	NDS
8.	Paper-II U-III Ecology and Environmental Botany Biogeochemical Cycles- Carbon, Nitrogen and Water.	November-December	SS
9.	Paper-III U-III Biostatistics: The chi square test.	November-December	SC

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10.	Paper-I U-I Structure, life cycle and systematic position of Erysiphe and Xylaria	December-January	NDS
11.	Paper-II U-I Growth rings, periderm, lenticels, tyloses, heart wood and sap wood.	December-January	AYS
12.	Paper-III U-I Types of garden o Formal and informal gardens	December-January	AKR
13.	Paper-I U-II Pteridophyta and Paleobotany Pteridophyta- Structure, life cycle and systematic position of Selaginella	December-January	NDS
14.	Paper-II U-II Plant Physiology and Plant Biochemistry Photorespiration	December-January	PS
15.	Paper-III U-II Introduction to plant tissue culture o Totipotency o Organogenesis	December-January	SC
16.	Paper-I U-III Structure life cycle and systematic position of Pinus	December-January	NDS
17.	Paper-II U-III Ecological factors: Concept of environmental factors.	December-January	SS
18.	Paper-III U-III Biostatistics: Correlation – Calculation of coefficient of correlation.	December-January	SC
19.	Paper-I U-I Thallophyta: Plant Pathology- Symptoms, causative organism, disease cycle and control measures of o Powdery mildew	January-February	NDS
20.	Paper-II U-I • Mechanical Tissue system o Tissues providing mechanical strength and support and their disposition	January-February	AYS
21.	Paper-III U-I • Types of garden o National Park: Sanjay Gandhi National Park.	January-February	AKR
22.	Paper-I U-II • Paleobotany- The geological time scale	January-February	NDS

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23.	Paper-II U-II Plant Physiology and Plant Biochemistry Photoperiodism: Phytochrome Response and Vernalization with reference to flowering in higher plants	January-February	PS
24.	Paper-III U-II Introduction to plant tissue culture o Organ culture – root cultures, meristem cultures, anther and pollen culture, embryo culture.	January-February	SC
25.	Paper-I U-III Structure and systematic position of the form genus Cordaites	January-February	NDS
26.	Paper-II U-III Soil as an edaphic factor, Soil composition, types of soil, soil formation, soil profile.	January-February	SS
27.	Paper-III U-III Biostatistics and Bioinformatics • Bioinformatics o Information technology: History and tools of IT, Internet and its uses.	January-February	SC
28.	Paper-I U-I Thallophyta: Plant Pathology-Symptoms, causative organism, disease cycle and control measures of o Late blight of potato	February-March	NDS
29.	Paper-II U-I • Mechanical Tissue system o I-girders in aerial and underground organs	February-March	AYS
30.	Paper-III U-I o Botanical Garden: Veer Mata JijabaiUdyan (Victoria Garden)	February-March	AKR
31.	Paper-I U-II Formation and types of fossils	February-March	NDS
32.	Paper-II U-II Physico-chemical properties of phytochrome	February-March	PS
33.	Paper-III U-II • R-DNA technology- o Gene cloning	February-March	SC
34.	Paper-I U-III • Structure of Cordaites	February-March	NDS
35.	Paper-II U-III Community ecology- Characters of	February-March	SS

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	community - Quantitative characters and qualitative characters		
36.	Paper-III U-III Biostatistics and Bioinformatics o Introduction to Bioinformatics- goal, need, scope and limitation o Aims of Bioinformatics: Data organization, Tools of Bioinformatics- tools for web search, Data retrieval tools- Entrez	February-March	SC
37.	Paper-I U-I Lichens- Classification, Structure, Method of Reproduction, Economic Importance and Ecological Significance of Lichens.	March-April	NDS
38.	Paper-II U-I Types of Vascular Bundles.	March-April	AYS
39.	Paper-III U-I Types of garden o National Park: Sanjay Gandhi National Park. o Botanical Garden: Veer Mata JijabaiUdyan (Victoria Garden)	March-April	AKR
40.	Paper-I U-II Structure and systematic position of form genus Rhynia	March-April	NDS
41.	Paper-II U-II Vernalization mechanisms and applications.	March-April	PS
42.	Paper-III U-II R-DNA technology- o Enzymes involved in Gene cloning o Vectors used for Gene cloning.	March-April	SC
43.	Paper-I U-III systematic position of the form genus Cordaites	March-April	NDS
44.	Paper-II U-III Community ecology- Characters of community - qualitative characters	March-April	SS
45.	Paper-III U-III o BLAST o Bioinformatics programme in India.	March-April	SC

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Sr. No.	Topics	Month	Faculty name
1.	Paper-I U-I Thallophyta (Algae) & Bryophyta General Characters of Division Phaeophyta: Distribution, Cell structure, range of thallus, Economic Importance.	June-July	NDS
2.	Paper-II U-I Cell Biology Ultra-Structure and functions of the following cell organelles: o Mitochondrion (membranes, cristae, F1 particles and matrix)	June-July	AYS
3.	Paper-III U-I Pharmacognosy and phytochemistry Introduction to pharmacopoeia	June-July	AKR
4.	Paper-I U-II Angiosperms Systematics: Objectives and Goals of Plant systematic • Plant Nomenclature	June-July	NDS
5.	Paper-II U-II Cytogenetics Variation in Chromosome structure (Chromosomal Aberrations) Definition, Origin, Cytological and Genetic Effects of the following: Deletions	June-July	PS
6.	Paper-III U-II Forestry and Economic Botany Forestry: Outline of types of forest in India	June-July	SS
7.	Paper-I U-III Modern Techniques to Study Plant Diversity Preservation methods: Dry and Wet method	June-July	PS
8.	Paper-II U-III Molecular Biology DNA replication: Modes of Replication, Messelson and Stahl Experment,	June-July	PS
9.	Paper-III U-III Industry based on plant products Aromatherapy- Introduction, Uses with few examples. Jojoba, lemon	June-July	AKR

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10.	Paper-I U-I Thallophyta (Algae) & Bryophyta • Structure, life cycle and systematic position of Sargassum	July-August	NDS
11.	Paper-II U-I Cell Biology Ultra Structure and functions of the following cell organelles: Peroxisomes and Glyoxysomes o Ribosomes (prokaryotic, eukaryotic and subunits)	July-August	AYS
12.	Paper-III U-I Pharmacognosy and phytochemistry Indian pharmacopoeia, Indian Herbal Pharmacopoeia and Ayurvedic Pharmacopoeia	July-August	AKR
13.	Paper-I U-II Angiosperms Taxonomy in relation to Anatomy Palynology Chemical constituents	July-August	NDS
14.	Paper-II U-II Cytogenetics Variation in Chromosome structure (Chromosomal Aberrations) Definition, Origin, Cytological and Genetic Effects of the following: Duplications, Inversions and Translocations.	July-August	PS
15.	Paper-III U-II Forestry and Economic Botany Forestry: Agro-forestry, Urban forestry, organic farming, Silviculture	July-August	SS
16.	Paper-I U-III Modern Techniques to Study Plant Diversity Microscopy – Principle and working of Light, and electron microscope.	July-August	PS
17.	Paper-II U-III Molecular Biology DNA replication in prokaryotes and eukaryotes- enzymes involved and molecular mechanism of replication.	July-August	PS
18.	Paper-III U-III Industry based on plant products Aromatherapy- Botanical and nutraceuticals -Spirulina, Vanillin, Garcinia indica/ Garcinia cambogia	July-August	AKR
19.	Paper-I U-I Thallophyta (Algae) & Bryophyta	August-September	NDS

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	General Account of Class Anthocerotae and Musci		
20.	Paper-II U-I Cell Biology Cell Division and its significance o Cell Cycle, structure of Interphase Nucleus (nuclear envelop, chromatin network, nucleolus and nucleoplasm) o Mitosis & Meiosis o Differences between Mitosis and Meiosis	August-September	AYS
21.	Paper-III U-I Pharmacognosy and phytochemistry Secondary Metabolites: Sources, properties, uses and adulterants, regional and seasonal variations	August-September	AKR
22.	Paper-I U-II Angiosperms Taxonomy in relation to Anatomy Embryology Cytology Ecology	August-September	NDS
23.	Paper-II U-II Cytogenetics Sex determination, Sex linked, sex influenced and sex limited traits: Sex determination- Chromosomal Methods: heterogametic males and heterogametic females. Sex determination in monoecious and dioecious plants. Genic Balance Theory of sex determination in Drosophila, Lyon's Hypothesis of X chromosome inactivation. Sex linked-eye colour in Drosophila, Haemophilia, colour blindness Sex influenced- baldness in man	August-September	PS
24.	Paper-III U-II Forestry and Economic Botany Economic Botany: • Types of fibers: Jute and cotton, • Current trends in Fiber Industries	August-September	SS
25.	Paper-I U-III Modern Techniques to Study Plant Diversity Chromatography- Principles and techniques in paper and thin layer chromatography.	August-September	PS
26.	Paper-II U-III Molecular Biology Protein Synthesis: o Central dogma of	August-September	PS

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	Protein synthesis		
27.	Paper-III U-III Industry based on plant products Enzymes industry: Cellulases, Papain, Bromelain	August-September	AKR
28.	Paper-I U-I Thallophyta (Algae) & Bryophyta Lichens- Classification, Structure, Method of Reproduction, Economic Importance and Ecological Significance of Lichens.	September-October	NDS
29.	Paper-II U-I Cell Biology Differences between Mitosis and Meiosis • Nucleic Acids: Types, structure and functions of DNA and RNA	September-October	AYS
30.	Paper-III U-I Pharmacognosy and phytochemistry Adulterants: Saraca asoca, Polyalthia longifolia Terminalia arjuna, Terminalia tomentosa Bacopa monnieri, Centella asiatica Abrus, Glycyrrhiza Phyllanthus amarus (Bhuiamla)	September-October	AKR
31.	Paper-I U-II Angiosperms With the help of Bentham and Hooker's system of Classification for flowering plants study the vegetative, floral characters and economic importance of the following families: o Leguminosae o Asterace o Amaranthaceae o Palmae	September-October	NDS
32.	Paper-II U-II Cytogenetics Extranuclear Genetics Organelle heredity- o Chloroplast determines heredity - Plastid transmission in plants, Streptomycin resistance in Chlamydomonas. o Male sterility in maize	September-October	PS
33.	Paper-III U-II Forestry and Economic Botany Community ecology- Characters of community - Quantitative characters and qualitative characters	September-October	SS
34.	Paper-I U-III	September-October	PS

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	Modern Techniques to Study Plant Diversity Principles and techniques of Horizontal and Vertical electrophoresis		
35.	Paper-II U-III Molecular Biology Transcription in prokaryotes and eukaryotes: promoter sites, initiation, elongation and termination. o RNA processing: Adenylation & Capping.	September-October	PS
36.	Paper-III U-III Industry based on plant products • Biofuels.	September-October	AKR

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Semester-IV

Sr. No.	Topics	Month	Faculty name
1.	Paper-I U-I Thallophyta: Fungi, Plant Pathology and Lichens Fungi • General characters of Ascomycetae	November-December	NDS
2.	Paper-II U-I Anatomy • Normal Secondary Growth in Dicotyledonous stem and root.	November-December	AYS
3.	Paper-III U-I Horticulture and Gardening Introduction to Horticulture: Branches of Horticulture	November-December	AKR
4.	Paper-I U-II Thallophyta: Fungi, Plant Pathology and Lichens Fungi Salient features and classification upto orders (with examples of each) of Psilophyta and Lepidophyta (G M Smith's system of classification to be followed)	November-December	NDS
5.	Paper-II U-II Plant Physiology and Plant Biochemistry • Respiration: Aerobic: Glycolysis, TCA Cycle, ETS & Energetic of respiration; Anaerobic respiration.	November-December	PS
6.	Paper-III U-II Biotechnology • Introduction to plant tissue culture o Laboratory organization and techniques in plant tissue culture	November-December	PS
7.	Paper-I U-III Gymnosperms • Salient features, classification up to orders (with examples of each) and economic importance of Coniferophyta (Chamberlain's system of classification to be followed)	November-December	NDS
8.	Paper-II U-III Ecology and Environmental Botany Biogeochemical Cycles- Carbon, Nitrogen and Water.	November-December	SS
9.	Paper-III U-III Biostatistics: The chi square test.	November-December	PS
10.	Paper-I U-I	December-January	NDS

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	Structure, life cycle and systematic position of Erysiphe and Xylaria		
11.	Paper-II U-I Growth rings, periderm, lenticels, tyloses, heart wood and sap wood.	December-January	AYS
12.	Paper-III U-I Types of garden o Formal and informal gardens	December-January	AKR
13.	Paper-I U-II Pteridophyta and Paleobotany Pteridophyta- Structure, life cycle and systematic position of Selaginella	December-January	NDS
14.	Paper-II U-II Plant Physiology and Plant Biochemistry Photorespiration	December-January	PS
15.	Paper-III U-II Introduction to plant tissue culture o Totipotency o Organogenesis	December-January	PS
16.	Paper-I U-III Structure life cycle and systematic position of Pinus	December-January	NDS
17.	Paper-II U-III Ecological factors: Concept of environmental factors.	December-January	SS
18.	Paper-III U-III Biostatistics: Correlation – Calculation of coefficient of correlation.	December-January	PS
19.	Paper-I U-I Thallophyta: Plant Pathology- Symptoms, causative organism, disease cycle and control measures of o Powdery mildew	January-February	NDS
20.	Paper-II U-I • Mechanical Tissue system o Tissues providing mechanical strength and support and their disposition	January-February	AYS
21.	Paper-III U-I • Types of garden o National Park: Sanjay Gandhi National Park.	January-February	AKR
22.	Paper-I U-II • Paleobotany- The geological time scale	January-February	NDS
23.	Paper-II U-II Plant Physiology and Plant	January-February	PS

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	Biochemistry Photoperiodism: Phytochrome Response and Vernalization with reference to flowering in higher plants		
24.	Paper-III U-II Introduction to plant tissue culture o Organ culture – root cultures, meristem cultures, anther and pollen culture, embryo culture.	January-February	PS
25.	Paper-I U-III Structure and systematic position of the form genus Cordaites	January-February	NDS
26.	Paper-II U-III Soil as an edaphic factor, Soil composition, types of soil, soil formation, soil profile.	January-February	SS
27.	Paper-III U-III Biostatistics and Bioinformatics • Bioinformatics o Information technology: History and tools of IT, Internet and its uses.	January-February	PS
28.	Paper-I U-I Thallophyta: Plant Pathology-Symptoms, causative organism, disease cycle and control measures of o Late blight of potato	February-March	NDS
29.	Paper-II U-I • Mechanical Tissue system o I-girders in aerial and underground organs	February-March	AYS
30.	Paper-III U-I o Botanical Garden: Veer Mata JijabaiUdyan (Victoria Garden)	February-March	AKR
31.	Paper-I U-II Formation and types of fossils	February-March	NDS
32.	Paper-II U-II Physico-chemical properties of phytochrome	February-March	PS
33.	Paper-III U-II • R-DNA technology- o Gene cloning	February-March	PS
34.	Paper-I U-III • Structure and systematic position of the form genus Cordaites	February-March	NDS
35.	Paper-II U-III Community ecology- Characters of community - Quantitative characters and qualitative characters	February-March	SS
36.	Paper-III U-III	February-March	PS

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	Biostatistics and Bioinformatics o Introduction to Bioinformatics- goal, need, scope and limitation o Aims of Bioinformatics: Data organization, Tools of Bioinformatics- tools for web search, Data retrieval tools- Entrez, o BLAST o Bioinformatics programme in India.		
37.	Paper-I U-I Lichens- Classification, Structure, Method of Reproduction, Economic Importance and Ecological Significance of Lichens.	March-April	NDS
38.	Paper-II U-I Types of Vascular Bundles.	March-April	AYS
39.	Paper-III U-I Types of garden o National Park: Sanjay Gandhi National Park. o Botanical Garden: Veer Mata JijabaiUdyan (Victoria Garden)	March-April	AKR
40.	Paper-I U-II Structure and systematic position of form genus Rhynia	March-April	NDS
41.	Paper-II U-II Vernalization mechanisms and applications.	March-April	PS
42.	Paper-III U-II R-DNA technology- o Enzymes involved in Gene cloning o Vectors used for Gene cloning.	March-April	SC
43.	Paper-I U-III systematic position of the form genus Cordaites	March-April	NDS
44.	Paper-II U-III Community ecology- Characters of community - qualitative characters	March-April	SS
45.	Paper-III U-III o BLAST o Bioinformatics programme in India.	March-April	SC

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Sr. No.	Topics	Month	Faculty name
1.	Paper-I U-I Thallophyta (Algae) & Bryophyta General Characters of Division Phaeophyta: Distribution, Cell structure, range of thallus, Economic Importance.	June-July	NDS
2.	Paper-II U-I Cell Biology Ultra-Structure and functions of the following cell organelles: o Mitochondrion (membranes, cristae, F1 particles and matrix)	June-July	AYS
3.	Paper-III U-I Pharmacognosy and phytochemistry Introduction to pharmacopoeia	June-July	AKR
4.	Paper-I U-II Angiosperms Systematics: Objectives and Goals of Plant systematic • Plant Nomenclature	June-July	NDS
5.	Paper-II U-II Cytogenetics Variation in Chromosome structure (Chromosomal Aberrations) Definition, Origin, Cytological and Genetic Effects of the following: Deletions	June-July	PS
6.	Paper-III U-II Forestry and Economic Botany Forestry: Outline of types of forest in India	June-July	SS
7.	Paper-I U-III Modern Techniques to Study Plant Diversity Preservation methods: Dry and Wet method	June-July	PS
8.	Paper-II U-III Molecular Biology DNA replication: Modes of Replication, Messelson and Stahl Experment,	June-July	PS
9.	Paper-III U-III Industry based on plant products Aromatherapy- Introduction, Uses with few examples. Jojoba, lemon	June-July	AKR

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10.	Paper-I U-I Thallophyta (Algae) & Bryophyta • Structure, life cycle and systematic position of Sargassum	July-August	NDS
11.	Paper-II U-I Cell Biology Ultra Structure and functions of the following cell organelles: Peroxisomes and Glyoxysomes o Ribosomes (prokaryotic, eukaryotic and subunits)	July-August	AYS
12.	Paper-III U-I Pharmacognosy and phytochemistry Indian pharmacopoeia, Indian Herbal Pharmacopoeia and Ayurvedic Pharmacopoeia	July-August	AKR
13.	Paper-I U-II Angiosperms Taxonomy in relation to Anatomy Palynology Chemical constituents	July-August	NDS
14.	Paper-II U-II Cytogenetics Variation in Chromosome structure (Chromosomal Aberrations) Definition, Origin, Cytological and Genetic Effects of the following: Duplications, Inversions and Translocations.	July-August	PS
15.	Paper-III U-II Forestry and Economic Botany Forestry: Agro-forestry, Urban forestry, organic farming, Silviculture	July-August	SS
16.	Paper-I U-III Modern Techniques to Study Plant Diversity MicroPSopy – Principle and working of Light, and electron microPSope.	July-August	PS
17.	Paper-II U-III Molecular Biology DNA replication in prokaryotes and eukaryotes- enzymes involved and molecular mechanism of replication.	July-August	PS
18.	Paper-III U-III Industry based on plant products Aromatherapy- Botanical and nutraceuticals -Spirulina, Vanillin, Garcinia indica/ Garcinia cambogia	July-August	AKR
19.	Paper-I U-I Thallophyta (Algae) & Bryophyta -	August-September	NDS

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	General Account of Class Anthocerotae and MuPSI		
20.	Paper-II U-I Cell Biology Cell Division and its significance o Cell Cycle, structure of Interphase Nucleus (nuclear envelop, chromatin network, nucleolus and nucleoplasm) o Mitosis & Meiosis o Differences between Mitosis and Meiosis	August-September	AYS
21.	Paper-III U-I Pharmacognosy and phytochemistry Secondary Metabolites: Sources, properties, uses and adulterants, regional and seasonal variations	August-September	AKR
22.	Paper-I U-II Angiosperms Taxonomy in relation to Anatomy Embryology Cytology Ecology	August-September	NDS
23.	Paper-II U-II Cytogenetics Sex determination, Sex linked, sex influenced and sex limited traits: Sex determination- Chromosomal Methods: heterogametic males and heterogametic females. Sex determination in monoecious and dioecious plants. Genic Balance Theory of sex determination in Drosophila, Lyon's Hypothesis of X chromosome inactivation. Sex linked- eye colour in Drosophila, Haemophilia, colour blindness Sex influenced- baldness in man	August-September	PS
24.	Paper-III U-II Forestry and Economic Botany Economic Botany: • Types of fibers: Jute and cotton, • Current trends in Fiber industries	August-September	SS
25.	Paper-I U-III Modern Techniques to Study Plant Diversity Chromatography- Principles and techniques in paper and thin layer chromatography.	August-September	PS
26.	Paper-II U-III Molecular Biology Protein Synthesis: o Central dogma of	August-September	PS

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	Protein synthesis		
27.	Paper-III U-III Industry based on plant products Enzymes industry: Cellulases, Papain, Bromelain	August-September	AKR
28.	Paper-I U-I Thallophyta (Algae) & Bryophyta Lichens- Classification, Structure, Method of Reproduction, Economic Importance and Ecological Significance of Lichens.	September-October	NDS
29.	Paper-II U-I Cell Biology Differences between Mitosis and Meiosis • Nucleic Acids: Types, structure and functions of DNA and RNA	September-October	AYS
30.	Paper-III U-I Pharmacognosy and phytochemistry Adulterants: Saraca asoca, Polyalthia longifolia Terminalia arjuna, Terminalia tomentosa Bacopa monnieri, Centella asiatica Abrus, Glycyrrhiza Phyllanthus amarus (Bhuiamla)	September-October	AKR
31.	Paper-I U-II Angiosperms With the help of Bentham and Hooker's system of Classification for flowering plants study the vegetative, floral characters and economic importance of the following families: o Leguminosae o Asterace o Amaranthaceae o Palmae	September-October	NDS
32.	Paper-II U-II Cytogenetics Extranuclear Genetics Organelle heredity- o Chloroplast determines heredity - Plastid transmission in plants, Streptomycin resistance in Chlamydomonas. o Male sterility in maize	September-October	PS
33.	Paper-III U-II Forestry and Economic Botany Community ecology- Characters of community - Quantitative characters and qualitative characters	September-October	SS
34.	Paper-I U-III	September-October	PS

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	Modern Techniques to Study Plant Diversity Principles and techniques of Horizontal and Vertical electrophoresis		
35.	Paper-II U-III Molecular Biology TranPSription in prokaryotes and eukaryotes: promoter sites, initiation, elongation and termination. o RNA processing: Adenylation & Capping.	September-October	PS
36.	Paper-III U-III Industry based on plant products • Biofuels.	September-October	AKR

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Department: Botany Teaching Plan: Year-2020-21

Class: S.Y.B.PS.

Semester-IV

Sr. No.	Topics	Month	Faculty name
1.	Paper-I U-I Thallophyta: Fungi, Plant Pathology and Lichens Fungi • General characters of APSomycetae	November-December	NDS
2.	Paper-II U-I Anatomy • Normal Secondary Growth in Dicotyledonous stem and root.	November-December	AYS
3.	Paper-III U-I Horticulture and Gardening Introduction to Horticulture: Branches of Horticulture	November-December	AKR
4.	Paper-I U-II Thallophyta: Fungi, Plant Pathology and Lichens Fungi Salient features and classification upto orders (with examples of each) of Psilophyta and Lepidophyta (G M Smith's system of classification to be followed)	November-December	NDS
5.	Paper-II U-II Plant Physiology and Plant Biochemistry • Respiration: Aerobic: Glycolysis, TCA Cycle, ETS & Energetic of respiration; Anaerobic respiration.	November-December	PS
6.	Paper-III U-II Biotechnology • Introduction to plant tissue culture o Laboratory organization and techniques in plant tissue culture	November-December	PS
7.	Paper-I U-III Gymnosperms • Salient features, classification up to orders (with examples of each) and economic importance of Coniferophyta (Chamberlain's system of classification to be followed)	November-December	NDS
8.	Paper-II U-III Ecology and Environmental Botany Biogeochemical Cycles- Carbon, Nitrogen and Water.	November-December	SS
9.	Paper-III U-III Biostatistics: The chi square test.	November-December	PS
10.	Paper-I U-I	December-January	NDS

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	Structure, life cycle and systematic position of Erysiphe and Xylaria		
11.	Paper-II U-I Growth rings, periderm, lenticels, tyloses, heart wood and sap wood.	December-January	AYS
12.	Paper-III U-I Types of garden o Formal and informal gardens	December-January	AKR
13.	Paper-I U-II Pteridophyta and Paleobotany Pteridophyta- Structure, life cycle and systematic position of Selaginella	December-January	NDS
14.	Paper-II U-II Plant Physiology and Plant Biochemistry Photorespiration	December-January	PS
15.	Paper-III U-II Introduction to plant tissue culture o Totipotency o Organogenesis	December-January	PS
16.	Paper-I U-III Structure life cycle and systematic position of Pinus	December-January	NDS
17.	Paper-II U-III Ecological factors: Concept of environmental factors.	December-January	SS
18.	Paper-III U-III Biostatistics: Correlation – Calculation of coefficient of correlation.	December-January	PS
19.	Paper-I U-I Thallophyta: Plant Pathology- Symptoms, causative organism, disease cycle and control measures of o Powdery mildew	January-February	NDS
20.	Paper-II U-I • Mechanical Tissue system o Tissues providing mechanical strength and support and their disposition	January-February	AYS
21.	Paper-III U-I • Types of garden o National Park: Sanjay Gandhi National Park.	January-February	AKR
22.	Paper-I U-II • Paleobotany- The geological time PSale	January-February	NDS
23.	Paper-II U-II Plant Physiology and Plant	January-February	PS

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	Biochemistry Photoperiodism: Phytochrome Response and Vernalization with reference to flowering in higher plants		
24.	Paper-III U-II Introduction to plant tissue culture o Organ culture – root cultures, meristem cultures, anther and pollen culture, embryo culture.	January-February	PS
25.	Paper-I U-III Structure and systematic position of the form genus Cordaites	January-February	NDS
26.	Paper-II U-III Soil as an edaphic factor, Soil composition, types of soil, soil formation, soil profile.	January-February	SS
27.	Paper-III U-III Biostatistics and Bioinformatics • Bioinformatics o Information technology: History and tools of IT, Internet and its uses.	January-February	PS
28.	Paper-I U-I Thallophyta: Plant Pathology-Symptoms, causative organism, disease cycle and control measures of o Late blight of potato	February-March	NDS
29.	Paper-II U-I • Mechanical Tissue system o I-girders in aerial and underground organs	February-March	AYS
30.	Paper-III U-I o Botanical Garden: Veer Mata JijabaiUdyan (Victoria Garden)	February-March	AKR
31.	Paper-I U-II Formation and types of fossils	February-March	NDS
32.	Paper-II U-II Physico-chemical properties of phytochrome	February-March	PS
33.	Paper-III U-II • R-DNA technology- o Gene cloning	February-March	PS
34.	Paper-I U-III • Structure and systematic position of the form genus Cordaites	February-March	NDS
35.	Paper-II U-III Community ecology- Characters of community - Quantitative characters and qualitative characters	February-March	SS
36.	Paper-III U-III	February-March	PS

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	Biostatistics and Bioinformatics o Introduction to Bioinformatics- goal, need, PSope and limitation o Aims of Bioinformatics: Data organization, Tools of Bioinformatics- tools for web search, Data retrieval tools- Entrez, o BLAST o Bioinformatics programme in India.		
1.	Paper-I U-I Thallophyta: Fungi, Plant Pathology and Lichens Fungi • General characters of Ascomycetae	November-December	NDS
2.	Paper-II U-I Anatomy • Normal Secondary Growth in Dicotyledonous stem and root.	November-December	AYS
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6.	Paper-III U-II Biotechnology • Introduction to plant tissue culture o Laboratory organization and techniques in plant tissue culture	November-December	SC
7.	Paper-I U-III Gymnosperms • Salient features, classification up to orders (with examples of each) and economic importance of Coniferophyta (Chamberlain's system of classification to be followed)	November-December	NDS
8.	Paper-II U-III	November-December	SS

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	Ecology and Environmental Botany Biogeochemical Cycles- Carbon, Nitrogen and Water.		
9.	Paper-III U-III Biostatistics: The chi square test.	November-December	SC
10.	Paper-I U-I Structure, life cycle and systematic position of Erysiphe and Xylaria	December-January	NDS
11.	Paper-II U-I Growth rings, periderm, lenticels, tyloses, heart wood and sap wood.	December-January	AYS
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19.	Paper-I U-I Thallophyta: Plant Pathology- Symptoms, causative organism, disease cycle and control measures of o Powdery mildew	January-February	NDS
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21.	Paper-III U-I • Types of garden o National Park: Sanjay Gandhi	January-February	AKR

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	National Park.		
22.	Paper-I U-II • Paleobotany- The geological time scale	January-February	NDS
23.	Paper-II U-II Plant Physiology and Plant Biochemistry Photoperiodism: Phytochrome Response and Vernalization with reference to flowering in higher plants	January-February	PS
24.	Paper-III U-II Introduction to plant tissue culture o Organ culture – root cultures, meristem cultures, anther and pollen culture, embryo culture.	January-February	SC
25.	Paper-I U-III Structure and systematic position of the form genus Cordaites	January-February	NDS
26.	Paper-II U-III Soil as an edaphic factor, Soil composition, types of soil, soil formation, soil profile.	January-February	SS
27.	Paper-III U-III Biostatistics and Bioinformatics • Bioinformatics o Information technology: History and tools of IT, Internet and its uses.	January-February	SC
28.	Paper-I U-I Thallophyta: Plant Pathology-Symptoms, causative organism, disease cycle and control measures of o Late blight of potato	February-March	NDS
29.	Paper-II U-I • Mechanical Tissue system o I-girders in aerial and underground organs	February-March	AYS
30.	Paper-III U-I o Botanical Garden: Veer Mata JijabaiUdyan (Victoria Garden)	February-March	AKR
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32.	Paper-II U-II Physico-chemical properties of phytochrome	February-March	PS
33.	Paper-III U-II • R-DNA technology- o Gene cloning	February-March	SC
34.	Paper-I U-III	February-March	NDS

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	• Structure of Cordaites		
35.	Paper-II U-III Community ecology- Characters of community - Quantitative characters and qualitative characters	February-March	SS
36.	Paper-III U-III Biostatistics and Bioinformatics o Introduction to Bioinformatics- goal, need, scope and limitation o Aims of Bioinformatics: Data organization, Tools of Bioinformatics- tools for web search, Data retrieval tools- Entrez	February-March	SC
37.	Paper-I U-I Lichens- Classification, Structure, Method of Reproduction, Economic Importance and Ecological Significance of Lichens.	March-April	NDS
38.	Paper-II U-I Types of Vascular Bundles.	March-April	AYS
39.	Paper-III U-I Types of garden o National Park: Sanjay Gandhi National Park. o Botanical Garden: Veer Mata JijabaiUdyan (Victoria Garden)	March-April	AKR
40.	Paper-I U-II Structure and systematic position of form genus Rhynia	March-April	NDS
41.	Paper-II U-II Vernalization mechanisms and applications.	March-April	PS
42.	Paper-III U-II R-DNA technology- o Enzymes involved in Gene cloning o Vectors used for Gene cloning.	March-April	SC
43.	Paper-I U-III systematic position of the form genus Cordaites	March-April	NDS
44.	Paper-II U-III Community ecology- Characters of community - qualitative characters	March-April	SS
45.	Paper-III U-III o BLAST o Bioinformatics programme in India.	March-April	SC

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Sr. No.	Topics	Month	Faculty name
1.	Paper-I U-I Thallophyta (Algae) & Bryophyta General Characters of Division Phaeophyta: Distribution, Cell structure, range of thallus, Economic Importance.	June-July	NDS
2.	Paper-II U-I Cell Biology Ultra-Structure and functions of the following cell organelles: o Mitochondrion (membranes, cristae, F1 particles and matrix)	June-July	AYS
3.	Paper-III U-I Pharmacognosy and phytochemistry Introduction to pharmacopoeia	June-July	AKR
4.	Paper-I U-II Angiosperms Systematics: Objectives and Goals of Plant systematic • Plant Nomenclature	June-July	NDS
5.	Paper-II U-II Cytogenetics Variation in Chromosome structure (Chromosomal Aberrations) Definition, Origin, Cytological and Genetic Effects of the following: Deletions	June-July	ST
6.	Paper-III U-II Forestry and Economic Botany Forestry: Outline of types of forest in India	June-July	SS
7.	Paper-I U-III Modern Techniques to Study Plant Diversity Preservation methods: Dry and Wet method	June-July	ST
8.	Paper-II U-III Molecular Biology DNA replication: Modes of Replication, Messelson and Stahl Experment,	June-July	SC
9.	Paper-III U-III Industry based on plant products Aromatherapy- Introduction, Uses with few examples. Jojoba, lemon	June-July	AKR

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10.	Paper-I U-I Thallophyta (Algae) & Bryophyta • Structure, life cycle and systematic position of Sargassum	July-August	NDS
11.	Paper-II U-I Cell Biology Ultra Structure and functions of the following cell organelles: Peroxisomes and Glyoxysomes o Ribosomes (prokaryotic, eukaryotic and subunits)	July-August	AYS
12.	Paper-III U-I Pharmacognosy and phytochemistry Indian pharmacopoeia, Indian Herbal Pharmacopoeia and Ayurvedic Pharmacopoeia	July-August	AKR
13.	Paper-I U-II Angiosperms Taxonomy in relation to Anatomy Palynology Chemical constituents	July-August	NDS
14.	Paper-II U-II Cytogenetics Variation in Chromosome structure (Chromosomal Aberrations) Definition, Origin, Cytological and Genetic Effects of the following: Duplications, Inversions and Translocations.	July-August	ST
15.	Paper-III U-II Forestry and Economic Botany Forestry: Agro-forestry, Urban forestry, organic farming, Silviculture	July-August	SS
16.	Paper-I U-III Modern Techniques to Study Plant Diversity Microscopy – Principle and working of Light, and electron microscope.	July-August	ST
17.	Paper-II U-III Molecular Biology DNA replication in prokaryotes and eukaryotes- enzymes involved and molecular mechanism of replication.	July-August	SC
18.	Paper-III U-III Industry based on plant products Aromatherapy- Botanical and nutraceuticals -Spirulina, Vanillin, Garcinia indica/ Garcinia cambogia	July-August	AKR
19.	Paper-I U-I Thallophyta (Algae) & Bryophyta	August-September	NDS

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	General Account of Class Anthocerotae and Musci		
20.	Paper-II U-I Cell Biology Cell Division and its significance o Cell Cycle, structure of Interphase Nucleus (nuclear envelop, chromatin network, nucleolus and nucleoplasm) o Mitosis & Meiosis o Differences between Mitosis and Meiosis	August-September	AYS
21.	Paper-III U-I Pharmacognosy and phytochemistry Secondary Metabolites: Sources, properties, uses and adulterants, regional and seasonal variations	August-September	AKR
22.	Paper-I U-II Angiosperms Taxonomy in relation to Anatomy Embryology Cytology Ecology	August-September	NDS
23.	Paper-II U-II Cytogenetics Sex determination, Sex linked, sex influenced and sex limited traits: Sex determination- Chromosomal Methods: heterogametic males and heterogametic females. Sex determination in monoecious and dioecious plants. Genic Balance Theory of sex determination in Drosophila, Lyon's Hypothesis of X chromosome inactivation. Sex linked- eye colour in Drosophila, Haemophilia, colour blindness Sex influenced- baldness in man	August-September	ST
24.	Paper-III U-II Forestry and Economic Botany Economic Botany: • Types of fibers: Jute and cotton, • Current trends in Fiber industries	August-September	SS
25.	Paper-I U-III Modern Techniques to Study Plant Diversity Chromatography- Principles and techniques in paper and thin layer chromatography.	August-September	ST
26.	Paper-II U-III Molecular Biology Protein Synthesis: o Central dogma of	August-September	SC

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	Protein synthesis		
27.	Paper-III U-III Industry based on plant products Enzymes industry: Cellulases, Papain, Bromelain	August-September	AKR
28.	Paper-I U-I Thallophyta (Algae) & Bryophyta Lichens- Classification, Structure, Method of Reproduction, Economic Importance and Ecological Significance of Lichens.	September-October	NDS
29.	Paper-II U-I Cell Biology Differences between Mitosis and Meiosis • Nucleic Acids: Types, structure and functions of DNA and RNA	September-October	AYS
30.	Paper-III U-I Pharmacognosy and phytochemistry Adulterants: Saraca asoca, Polyalthia longifolia Terminalia arjuna, Terminalia tomentosa Bacopa monnieri, Centella asiatica Abrus, Glycyrrhiza Phyllanthus amarus (Bhuiamla)	September-October	AKR
31.	Paper-I U-II Angiosperms With the help of Bentham and Hooker's system of Classification for flowering plants study the vegetative, floral characters and economic importance of the following families: o Leguminosae o Asterace o Amaranthaceae o Palmae	September-October	NDS
32.	Paper-II U-II Cytogenetics Extranuclear Genetics Organelle heredity- o Chloroplast determines heredity - Plastid transmission in plants, Streptomycin resistance in Chlamydomonas. o Male sterility in maize	September-October	ST
33.	Paper-III U-II Forestry and Economic Botany Community ecology- Characters of community - Quantitative characters and qualitative characters	September-October	SS
34.	Paper-I U-III	September-October	ST

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	Modern Techniques to Study Plant Diversity Principles and techniques of Horizontal and Vertical electrophoresis		
35.	Paper-II U-III Molecular Biology Transcription in prokaryotes and eukaryotes: promoter sites, initiation, elongation and termination. o RNA processing: Adenylation & Capping.	September-October	SC
36.	Paper-III U-III Industry based on plant products • Biofuels.	September-October	AKR

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Semester-IV

Sr. No.	Topics	Month	Faculty name
	Semester-IV		
1.	Paper-I U-I Thallophyta: Fungi, Plant Pathology and Lichens Fungi • General characters of APSomycetae	November-December	NDS
2.	Paper-II U-I Anatomy • Normal Secondary Growth in Dicotyledonous stem and root.	November-December	AYS
3.	Paper-III U-I Horticulture and Gardening Introduction to Horticulture: Branches of Horticulture	November-December	AKR
4.	Paper-I U-II Thallophyta: Fungi, Plant Pathology and Lichens Fungi Salient features and classification upto orders (with examples of each) of Psilophyta and Lepidophyta (G M Smith's system of classification to be followed)	November-December	NDS
5.	Paper-II U-II Plant Physiology and Plant Biochemistry • Respiration: Aerobic: Glycolysis, TCA Cycle, ETS & Energetic of respiration; Anaerobic respiration.	November-December	PS
6.	Paper-III U-II Biotechnology • Introduction to plant tissue culture o Laboratory organization and techniques in plant tissue culture	November-December	PS
7.	Paper-I U-III Gymnosperms • Salient features, classification up to orders (with examples of each) and economic importance of Coniferophyta (Chamberlain's system of classification to be followed)	November-December	NDS
8.	Paper-II U-III Ecology and Environmental Botany Biogeochemical Cycles- Carbon, Nitrogen and Water.	November-December	SS
9.	Paper-III U-III	November-December	PS

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	Biostatistics: The chi square test.		
10.	Paper-I U-I Structure, life cycle and systematic position of Erysiphe and Xylaria	December-January	NDS
11.	Paper-II U-I Growth rings, periderm, lenticels, tyloses, heart wood and sap wood.	December-January	AYS
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22.	Paper-I U-II • Paleobotany- The geological time PSale	January-February	NDS

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23.	Paper-II U-II Plant Physiology and Plant Biochemistry Photoperiodism: Phytochrome Response and Vernalization with reference to flowering in higher plants	January-February	PS
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31.	Paper-I U-II Formation and types of fossils	February-March	NDS
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	and qualitative characters		
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2.	Paper-II U-I Anatomy • Normal Secondary Growth in Dicotyledonous stem and root.	November-December	AYS
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7.	Paper-I U-III Gymnosperms • Salient features, classification up to orders (with examples of each) and economic importance of Coniferophyta (Chamberlain's system	November-December	NDS

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	of classification to be followed)		
8.	Paper-II U-III Ecology and Environmental Botany Biogeochemical Cycles- Carbon, Nitrogen and Water.	November-December	SS
9.	Paper-III U-III Biostatistics: The chi square test.	November-December	SC
10.	Paper-I U-I Structure, life cycle and systematic position of Erysiphe and Xylaria	December-January	NDS
11.	Paper-II U-I Growth rings, periderm, lenticels, tyloses, heart wood and sap wood.	December-January	AYS
12.	Paper-III U-I Types of garden o Formal and informal gardens	December-January	AKR
13.	Paper-I U-II Pteridophyta and Paleobotany Pteridophyta- Structure, life cycle and systematic position of Selaginella	December-January	NDS
14.	Paper-II U-II Plant Physiology and Plant Biochemistry Photorespiration	December-January	PS
15.	Paper-III U-II Introduction to plant tissue culture o Totipotency o Organogenesis	December-January	SC
16.	Paper-I U-III Structure life cycle and systematic position of Pinus	December-January	NDS
17.	Paper-II U-III Ecological factors: Concept of environmental factors.	December-January	SS
18.	Paper-III U-III Biostatistics: Correlation – Calculation of coefficient of correlation.	December-January	SC
19.	Paper-I U-I Thallophyta: Plant Pathology- Symptoms, causative organism, disease cycle and control measures of o Powdery mildew	January-February	NDS
20.	Paper-II U-I • Mechanical Tissue system o Tissues providing mechanical strength and support and their disposition	January-February	AYS
21.	Paper-III U-I	January-February	AKR

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	• Types of garden o National Park: Sanjay Gandhi National Park.		
22.	Paper-I U-II • Paleobotany- The geological time scale	January-February	NDS
23.	Paper-II U-II Plant Physiology and Plant Biochemistry Photoperiodism: Phytochrome Response and Vernalization with reference to flowering in higher plants	January-February	PS
24.	Paper-III U-II Introduction to plant tissue culture o Organ culture – root cultures, meristem cultures, anther and pollen culture, embryo culture.	January-February	SC
25.	Paper-I U-III Structure and systematic position of the form genus Cordaites	January-February	NDS
26.	Paper-II U-III Soil as an edaphic factor, Soil composition, types of soil, soil formation, soil profile.	January-February	SS
27.	Paper-III U-III Biostatistics and Bioinformatics • Bioinformatics o Information technology: History and tools of IT, Internet and its uses.	January-February	SC
28.	Paper-I U-I Thallophyta: Plant Pathology-Symptoms, causative organism, disease cycle and control measures of o Late blight of potato	February-March	NDS
29.	Paper-II U-I • Mechanical Tissue system o I-girders in aerial and underground organs	February-March	AYS
30.	Paper-III U-I o Botanical Garden: Veer Mata JijabaiUdyan (Victoria Garden)	February-March	AKR
31.	Paper-I U-II Formation and types of fossils	February-March	NDS
32.	Paper-II U-II Physico-chemical properties of phytochrome	February-March	PS
33.	Paper-III U-II • R-DNA technology-	February-March	SC

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	o Gene cloning		
34.	Paper-I U-III • Structure of Cordaites	February-March	NDS
35.	Paper-II U-III Community ecology- Characters of community - Quantitative characters and qualitative characters	February-March	SS
36.	Paper-III U-III Biostatistics and Bioinformatics o Introduction to Bioinformatics- goal, need, scope and limitation o Aims of Bioinformatics: Data organization, Tools of Bioinformatics- tools for web search, Data retrieval tools- Entrez	February-March	SC
37.	Paper-I U-I Lichens- Classification, Structure, Method of Reproduction, Economic Importance and Ecological Significance of Lichens.	March-April	NDS
38.	Paper-II U-I Types of Vascular Bundles.	March-April	AYS
39.	Paper-III U-I Types of garden o National Park: Sanjay Gandhi National Park. o Botanical Garden: Veer Mata JijabaiUdyan (Victoria Garden)	March-April	AKR
40.	Paper-I U-II Structure and systematic position of form genus Rhynia	March-April	NDS
41.	Paper-II U-II Vernalization mechanisms and applications.	March-April	PS
42.	Paper-III U-II R-DNA technology- o Enzymes involved in Gene cloning o Vectors used for Gene cloning.	March-April	SC
43.	Paper-I U-III systematic position of the form genus Cordaites	March-April	NDS
44.	Paper-II U-III Community ecology- Characters of community - qualitative characters	March-April	SS
45.	Paper-III U-III o BLAST o Bioinformatics programme in India.	March-April	SC

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Sr. No.	Topics	Month	Faculty name
1.	Paper-I U-I Thallophyta (Algae) & Bryophyta General Characters of Division Phaeophyta: Distribution, Cell structure, range of thallus, Economic Importance.	June-July	NDS
2.	Paper-II U-I Cell Biology Ultra-Structure and functions of the following cell organelles: o Mitochondrion (membranes, cristae, F1 particles and matrix)	June-July	AYS
3.	Paper-III U-I Pharmacognosy and phytochemistry Introduction to pharmacopoeia	June-July	AKR
4.	Paper-I U-II Angiosperms Systematics: Objectives and Goals of Plant systematic • Plant Nomenclature	June-July	NDS
5.	Paper-II U-II Cytogenetics Variation in Chromosome structure (Chromosomal Aberrations) Definition, Origin, Cytological and Genetic Effects of the following: Deletions	June-July	ST
6.	Paper-III U-II Forestry and Economic Botany Forestry: Outline of types of forest in India	June-July	SS
7.	Paper-I U-III Modern Techniques to Study Plant Diversity Preservation methods: Dry and Wet method	June-July	ST
8.	Paper-II U-III Molecular Biology DNA replication: Modes of Replication, Messelson and Stahl Experment,	June-July	SC
9.	Paper-III U-III Industry based on plant products Aromatherapy- Introduction, Uses with few examples. Jojoba, lemon	June-July	AKR

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10.	Paper-I U-I Thallophyta (Algae) & Bryophyta • Structure, life cycle and systematic position of Sargassum	July-August	NDS
11.	Paper-II U-I Cell Biology Ultra Structure and functions of the following cell organelles: Peroxisomes and Glyoxysomes o Ribosomes (prokaryotic, eukaryotic and subunits)	July-August	AYS
12.	Paper-III U-I Pharmacognosy and phytochemistry Indian pharmacopoeia, Indian Herbal Pharmacopoeia and Ayurvedic Pharmacopoeia	July-August	AKR
13.	Paper-I U-II Angiosperms Taxonomy in relation to Anatomy Palynology Chemical constituents	July-August	NDS
14.	Paper-II U-II Cytogenetics Variation in Chromosome structure (Chromosomal Aberrations) Definition, Origin, Cytological and Genetic Effects of the following: Duplications, Inversions and Translocations.	July-August	ST
15.	Paper-III U-II Forestry and Economic Botany Forestry: Agro-forestry, Urban forestry, organic farming, Silviculture	July-August	SS
16.	Paper-I U-III Modern Techniques to Study Plant Diversity Microscopy – Principle and working of Light, and electron microscope.	July-August	ST
17.	Paper-II U-III Molecular Biology DNA replication in prokaryotes and eukaryotes- enzymes involved and molecular mechanism of replication.	July-August	SC
18.	Paper-III U-III Industry based on plant products Aromatherapy- Botanical and nutraceuticals -Spirulina, Vanillin, Garcinia indica/ Garcinia cambogia	July-August	AKR
19.	Paper-I U-I Thallophyta (Algae) & Bryophyta	August-September	NDS

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	General Account of Class Anthocerotae and Musci		
20.	Paper-II U-I Cell Biology Cell Division and its significance o Cell Cycle, structure of Interphase Nucleus (nuclear envelop, chromatin network, nucleolus and nucleoplasm) o Mitosis & Meiosis o Differences between Mitosis and Meiosis	August-September	AYS
21.	Paper-III U-I Pharmacognosy and phytochemistry Secondary Metabolites: Sources, properties, uses and adulterants, regional and seasonal variations	August-September	AKR
22.	Paper-I U-II Angiosperms Taxonomy in relation to Anatomy Embryology Cytology Ecology	August-September	NDS
23.	Paper-II U-II Cytogenetics Sex determination, Sex linked, sex influenced and sex limited traits: Sex determination- Chromosomal Methods: heterogametic males and heterogametic females. Sex determination in monoecious and dioecious plants. Genic Balance Theory of sex determination in Drosophila, Lyon's Hypothesis of X chromosome inactivation. Sex linked-eye colour in Drosophila, Haemophilia, colour blindness Sex influenced- baldness in man	August-September	SC
24.	Paper-III U-II Forestry and Economic Botany Economic Botany: • Types of fibers: Jute and cotton, • Current trends in Fiber industries	August-September	SS
25.	Paper-I U-III Modern Techniques to Study Plant Diversity Chromatography- Principles and techniques in paper and thin layer chromatography.	August-September	ST
26.	Paper-II U-III Molecular Biology Protein Synthesis: o Central dogma of	August-September	SC

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	Protein synthesis		
27.	Paper-III U-III Industry based on plant products Enzymes industry: Cellulases, Papain, Bromelain	August-September	AKR
28.	Paper-I U-I Thallophyta (Algae) & Bryophyta Lichens- Classification, Structure, Method of Reproduction, Economic Importance and Ecological Significance of Lichens.	September-October	NDS
29.	Paper-II U-I Cell Biology Differences between Mitosis and Meiosis • Nucleic Acids: Types, structure and functions of DNA and RNA	September-October	AYS
30.	Paper-III U-I Pharmacognosy and phytochemistry Adulterants: Saraca asoca, Polyalthia longifolia Terminalia arjuna, Terminalia tomentosa Bacopa monnieri, Centella asiatica Abrus, Glycyrrhiza Phyllanthus amarus (Bhuiamla)	September-October	AKR
31.	Paper-I U-II Angiosperms With the help of Bentham and Hooker's system of Classification for flowering plants study the vegetative, floral characters and economic importance of the following families: o Leguminosae o Asterace o Amaranthaceae o Palmae	September-October	NDS
32.	Paper-II U-II Cytogenetics Extranuclear Genetics Organelle heredity- o Chloroplast determines heredity - Plastid transmission in plants, Streptomycin resistance in Chlamydomonas. o Male sterility in maize	September-October	SC
33.	Paper-III U-II Forestry and Economic Botany Community ecology- Characters of community - Quantitative characters and qualitative characters	September-October	SS
34.	Paper-I U-III	September-October	ST

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	Modern Techniques to Study Plant Diversity Principles and techniques of Horizontal and Vertical electrophoresis		
35.	Paper-II U-III Molecular Biology Transcription in prokaryotes and eukaryotes: promoter sites, initiation, elongation and termination. o RNA processing: Adenylation & Capping.	September-October	SC
36.	Paper-III U-III Industry based on plant products • Biofuels.	September-October	AKR

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Semester-IV

Sr. No.	Topics	Month	Faculty name
1.	Paper-I U-I Thallophyta: Fungi, Plant Pathology and Lichens Fungi • General characters of Ascomycetae	November-December	NDS
2.	Paper-II U-I Anatomy • Normal Secondary Growth in Dicotyledonous stem and root.	November-December	AYS
3.	Paper-III U-I Horticulture and Gardening Introduction to Horticulture: Branches of Horticulture	November-December	AKR
4.	Paper-I U-II Thallophyta: Fungi, Plant Pathology and Lichens Fungi Salient features and classification upto orders (with examples of each) of Psilophyta and Lepidophyta (G M Smith's system of classification to be followed)	November-December	NDS
5.	Paper-II U-II Plant Physiology and Plant Biochemistry • Respiration: Aerobic: Glycolysis, TCA Cycle, ETS & Energetic of respiration; Anaerobic respiration.	November-December	ST
6.	Paper-III U-II Biotechnology • Introduction to plant tissue culture o Laboratory organization and techniques in plant tissue culture	November-December	SC
7.	Paper-I U-III Gymnosperms • Salient features, classification up to orders (with examples of each) and economic importance of Coniferophyta (Chamberlain's system of classification to be followed)	November-December	NDS
8.	Paper-II U-III Ecology and Environmental Botany Biogeochemical Cycles- Carbon, Nitrogen and Water.	November-December	SS
9.	Paper-III U-III Biostatistics: The chi square test.	November-December	ST
10.	Paper-I U-I	December-January	NDS

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	Structure, life cycle and systematic position of Erysiphe and Xylaria		
11.	Paper-II U-I Growth rings, periderm, lenticels, tyloses, heart wood and sap wood.	December-January	AYS
12.	Paper-III U-I Types of garden o Formal and informal gardens	December-January	AKR
13.	Paper-I U-II Pteridophyta and Paleobotany Pteridophyta- Structure, life cycle and systematic position of Selaginella	December-January	NDS
14.	Paper-II U-II Plant Physiology and Plant Biochemistry Photorespiration	December-January	ST
15.	Paper-III U-II Introduction to plant tissue culture o Totipotency o Organogenesis	December-January	SC
16.	Paper-I U-III Structure life cycle and systematic position of Pinus	December-January	NDS
17.	Paper-II U-III Ecological factors: Concept of environmental factors.	December-January	SS
18.	Paper-III U-III Biostatistics: Correlation – Calculation of coefficient of correlation.	December-January	ST
19.	Paper-I U-I Thallophyta: Plant Pathology- Symptoms, causative organism, disease cycle and control measures of o Powdery mildew	January-February	NDS
20.	Paper-II U-I • Mechanical Tissue system o Tissues providing mechanical strength and support and their disposition	January-February	AYS
21.	Paper-III U-I • Types of garden o National Park: Sanjay Gandhi National Park.	January-February	AKR
22.	Paper-I U-II • Paleobotany- The geological time scale	January-February	NDS
23.	Paper-II U-II Plant Physiology and Plant	January-February	ST

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	Biochemistry Photoperiodism: Phytochrome Response and Vernalization with reference to flowering in higher plants		
24.	Paper-III U-II Introduction to plant tissue culture o Organ culture – root cultures, meristem cultures, anther and pollen culture, embryo culture.	January-February	SC
25.	Paper-I U-III Structure and systematic position of the form genus Cordaites	January-February	NDS
26.	Paper-II U-III Soil as an edaphic factor, Soil composition, types of soil, soil formation, soil profile.	January-February	SS
27.	Paper-III U-III Biostatistics and Bioinformatics • Bioinformatics o Information technology: History and tools of IT, Internet and its uses.	January-February	ST
28.	Paper-I U-I Thallophyta: Plant Pathology-Symptoms, causative organism, disease cycle and control measures of o Late blight of potato	February-March	NDS
29.	Paper-II U-I • Mechanical Tissue system o I-girders in aerial and underground organs	February-March	AYS
30.	Paper-III U-I o Botanical Garden: Veer Mata JijabaiUdyan (Victoria Garden)	February-March	AKR
31.	Paper-I U-II Formation and types of fossils	February-March	NDS
32.	Paper-II U-II Physico-chemical properties of phytochrome	February-March	ST
33.	Paper-III U-II • R-DNA technology- o Gene cloning	February-March	SC
34.	Paper-I U-III • Structure and systematic position of the form genus Cordaites	February-March	NDS
35.	Paper-II U-III Community ecology- Characters of community - Quantitative characters and qualitative characters	February-March	SS
36.	Paper-III U-III	February-March	ST

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	Biostatistics and Bioinformatics o Introduction to Bioinformatics- goal, need, scope and limitation o Aims of Bioinformatics: Data organization, Tools of Bioinformatics- tools for web search, Data retrieval tools- Entrez, o BLAST o Bioinformatics programme in India.		
37.	Paper-I U-I Lichens- Classification, Structure, Method of Reproduction, Economic Importance and Ecological Significance of Lichens.	March-April	NDS
38.	Paper-II U-I Types of Vascular Bundles.	March-April	AYS
39.	Paper-III U-I Types of garden o National Park: Sanjay Gandhi National Park. o Botanical Garden: Veer Mata JijabaiUdyan (Victoria Garden)	March-April	AKR
40.	Paper-I U-II Structure and systematic position of form genus Rhynia	March-April	NDS
41.	Paper-II U-II Vernalization mechanisms and applications.	March-April	PS
42.	Paper-III U-II R-DNA technology- o Enzymes involved in Gene cloning o Vectors used for Gene cloning.	March-April	SC
43.	Paper-I U-III systematic position of the form genus Cordaites	March-April	NDS
44.	Paper-II U-III Community ecology- Characters of community - qualitative characters	March-April	SS
45.	Paper-III U-III o BLAST o Bioinformatics programme in India.	March-April	SC

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Name of the Lecturer: Mr. Nitin Shelake (Semester-V) Subject / Paper: **Paper -I** Units – I, II, III, IV

(Term : 18th June 2018 to 5th November 2018)

Lecture No.	Key Points to be Covered:				Expected Months	Uni. allotted Lecture
	Unit I	**Unit II**	**Unit III**	**Unit IV**		
1	Introduction to Microbiology Definition and Scope of Microbiology Historical Overview of Microbiology Importance of Microbes in Various Fields	Introduction to Algae Definition and Overview of Algae Importance of Algae in Aquatic Ecosystems and Beyond General Characteristics of Algae	Introduction to Fungi Definition and Overview of Fungi Importance and Economic Significance General Characteristics of Fungi	Introduction to Plant Pathology Overview of plant pathology Importance of studying plant diseases Basic concepts and terminology	June	**15 X 4 = 60 Lectures**
2	Classification of Microbes Introduction to Different Types of Microbes: Viruses, Bacteria, Algae, Fungi, Protozoa, Mycoplasma, and Actinomycetes, Characteristics and Distinctive Features of Each Microbial Type	Rhodophyta : Classification and General Characters of Division Rhodophyta Distribution of Rhodophyta Species ,Cell Structure and Pigments of Rhodophyta , Reserve Food and Thallus Range in Rhodophyta ,	Basidiomycetes Introduction to Basidiomycetes Classification and General Characters	Study of Plant Diseases - White Rust (Albugo sp.) Introduction to white rust, Causative organism (Albugo sp.) Symptoms, predisposing factors, and disease cycle Control measures for white rust	July	
3	Viruses Structure and Characteristics of Viruses Viral Replication Cycle Viral Pathogenesis and Diseases	Reproduction in Rhodophyta: Asexual and Sexual , Alternation of Generations in Rhodophyta, Economic Importance of Rhodophyta	Morphological Features and Structures Basidiomycetes	Tikka Disease of Groundnut (Cercospora)., Introduction to Tikka disease., Causative organism (Cercospora) Symptoms, predisposing factors, and disease cycle Control measures for Tikka disease		
4	Bacteria Morphology and Structure of Bacteria	Structure and Life Cycle of Polysiphonia Detailed Examination of	Life Cycle of Agaricus : Morphology and Anatomy	Damping Off Disease (Pythium) , Introduction to damping off disease ,		

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	Bacterial Growth and Reproduction Role of Bacteria in Ecology and Industry	Polysiphonia: Morphology and Anatomy	Germination and Hyphal Growth Spore Formation Formation of Basidiocarp (Mushroom)	Causative organism (Pythium) ,Symptoms, predisposing factors, and disease cycle, Control measures for damping off disease		
5	Algae Overview of Algae: Definition and Characteristics Classification of Algae Importance of Algae in Aquatic Ecosystems and Biotechnology	Life Cycle of Polysiphonia: Asexual and Sexual Reproduction	Reproduction in Agaricus Basidiospore Release	Citrus Canker (Xanthomonas sp.) Introduction to citrus canker , Causative organism (Xanthomonas sp.) , Symptoms, predisposing factors, and disease cycle, Control measures for citrus canker		
6	Fungi :Introduction to Fungi: Characteristics and Classification Structure and Function of Fungal Cells Ecological Roles and Economic Importance of Fungi	Structure and Life Cycle of Batrachospermum Anatomy and Morphology of Batrachospermum	Ecological Roles and Economic Importance of Agaricus	Leaf Curl (Leaf Curl Virus). Introduction to leaf curl disease., Causative agent (Leaf curl virus), Symptoms, predisposing factors, and disease cycle., Control measures for leaf curl disease	August	
7	Protozoa Characteristics and Diversity of Protozoa Protozoan Morphology and Locomotion Protozoan Parasites and Diseases	Reproductive Strategies and Life Cycle of Batrachospermum	Life Cycle of Puccinia Spore Formation and Dispersal Infection of Host Plant Development of urediniospores (Ureial Satge)	Biological Control Methods of Plant Diseases., Overview of biological control methods, Introduction to biocontrol agents (e.g., beneficial microbes, predators). Application and efficacy of biological control in disease management		
8	Mycoplasma and Actinomycetes Introduction to Mycoplasma and Actinomycetes Unique Features and	Classification and General Characters of Xanthophyta Overview of Division Xanthophyta , Distribution and Habitat of	Life Cycle of Puccinia Production of teliospores (Tilial Stage) on wheat, and	Study of Physical control methods of plant diseases.		

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	Adaptations of Mycoplasma Importance of Actinomycetes in Antibiotic Productio	Xanthophyta Species, Cell Structure and Pigments of Xanthophyta : Reserve Food and Thallus Range in Xanthophyta., Modes of Reproduction: Asexual and Sexual., Alternation of Generations in				
9	Culturing Techniques Principles of Microbial Culturing Sterilization Methods: Physical and Chemical Culture Media: Types and Preparation	Xanthophyta. Economic Importance of Xanthophyta., Structure and Life Cycle of Vaucheria Anatomy and Morphology of Vaucheria	Life Cycle of Puccinia Production of aeciospores on barberry.	Study of Chemical control methods of plant diseases.		
10	Staining Techniques Basics of Microbial Staining Differential Staining: Gram Staining and Acid-fast Staining., Specialized Staining Techniques for Microbial Identification	Reproduction in Vaucheria: Asexual and Sexual Life Cycle of Vaucheria	Sexual reproduction in Puccinia (spermatia) Plant Diseases Caused by Puccinia and Control Measures	Integrated Disease Management (IDM) Concept of integrated disease management Integration of physical, chemical, and biological control methods	September	
11	Colony Characteristics Identification of Microbial Colonies Characteristics Used for Colony Differentiation Interpretation of Colony Morphology	Classification and General Characters of Bacillariophyta Introduction to Division Bacillariophyta Global Distribution of Bacillariophyta Species Cell Structure and Pigments in Bacillariophyta Reserve Food and Thallus	Deuteromycetes (Deuteromycota) Introduction to Deuteromycetes Classification and General Characters Significance and Role in Nature	Epidemiology of Plant Diseases Overview of plant disease epidemiology Factors influencing disease spread and severity Disease forecasting and management strategies		

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		Range in Bacillariophyta				
12	Pure Cultures Importance of Pure Cultures in Microbiology Techniques for Isolation and Maintenance of Pure Cultures Preservation Methods for Long-term Culture Storage	Reproductive Strategies: Asexual and Sexual Alternation of Generations in Bacillariophyta Economic Importance of Bacillariophyta	Life Cycle of Alternaria Morphological Features of Alternaria	Plant Disease Resistance and Host Plant Resistance Introduction to plant disease resistance Types of resistance mechanisms (e.g., innate, induced) Breeding strategies for developing resistant cultivars		
13	Aseptic Techniques Principles and Practices of Aseptic Technique Sterile Handling of Microbial Cultures and Equipment Preventing Contamination in Microbiological Work	Structure and Life Cycle of Pinnularia Anatomy and Morphology of Pinnularia	Asexual Reproduction: Conidia Formation and Dispersal of Alternaria	Emerging Plant Diseases and Global Challenges Overview of emerging plant diseases Factors contributing to disease emergence and spread Challenges and strategies for global disease management		
14	Microbial Growth Kinetics Growth Curve of Microbial Populations ., Factors Influencing Microbial Growth Measurement and Control of Microbial Growth	Reproductive Patterns and Life Cycle of Pinnularia	Pathogenicity and Disease Development of Alternaria	Emerging Plant Diseases and Global Challenges Overview of emerging plant diseases	October	
15	Applied Microbiology Applications of Microbiology in Various Fields: Medicine, Agriculture, Industry, and Environmental Protection	Review of Previous Lectures and Concepts	Applied Mycology Industrial Applications of Fungi: Biotechnology and Bioremediation Medical Mycology: Fungal Infections and Treatments	Review and Discussion Recap of key concepts covered in the course Student presentations or discussions on related topics		

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Department: Botany | Lecture Plan: Year-2018-19 | Class: T.Y. Bsc

Name of the Lecturer: Mr. NItin Shelake | (Semester-VI) Subject / Paper: **Paper -I** | Units - I, II, III, IV

(Term: 26th Nov. 2018 to 4th May 2019)

Lecture No.	Key Points to be Covered:				Expected Months	Uni. allotted Lecture
	Unit I	**Unit II**	**Unit III**	**Unit IV**		
1	Introduction to Bryophytes Overview of Bryophytes Importance of Bryophytes in ecosystems Brief introduction to the G. M. Smith Classification system	Introduction to Pteridophytes Overview of Pteridophytes Importance of Pteridophytes in ecosystems Brief introduction to the G. M. Smith Classification system	Introduction to Applied Aspects of Bryophytes and Pteridophytes Overview of the course objectives and syllabus Importance of studying applied aspects of Bryophytes and Pteridophytes Introduction to key concepts: ecology, economic importance, indicators, evolution	Introduction to Gymnosperms Overview of Gymnosperms Historical background and significance Introduction to Chamberlain's Classification System	December	**15 X 4 = 60 L**
2	Introduction to *Marchantia* Taxonomy and classification of *Marchantia* with reasons Morphology of *Marchantia*	Introduction to Lepidophyta (Lycopodium) Taxonomy and classification of Lycopodium	Ecology of Bryophytes Habitat preferences and adaptations of Bryophytes	Life Cycle of Thuja Taxonomy and classification of Thuja		
3	Anatomy of *Marchantia* Asexual / Vegetative Reproduction in *Marchantia*	Morphology and Anatomy of Lycopodium	Role of Bryophytes in ecosystem processes Interactions with other organisms and environmental factors	Life Cycle of Thuja Morphology and anatomy of Thuja		
4	Life Cycle of *Marchantia* (Gametophyte) Introduction to the gametophyte generation Gametophyte structure and function Gametophyte development and growth	Gametophyte generation: structure and function Male and Female Gametophyte	Economic Importance of Bryophytes Commercial uses of Bryophytes: horticulture, medicine, cosmetics, etc. Contributions to ecosystem services and biodiversity conservation	Life Cycle of Thuja Reproductive structures and processes in Thuja	January	

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5	Life Cycle of *Marchantia* (Sporophyte) Introduction to the sporophyte generation Sporophyte structure and function	Sporophyte generation: structure and function and development	Bryophytes as Indicators Use of Bryophytes in environmental monitoring and assessment Indicators of habitat quality, pollution, and climate change	Life Cycle of Thuja Sporophyte generation: structure, function, and development Gametophyte generation: structure, function, and development Alternation of generations in Thuja		
6	Sporophyte development and growth Alternation of Generation in *Marchantia*	Introduction to Calamophyta (Equisetum) Taxonomy and classification of *Equisetum*	Evolution of Sporophyte and Gametophyte in Bryophytes Evolutionary history of Bryophytes	Life Cycle of Thuja Sprophyte generation: structure, function, and development Gametophyte generation: structure, function, and development Alternation of generations in Thuja		
7	Introduction to *Pelia* Taxonomy and classification of Pelia with reasons, Morphology of Pelia	Morphology And anatomy of *Equisetum*	Comparative morphology and development of sporophyte and gametophyte generations Significance of alternation of generations in Bryophytes	Life Cycle of Gnetum Taxonomy and classification of Gnetum		
8	Anatomy of *Pelia* ia Asexual / Vegetative Reproduction in *Pelia*	Reproduction in *Equisetum*, *Equisetum* Gametophyte structure and function Male Gametophyte, and Development	Economic Importance of Pteridophytes Commercial uses of Pteridophytes: ornamental plants, food, medicine, etc. Contributions to ecosystem services and restoration projects	Life Cycle of Gnetum Morphology and anatomy of Gnetum	February	
9	Life Cycle of *Pelia* (Gametophyte)	*Equisetum* Gametophyte generation: structure and	Diversity and Distribution of Indian Pteridophytes	Life Cycle of Gnetum Reproductive structures and		

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	Introduction to the gametophyte generation Gametophyte structure and function Gametophyte development and growth	function Female Gametophyte and Development	Overview of Pteridophyte diversity in India	processes in Gnetum		
10	Life Cycle of *Pelia* (Sporophyte) Introduction to the sporophyte generation Sporophyte structure and function	*Equisetum* Sporophyte generation: structure and function and Development	Factors influencing distribution patterns Conservation status and threats to Indian Pteridophytes	Life Cycle of Gnetum Sporophyte generation: structure, function, and development Gametophyte generation: structure, function, and development Alternation of generations in Gnetum		
11	Sporophyte development and growth & Alternation of Generation in *Pelia*	Introduction to Pterophyta Taxonomy and classification of Pterophyta Morphology of Adiantum and Marsilea	Types of Sori and Evolution of Sori in Pteridophytes Definition and significance of sori in Pteridophytes	Life Cycle of Ephedra Taxonomy and classification of Ephedra		
12	Introduction to *Sphagnum* Taxonomy and classification of *Sphagnum* with reasons Morphology of *Sphagnum*	Introduction to the life cycle of Adiantum Gametophyte generation: structure and function and development of Male and female gametophyte	Diversity of sorus types and their evolutionary adaptations Role of sori in reproductive strategies and dispersal	Life Cycle of Ephedra Morphology and anatomy of Ephedra	March	
13	Anatomy of *Sphagnum* ia Asexual / Vegetative Reproduction in *Sphagnum*	Sporophyte generation of Adiantum : structure and function and development	applications of Bryophytes and Pteridophytes in various fields such as forestry, agriculture, pharmaceuticals, and environmental management	Life Cycle of Ephedra Reproductive structures and processes in Ephedra		
14	Life Cycle of *Sphagnum*	Introduction to the life cycle of	Summary of key takeaways and	Life Cycle of Ephedra		

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	(Gametophyte) Introduction to the gametophyte generation Gametophyte structure and function Gametophyte development and growth	Marsilea Gametophyte generation: structure and function and development of Male and female gametophyte	conclusion of the course	Sporophyte generation: structure, function, and development Gametophyte generation: structure, function, and development Alternation of generations in Ephedra		
15	Life Cycle of *Sphagnum* (Sporophyte) Introduction to the sporophyte generation Sporophyte structure and function Sporophyte development and growth	Sporophyte generation Marsilea : structure and function and development	Revision of the course	Economic Importance of Gymnosperms Timber and wood products Medicinal uses Ornamental and landscaping value Ecological significance and conservation efforts		

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Department: Botany | Lecture Plan: Year-2019-20 | Class: T.Y. Bsc

Name of the Lecturer: Mr. Nitin Shelake | (Semester-V) Subject / Paper: **Paper -I** | Units – I, II, III, IV

(Term : 6th June 2019 to 24th October 2019)

Lecture No.	Key Points to be Covered:				Expected Months	Uni. allotted Lecture
	Unit I	**Unit II**	**Unit III**	**Unit IV**		
1	Introduction to Microbiology Definition and Scope of Microbiology Historical Overview of Microbiology Importance of Microbes in Various Fields	Introduction to Algae Definition and Overview of Algae Importance of Algae in Aquatic Ecosystems and Beyond General Characteristics of Algae	Introduction to Fungi Definition and Overview of Fungi Importance and Economic Significance General Characteristics of Fungi	Introduction to Plant Pathology Overview of plant pathology Importance of studying plant diseases Basic concepts and terminology	**June**	**15 X 4 =60 Lecture**
2	Classification of Microbes Introduction to Different Types of Microbes: Viruses, Bacteria, Algae, Fungi, Protozoa, Mycoplasma, and Actinomycetes, Characteristics and Distinctive Features of Each Microbial Type	Rhodophyta : Classification and General Characters of Division Rhodophyta Distribution of Rhodophyta Species ,Cell Structure and Pigments of Rhodophyta , Reserve Food and Thallus Range in Rhodophyta ,	Basidiomycetes Introduction to Basidiomycetes Classification and General Characters	Study of Plant Diseases - White Rust (Albugo sp.) Introduction to white rust, Causative organism (Albugo sp.) Symptoms, predisposing factors, and disease cycle Control measures for white rust		
3	Viruses Structure and Characteristics of Viruses Viral Replication Cycle Viral Pathogenesis and Diseases	Reproduction in Rhodophyta: Asexual and Sexual , Alternation of Generations in Rhodophyta, Economic Importance of Rhodophyta	Morphological Features and Structures Basidiomycetes	Tikka Disease of Groundnut (Cercospora)., Introduction to Tikka disease., Causative organism (Cercospora) Symptoms, predisposing factors, and disease cycle Control measures for Tikka disease		
4	Bacteria Morphology and Structure of	Structure and Life Cycle of Polysiphonia	Life Cycle of Agaricus : Morphology and Anatomy	Damping Off Disease (Pythium)	July	

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	Bacteria Bacterial Growth and Reproduction Role of Bacteria in Ecology and Industry	Detailed Examination of Polysiphonia: Morphology and Anatomy	Germination and Hyphal Growth Spore Formation Formation of Basidiocarp (Mushroom)	, Introduction to damping off disease , Causative organism (Pythium) ,Symptoms, predisposing factors, and disease cycle, Control measures for damping off disease		
5	Algae Overview of Algae: Definition and Characteristics Classification of Algae Importance of Algae in Aquatic Ecosystems and Biotechnology	Life Cycle of Polysiphonia: Asexual and Sexual Reproduction	Reproduction in Agaricus Basidiospore Release	Citrus Canker (Xanthomonas sp.) Introduction to citrus canker , Causative organism (Xanthomonas sp.) , Symptoms, predisposing factors, and disease cycle, Control measures for citrus canker		
6	Fungi :Introduction to Fungi: Characteristics and Classification Structure and Function of Fungal Cells Ecological Roles and Economic Importance of Fungi	Structure and Life Cycle of Batrachospermum Anatomy and Morphology of Batrachospermum	Ecological Roles and Economic Importance of Agaricus	Leaf Curl (Leaf Curl Virus), Introduction to leaf curl disease., Causative agent (Leaf curl virus), Symptoms, predisposing factors, and disease cycle., Control measures for leaf curl disease		
7	Protozoa Characteristics and Diversity of Protozoa Protozoan Morphology and Locomotion Protozoan Parasites and Diseases	Reproductive Strategies and Life Cycle of Batrachospermum	Life Cycle of Puccinia Spore Formation and Dispersal Infection of Host Plant Development of urediniospores (Ureial Satge)	Biological Control Methods of Plant Diseases., Overview of biological control methods, Introduction to biocontrol agents (e.g., beneficial microbes, predators). Application and efficacy of biological control in disease management		
8	Mycoplasma and Actinomycetes Introduction to Mycoplasma	Classification and General Characters of Xanthophyta Overview of Division	Life Cycle of Puccinia Production of teliospores (Tilial Stage) on wheat,	Study of Physical control methods of plant diseases.	August	

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	and Actinomycetes Unique Features and Adaptations of Mycoplasma Importance of Actinomycetes in Antibiotic Productio	Xanthophyta , Distribution and Habitat of Xanthophyta Species, Cell Structure and Pigments of Xanthophyta : Reserve Food and Thallus Range in Xanthophyta., Modes of Reproduction: Asexual and Sexual., Alternation of Generations in	and			
9	Culturing Techniques Principles of Microbial Culturing Sterilization Methods: Physical and Chemical Culture Media: Types and Preparation	Xanthophyta, Economic Importance of Xanthophyta., Structure and Life Cycle of Vaucheria Anatomy and Morphology of Vaucheria	Life Cycle of Puccinia Production of aeciospores on barberry.	Study of Chemical control methods of plant diseases.		
10	Staining Techniques Basics of Microbial Staining Differential Staining: Gram Staining and Acid-fast Staining., Specialized Staining Techniques for Microbial Identification	Reproduction in Vaucheria: Asexual and Sexual Life Cycle of Vaucheria	Sexual reproduction in Puccinia (spermatia) Plant Diseases Caused by Puccinia and Control Measures	Integrated Disease Management (IDM) Concept of integrated disease management Integration of physical, chemical, and biological control methods		
11	Colony Characteristics Identification of Microbial Colonies Characteristics Used for Colony Differentiation Interpretation of Colony Morphology	Classification and General Characters of Bacillariophyta Introduction to Division Bacillariophyta Global Distribution of Bacillariophyta Species Cell Structure and Pigments in	Deuteromycetes (Deuteromycota) Introduction to Deuteromycetes Classification and General Characters Significance and Role in Nature	Epidemiology of Plant Diseases Overview of plant disease epidemiology Factors influencing disease spread and severity Disease forecasting and management strategies		

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		Bacillariophyta Reserve Food and Thallus Range in Bacillariophyta				
12	Pure Cultures Importance of Pure Cultures in Microbiology Techniques for Isolation and Maintenance of Pure Cultures Preservation Methods for Long-term Culture Storage	Reproductive Strategies: Asexual and Sexual Alternation of Generations in Bacillariophyta Economic Importance of Bacillariophyta	Life Cycle of Alternaria Morphological Features of Alternaria	Plant Disease Resistance and Host Plant Resistance Introduction to plant disease resistance Types of resistance mechanisms (e.g., innate, induced) Breeding strategies for developing resistant cultivars	September	
13	Aseptic Techniques Principles and Practices of Aseptic Technique Sterile Handling of Microbial Cultures and Equipment Preventing Contamination in Microbiological Work	Structure and Life Cycle of Pinnularia Anatomy and Morphology of Pinnularia	Asexual Reproduction: Conidia Formation and Dispersal of Alternaria	Emerging Plant Diseases and Global Challenges Overview of emerging plant diseases Factors contributing to disease emergence and spread Challenges and strategies for global disease management		
14	Microbial Growth Kinetics Growth Curve of Microbial Populations ., Factors Influencing Microbial Growth Measurement and Control of Microbial Growth	Reproductive Patterns and Life Cycle of Pinnularia	Pathogenicity and Disease Development of Alternaria	Emerging Plant Diseases and Global Challenges Overview of emerging plant diseases		
15	Applied Microbiology Applications of Microbiology in Various Fields: Medicine, Agriculture, Industry, and Environmental Protection	Review of Previous Lectures and Concepts	Applied Mycology Industrial Applications of Fungi: Biotechnology and Bioremediation Medical Mycology: Fungal Infections and Treatments	Review and Discussion Recap of key concepts covered in the course Student presentations or discussions on related topics		

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Department: Botany | Lecture Plan: Year-2019-20 | Class: T.Y. Bsc

Name of the Lecturer: Mr. Nitin Shelake | (Semester-VI) Subject / Paper: **Paper -I** | Units – I, II, III, IV

(Term: 15th November 2019 to 2nd May 2020)

Lecture No.	Key Points to be Covered:				Expected Months	Uni. allotted Lecture
	Unit I	**Unit II**	**Unit III**	**Unit IV**		
1	Introduction to Bryophytes Overview of Bryophytes Importance of Bryophytes in ecosystems Brief introduction to the G. M. Smith Classification system	Introduction to Pteridophytes Overview of Pteridophytes Importance of Pteridophytes in ecosystems Brief introduction to the G. M. Smith Classification system	Introduction to Applied Aspects of Bryophytes and Pteridophytes Overview of the course objectives and syllabus Importance of studying applied aspects of Bryophytes and Pteridophytes Introduction to key concepts: ecology, economic importance, indicators, evolution	Introduction to Gymnosperms Overview of Gymnosperms Historical background and significance Introduction to Chamberlain's Classification System	Novembe r	**15 X 4 = 60 L**
2	Introduction to *Marchantia* Taxonomy and classification of *Marchantia* with reasons Morphology of *Marchantia*	Introduction to Lepidophyta (Lycopodium) Taxonomy and classification of Lycopodium	Ecology of Bryophytes Habitat preferences and adaptations of Bryophytes	Life Cycle of Thuja Taxonomy and classification of Thuja		
3	Anatomy of *Marchantia* Asexual / Vegetative Reproduction in *Marchantia*	Morphology and Anatomy of Lycopodium	Role of Bryophytes in ecosystem processes Interactions with other organisms and environmental factors	Life Cycle of Thuja Morphology and anatomy of Thuja	December	
4	Life Cycle of *Marchantia* (Gametophyte) Introduction to the gametophyte generation Gametophyte structure and function Gametophyte development and growth	Gametophyte generation: structure and function Male and Female Gametophyte	Economic Importance of Bryophytes Commercial uses of Bryophytes: horticulture, medicine, cosmetics, etc. Contributions to ecosystem services and biodiversity conservation	Life Cycle of Thuja Reproductive structures and processes in Thuja		

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5	Life Cycle of *Marchantia* (Sporophyte) Introduction to the sporophyte generation Sporophyte structure and function	Sporophyte generation: structure and function and development	Bryophytes as Indicators Use of Bryophytes in environmental monitoring and assessment Indicators of habitat quality, pollution, and climate change	Life Cycle of Thuja Sporophyte generation: structure, function, and development Gametophyte generation: structure, function, and development Alternation of generations in Thuja		
6	Sporophyte development and growth Alternation of Generation in *Marchantia*	Introduction to Calamophyta (Equisetum) Taxonomy and classification of *Equisetum*	Evolution of Sporophyte and Gametophyte in Bryophytes Evolutionary history of Bryophytes	Life Cycle of Thuja Sprophyte generation: structure, function, and development Gametophyte generation: structure, function, and development Alternation of generations in Thuja		
7	Introduction to *Pelia* Taxonomy and classification of Pelia with reasons, Morphology of Pelia	Morphology And anatomy of *Equisetum*	Comparative morphology and development of sporophyte and gametophyte generations Significance of alternation of generations in Bryophytes	Life Cycle of Gnetum Taxonomy and classification of Gnetum	January	
8	Anatomy of *Pelia* ia Asexual / Vegetative Reproduction in *Pelia*	Reproduction in *Equisetum*, *Equisetum* Gametophyte structure and function Male Gametophyte, and Development	Economic Importance of Pteridophytes Commercial uses of Pteridophytes: ornamental plants, food, medicine, etc. Contributions to ecosystem services and restoration projects	Life Cycle of Gnetum Morphology and anatomy of Gnetum		
9	Life Cycle of *Pelia* (Gametophyte)	*Equisetum* Gametophyte generation: structure and	Diversity and Distribution of Indian Pteridophytes	Life Cycle of Gnetum Reproductive structures and		

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	Introduction to the gametophyte generation Gametophyte structure and function Gametophyte development and growth	function Female Gametophyte and Development	Overview of Pteridophyte diversity in India	processes in Gnetum		
10	Life Cycle of *Pelia* (Sporophyte) Introduction to the sporophyte generation Sporophyte structure and function	*Equisetum* Sporophyte generation: structure and function and Development	Factors influencing distribution patterns Conservation status and threats to Indian Pteridophytes	Life Cycle of Gnetum Sporophyte generation: structure, function, and development Gametophyte generation: structure, function, and development Alternation of generations in Gnetum		
11	Sporophyte development and growth & Alternation of Generation in *Pelia*	Introduction to Pterophyta Taxonomy and classification of Pterophyta Morphology of Adiantum and Marsilea	Types of Sori and Evolution of Sori in Pteridophytes Definition and significance of sori in Pteridophytes	Life Cycle of Ephedra Taxonomy and classification of Ephedra	February	
12	Introduction to *Sphagnum* Taxonomy and classification of *Sphagnum* with reasons Morphology of *Sphagnum*	Introduction to the life cycle of Adiantum Gametophyte generation: structure and function and development of Male and female gametophyte	Diversity of sorus types and their evolutionary adaptations Role of sori in reproductive strategies and dispersal	Life Cycle of Ephedra Morphology and anatomy of Ephedra		
13	Anatomy of *Sphagnum* ia Asexual / Vegetative Reproduction in *Sphagnum*	Sporophyte generation of Adiantum : structure and function and development	applications of Bryophytes and Pteridophytes in various fields such as forestry, agriculture, pharmaceuticals, and environmental management	Life Cycle of Ephedra Reproductive structures and processes in Ephedra		
14	Life Cycle of *Sphagnum*	Introduction to the life cycle of	Summary of key takeaways and	Life Cycle of Ephedra		

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	(Gametophyte) Introduction to the gametophyte generation Gametophyte structure and function Gametophyte development and growth	Marsilea Gametophyte generation: structure and function and development of Male and female gametophyte	conclusion of the course	Sporophyte generation: structure, function, and development Gametophyte generation: structure, function, and development Alternation of generations in Ephedra		
15	Life Cycle of *Sphagnum* (Sporophyte) Introduction to the sporophyte generation Sporophyte structure and function Sporophyte development and growth	Sporophyte generation Marsilea : structure and function and development	Revision of the course	Economic Importance of Gymnosperms Timber and wood products Medicinal uses Ornamental and landscaping value Ecological significance and conservation efforts	**March**	

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Department: Botany | Lecture Plan: Year-2020-21 | Class: T.Y. Bsc

Name of the Lecturer: Mr. Nitin Shelake | (Semester-V) Subject / Paper: **Paper -I** | Units – I, II, III, IV

(Term : 07th August 2020 to 31st December 2020)

Lecture No.	Key Points to be Covered:				Expected Months	Uni. allotted Lecture
	Unit I	**Unit II**	**Unit III**	**Unit IV**		
1	Introduction to Microbiology Definition and Scope of Microbiology Historical Overview of Microbiology Importance of Microbes in Various Fields	Introduction to Algae Definition and Overview of Algae Importance of Algae in Aquatic Ecosystems and Beyond General Characteristics of Algae	Introduction to Fungi Definition and Overview of Fungi Importance and Economic Significance General Characteristics of Fungi	Introduction to Plant Pathology Overview of plant pathology Importance of studying plant diseases Basic concepts and terminology	August	**15 X 4 = 60 L**
2	Classification of Microbes Introduction to Different Types of Microbes: Viruses, Bacteria, Algae, Fungi, Protozoa, Mycoplasma, and Actinomycetes, Characteristics and Distinctive Features of Each Microbial Type	Rhodophyta : Classification and General Characters of Division Rhodophyta Distribution of Rhodophyta Species ,Cell Structure and Pigments of Rhodophyta , Reserve Food and Thallus Range in Rhodophyta ,	Basidiomycetes Introduction to Basidiomycetes Classification and General Characters	Study of Plant Diseases - White Rust (Albugo sp.) Introduction to white rust, Causative organism (Albugo sp.) Symptoms, predisposing factors, and disease cycle Control measures for white rust		
3	Viruses Structure and Characteristics of Viruses Viral Replication Cycle Viral Pathogenesis and Diseases	Reproduction in Rhodophyta: Asexual and Sexual , Alternation of Generations in Rhodophyta, Economic Importance of Rhodophyta	Morphological Features and Structures Basidiomycetes	Tikka Disease of Groundnut (Cercospora)., Introduction to Tikka disease., Causative organism (Cercospora) Symptoms, predisposing factors, and disease cycle Control measures for Tikka disease		
4	Bacteria Morphology and Structure of	Structure and Life Cycle of Polysiphonia	Life Cycle of Agaricus : Morphology and	Damping off Disease (Pythium) ,	September	

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	Bacteria Bacterial Growth and Reproduction Role of Bacteria in Ecology and Industry	Detailed Examination of Polysiphonia: Morphology and Anatomy	Anatomy Germination and Hyphal Growth Spore Formation Formation of Basidiocarp (Mushroom)	Introduction to damping off disease , Causative organism (Pythium) ,Symptoms, predisposing factors, and disease cycle, Control measures for damping off disease		
5	Algae Overview of Algae: Definition and Characteristics Classification of Algae Importance of Algae in Aquatic Ecosystems and Biotechnology	Life Cycle of Polysiphonia: Asexual and Sexual Reproduction	Reproduction in Agaricus Basidiospore Release	Citrus Canker (Xanthomonas sp.) Introduction to citrus canker , Causative organism (Xanthomonas sp.) , Symptoms, predisposing factors, and disease cycle, Control measures for citrus canker		
6	Fungi :Introduction to Fungi: Characteristics and Classification Structure and Function of Fungal Cells Ecological Roles and Economic Importance of Fungi	Structure and Life Cycle of Batrachospermum Anatomy and Morphology of Batrachospermum	Ecological Roles and Economic Importance of Agaricus	Leaf Curl (Leaf Curl Virus), Introduction to leaf curl disease., Causative agent (Leaf curl virus), Symptoms, predisposing factors, and disease cycle., Control measures for leaf curl disease		
7	Protozoa Characteristics and Diversity of Protozoa Protozoan Morphology and Locomotion Protozoan Parasites and Diseases	Reproductive Strategies and Life Cycle of Batrachospermum	Life Cycle of Puccinia Spore Formation and Dispersal Infection of Host Plant Development of urediniospores (Urcial Satge)	Biological Control Methods of Plant Diseases., Overview of biological control methods, Introduction to biocontrol agents (e.g., beneficial microbes, predators). Application and efficacy of biological control in disease management		
8	Mycoplasma and Actinomycetes Introduction to Mycoplasma	Classification and General Characters of Xanthophyta Overview of Division	Life Cycle of Puccinia Production of teliospores (Tilial	Study of Physical control methods of plant diseases.	October	

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	and Actinomycetes Unique Features and Adaptations of Mycoplasma Importance of Actinomycetes in Antibiotic Productio	Xanthophyta , Distribution and Habitat of Xanthophyta Species, Cell Structure and Pigments of Xanthophyta : Reserve Food and Thallus Range in Xanthophyta., Modes of Reproduction: Asexual and Sexual., Alternation of Generations in	Stage) on wheat, and			
9	Culturing Techniques Principles of Microbial Culturing Sterilization Methods: Physical and Chemical Culture Media: Types and Preparation	Xanthophyta, Economic Importance of Xanthophyta., Structure and Life Cycle of Vaucheria Anatomy and Morphology of Vaucheria	Life Cycle of Puccinia Production of aeciospores on barberry.	Study of Chemical control methods of plant diseases.		
10	Staining Techniques Basics of Microbial Staining Differential Staining: Gram Staining and Acid-fast Staining., Specialized Staining Techniques for Microbial Identification	Reproduction in Vaucheria: Asexual and Sexual Life Cycle of Vaucheria	Sexual reproduction in Puccinia (spermatia) Plant Diseases Caused by Puccinia and Control Measures	Integrated Disease Management (IDM) Concept of integrated disease management Integration of physical, chemical, and biological control methods		
11	Colony Characteristics Identification of Microbial Colonies Characteristics Used for Colony Differentiation Interpretation of Colony Morphology	Classification and General Characters of Bacillariophyta Introduction to Division Bacillariophyta Global Distribution of Bacillariophyta Species Cell Structure and Pigments in	Deuteromycetes (Deuteromycota) Introduction to Deuteromycetes Classification and General Characters Significance and Role in Nature	Epidemiology of Plant Diseases Overview of plant disease epidemiology Factors influencing disease spread and severity Disease forecasting and management strategies		

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		Bacillariophyta Reserve Food and Thallus Range in Bacillariophyta				
12	Pure Cultures Importance of Pure Cultures in Microbiology Techniques for Isolation and Maintenance of Pure Cultures Preservation Methods for Long-term Culture Storage	Reproductive Strategies: Asexual and Sexual Alternation of Generations in Bacillariophyta Economic Importance of Bacillariophyta	Life Cycle of Alternaria Morphological Features of Alternaria	Plant Disease Resistance and Host Plant Resistance Introduction to plant disease resistance Types of resistance mechanisms (e.g., innate, induced) Breeding strategies for developing resistant cultivars	November	
13	Aseptic Techniques Principles and Practices of Aseptic Technique Sterile Handling of Microbial Cultures and Equipment Preventing Contamination in Microbiological Work	Structure and Life Cycle of Pinnularia Anatomy and Morphology of Pinnularia	Asexual Reproduction: Conidia Formation and Dispersal of Alternaria	Emerging Plant Diseases and Global Challenges Overview of emerging plant diseases Factors contributing to disease emergence and spread Challenges and strategies for global disease management		
14	Microbial Growth Kinetics Growth Curve of Microbial Populations ., Factors Influencing Microbial Growth Measurement and Control of Microbial Growth	Reproductive Patterns and Life Cycle of Pinnularia	Pathogenicity and Disease Development of Alternaria	Emerging Plant Diseases and Global Challenges Overview of emerging plant diseases		
15	Applied Microbiology Applications of Microbiology in Various Fields: Medicine, Agriculture, Industry, and Environmental Protection	Review of Previous Lectures and Concepts	Applied Mycology Industrial Applications of Fungi: Biotechnology and Bioremediation Medical Mycology: Fungal Infections and Treatments	Review and Discussion Recap of key concepts covered in the course Student presentations or discussions on related topics		

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Department: Botany | Lecture Plan: Year-2020-21 | Class: T.Y. Bsc

Name of the Lecturer: Mr. Nitin Shelake | **(Semester-VI)** **Subject / Paper: Paper -I** | **Units –I, II, III, IV**

(Term: 01st January, 2021 to 31st May, 2021**)**

Lecture No.	Key Points to be Covered:				Expected Months	Uni. allotted Lecture
	Unit I	**Unit II**	**Unit III**	**Unit IV**		
1	Introduction to Bryophytes Overview of Bryophytes Importance of Bryophytes in ecosystems Brief introduction to the G. M. Smith Classification system	Introduction to Pteridophytes Overview of Pteridophytes Importance of Pteridophytes in ecosystems Brief introduction to the G. M. Smith Classification system	Introduction to Applied Aspects of Bryophytes and Pteridophytes Overview of the course objectives and syllabus Importance of studying applied aspects of Bryophytes and Pteridophytes Introduction to key concepts: ecology, economic importance, indicators, evolution	Introduction to Gymnosperms Overview of Gymnosperms Historical background and significance Introduction to Chamberlain's Classification System	January	**15 X 4 = 60 L**
2	Introduction to *Marchantia* Taxonomy and classification of *Marchantia* with reasons Morphology of *Marchantia*	Introduction to Lepidophyta (Lycopodium) Taxonomy and classification of Lycopodium	Ecology of Bryophytes Habitat preferences and adaptations of Bryophytes	Life Cycle of Thuja Taxonomy and classification of Thuja		
3	Anatomy of *Marchantia* Asexual / Vegetative Reproduction in *Marchantia*	Morphology and Anatomy of Lycopodium	Role of Bryophytes in ecosystem processes Interactions with other organisms and environmental factors	Life Cycle of Thuja Morphology and anatomy of Thuja		
4	Life Cycle of *Marchantia* (Gametophyte) Introduction to the gametophyte generation Gametophyte structure and function Gametophyte development and growth	Gametophyte generation: structure and function Male and Female Gametophyte	Economic Importance of Bryophytes Commercial uses of Bryophytes: horticulture, medicine, cosmetics, etc. Contributions to ecosystem services and biodiversity conservation	Life Cycle of Thuja Reproductive structures and processes in Thuja		

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5	Life Cycle of *Marchantia* (Sporophyte) Introduction to the sporophyte generation Sporophyte structure and function	Sporophyte generation: structure and function and development	Bryophytes as Indicators Use of Bryophytes in environmental monitoring and assessment Indicators of habitat quality, pollution, and climate change	Life Cycle of Thuja Sporophyte generation: structure, function, and development Gametophyte generation: structure, function, and development Alternation of generations in Thuja	February	
6	Sporophyte development and growth Alternation of Generation in *Marchantia*	Introduction to Calamophyta (Equisetum) Taxonomy and classification of *Equisetum*	Evolution of Sporophyte and Gametophyte in Bryophytes Evolutionary history of Bryophytes	Life Cycle of Thuja Sprophyte generation: structure, function, and development Gametophyte generation: structure, function, and development Alternation of generations in Thuja		
7	Introduction to *Pelia* Taxonomy and classification of Pelia with reasons, Morphology of Pelia	Morphology And anatomy of *Equisetum*	Comparative morphology and development of sporophyte and gametophyte generations Significance of alternation of generations in Bryophytes	Life Cycle of Gnetum Taxonomy and classification of Gnetum		
8	Anatomy of *Pelia* ia Asexual / Vegetative Reproduction in *Pelia*	Reproduction in *Equisetum*, *Equisetum* Gametophyte structure and function Male Gametophyte, and Development	Economic Importance of Pteridophytes Commercial uses of Pteridophytes: ornamental plants, food, medicine, etc. Contributions to ecosystem services and restoration projects	Life Cycle of Gnetum Morphology and anatomy of Gnetum		
9	Life Cycle of *Pelia* (Gametophyte)	*Equisetum* Gametophyte generation: structure and	Diversity and Distribution of Indian Pteridophytes	Life Cycle of Gnetum Reproductive structures and	March	

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	Introduction to the gametophyte generation Gametophyte structure and function Gametophyte development and growth	function Female Gametophyte and Development	Overview of Pteridophyte diversity in India	processes in Gnetum		
10	Life Cycle of *Pelia* (Sporophyte) Introduction to the sporophyte generation Sporophyte structure and function	*Equisetum* Sporophyte generation: structure and function and Development	Factors influencing distribution patterns Conservation status and threats to Indian Pteridophytes	Life Cycle of Gnetum Sporophyte generation: structure, function, and development Gametophyte generation: structure, function, and development Alternation of generations in Gnetum		
11	Sporophyte development and growth & Alternation of Generation in *Pelia*	Introduction to Pterophyta Taxonomy and classification of Pterophyta Morphology of Adiantum and Marsilea	Types of Sori and Evolution of Sori in Pteridophytes Definition and significance of sori in Pteridophytes	Life Cycle of Ephedra Taxonomy and classification of Ephedra		
12	Introduction to *Sphagnum* Taxonomy and classification of *Sphagnum* with reasons Morphology of *Sphagnum*	Introduction to the life cycle of Adiantum Gametophyte generation: structure and function and development of Male and female gametophyte	Diversity of sorus types and their evolutionary adaptations Role of sori in reproductive strategies and dispersal	Life Cycle of Ephedra Morphology and anatomy of Ephedra		
13	Anatomy of *Sphagnum* ia Asexual / Vegetative Reproduction in *Sphagnum*	Sporophyte generation of Adiantum : structure and function and development	applications of Bryophytes and Pteridophytes in various fields such as forestry, agriculture, pharmaceuticals, and environmental management	Life Cycle of Ephedra Reproductive structures and processes in Ephedra	April	
14	Life Cycle of *Sphagnum*	Introduction to the life cycle of	Summary of key takeaways and	Life Cycle of Ephedra		

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	(Gametophyte) Introduction to the gametophyte generation Gametophyte structure and function Gametophyte development and growth	Marsilea Gametophyte generation: structure and function and development of Male and female gametophyte	conclusion of the course	Sporophyte generation: structure, function, and development Gametophyte generation: structure, function, and development Alternation of generations in Ephedra		
15	Life Cycle of *Sphagnum* (Sporophyte) Introduction to the sporophyte generation Sporophyte structure and function Sporophyte development and growth	Sporophyte generation Marsilea : structure and function and development	Revision of the course	Economic Importance of Gymnosperms Timber and wood products Medicinal uses Ornamental and landscaping value Ecological significance and conservation efforts		

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Department: Botany | Lecture Plan: Year-2022-23 | Class: T.Y. Bsc

Name of the Lecturer: Mr. Nitin Shelake (Semester-V) Subject / Paper: **Paper -I** Units – I, II, III, IV

(Term : 13th June 2022 to 22nd October 2022)

Lecture No.	Key Points to be Covered:				Expected Months	Uni. allotted Lecture
	Unit I	**Unit II**	**Unit III**	**Unit IV**		
1	Introduction to Microbiology Definition and Scope of Microbiology Historical Overview of Microbiology Importance of Microbes in Various Fields	Introduction to Algae Definition and Overview of Algae Importance of Algae in Aquatic Ecosystems and Beyond General Characteristics of Algae	Introduction to Fungi Definition and Overview of Fungi Importance and Economic Significance General Characteristics of Fungi	Introduction to Plant Pathology Overview of plant pathology Importance of studying plant diseases Basic concepts and terminology	June	15 X 4= 60 L
2	Classification of Microbes Introduction to Different Types of Microbes: Viruses, Bacteria, Algae, Fungi, Protozoa, Mycoplasma, and Actinomycetes, Characteristics and Distinctive Features of Each Microbial Type	Rhodophyta : Classification and General Characters of Division Rhodophyta Distribution of Rhodophyta Species ,Cell Structure and Pigments of Rhodophyta , Reserve Food and Thallus Range in Rhodophyta ,	Basidiomycetes Introduction to Basidiomycetes Classification and General Characters	Study of Plant Diseases - White Rust (Albugo sp.) Introduction to white rust, Causative organism (Albugo sp.) Symptoms, predisposing factors, and disease cycle Control measures for white rust		
3	Viruses Structure and Characteristics of Viruses Viral Replication Cycle Viral Pathogenesis and Diseases	Reproduction in Rhodophyta: Asexual and Sexual , Alternation of Generations in Rhodophyta, Economic Importance of Rhodophyta	Morphological Features and Structures Basidiomycetes	Tikka Disease of Groundnut (Cercospora)., Introduction to Tikka disease., Causative organism (Cercospora) Symptoms, predisposing factors, and disease cycle Control measures for Tikka disease	July	
4	Bacteria Morphology and Structure of	Structure and Life Cycle of Polysiphonia	Life Cycle of Agaricus : Morphology and	Damping Off Disease (Pythium) ,		

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	Bacteria Bacterial Growth and Reproduction Role of Bacteria in Ecology and Industry	Detailed Examination of Polysiphonia: Morphology and Anatomy	Anatomy Germination and Hyphal Growth Spore Formation Formation of Basidiocarp (Mushroom)	Introduction to damping off disease , Causative organism (Pythium) ,Symptoms, predisposing factors, and disease cycle, Control measures for damping off disease		
5	Algae Overview of Algae: Definition and Characteristics Classification of Algae Importance of Algae in Aquatic Ecosystems and Biotechnology	Life Cycle of Polysiphonia: Asexual and Sexual Reproduction	Reproduction in Agaricus Basidiospore Release	Citrus Canker (Xanthomonas sp.) Introduction to citrus canker , Causative organism (Xanthomonas sp.) , Symptoms, predisposing factors, and disease cycle, Control measures for citrus canker		
6	Fungi :Introduction to Fungi: Characteristics and Classification Structure and Function of Fungal Cells Ecological Roles and Economic Importance of Fungi	Structure and Life Cycle of Batrachospermum Anatomy and Morphology of Batrachospermum	Ecological Roles and Economic Importance of Agaricus	Leaf Curl (Leaf Curl Virus), Introduction to leaf curl disease., Causative agent (Leaf curl virus), Symptoms, predisposing factors, and disease cycle., Control measures for leaf curl disease		
7	Protozoa Characteristics and Diversity of Protozoa Protozoan Morphology and Locomotion Protozoan Parasites and Diseases	Reproductive Strategies and Life Cycle of Batrachospermum	Life Cycle of Puccinia Spore Formation and Dispersal Infection of Host Plant Development of urediniospores (Ureial Satge)	Biological Control Methods of Plant Diseases., Overview of biological control methods, Introduction to biocontrol agents (e.g., beneficial microbes, predators). Application and efficacy of biological control in disease management	August	
8	Mycoplasma and Actinomycetes Introduction to Mycoplasma and Actinomycetes	Classification and General Characters of Xanthophyta Overview of Division Xanthophyta , Distribution	Life Cycle of Puccinia Production of teliospores (Tilial	Study of Physical control methods of plant diseases.		

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	Unique Features and Adaptations of Mycoplasma Importance of Actinomycetes in Antibiotic Productio	and Habitat of Xanthophyta Species, Cell Structure and Pigments of Xanthophyta : Reserve Food and Thallus Range in Xanthophyta., Modes of Reproduction: Asexual and Sexual., Alternation of Generations in	Stage) on wheat, and			
9	Culturing Techniques Principles of Microbial Culturing Sterilization Methods: Physical and Chemical Culture Media: Types and Preparation	Xanthophyta, Economic Importance of Xanthophyta., Structure and Life Cycle of Vaucheria Anatomy and Morphology of Vaucheria	Life Cycle of Puccinia Production of aeciospores on barberry.	Study of Chemical control methods of plant diseases.		
10	Staining Techniques Basics of Microbial Staining Differential Staining: Gram Staining and Acid-fast Staining., Specialized Staining Techniques for Microbial Identification	Reproduction in Vaucheria: Asexual and Sexual Life Cycle of Vaucheria	Sexual reproduction in Puccinia (spermatia) Plant Diseases Caused by Puccinia and Control Measures	Integrated Disease Management (IDM) Concept of integrated disease management Integration of physical, chemical, and biological control methods		
11	Colony Characteristics Identification of Microbial Colonies Characteristics Used for Colony Differentiation Interpretation of Colony Morphology	Classification and General Characters of Bacillariophyta Introduction to Division Bacillariophyta Global Distribution of Bacillariophyta Species Cell Structure and Pigments in Bacillariophyta	Deuteromycetes (Deuteromycota) Introduction to Deuteromycetes Classification and General Characters Significance and Role in Nature	Epidemiology of Plant Diseases Overview of plant disease epidemiology Factors influencing disease spread and severity Disease forecasting and management strategies	September	

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		Reserve Food and Thallus Range in Bacillariophyta				
12	Pure Cultures Importance of Pure Cultures in Microbiology Techniques for Isolation and Maintenance of Pure Cultures Preservation Methods for Long-term Culture Storage	Reproductive Strategies: Asexual and Sexual Alternation of Generations in Bacillariophyta Economic Importance of Bacillariophyta	Life Cycle of Alternaria Morphological Features of Alternaria	Plant Disease Resistance and Host Plant Resistance Introduction to plant disease resistance Types of resistance mechanisms (e.g., innate, induced) Breeding strategies for developing resistant cultivars		
13	Aseptic Techniques Principles and Practices of Aseptic Technique Sterile Handling of Microbial Cultures and Equipment Preventing Contamination in Microbiological Work	Structure and Life Cycle of Pinnularia Anatomy and Morphology of Pinnularia	Asexual Reproduction: Conidia Formation and Dispersal of Alternaria	Emerging Plant Diseases and Global Challenges Overview of emerging plant diseases Factors contributing to disease emergence and spread Challenges and strategies for global disease management		
14	Microbial Growth Kinetics Growth Curve of Microbial Populations ., Factors Influencing Microbial Growth Measurement and Control of Microbial Growth	Reproductive Patterns and Life Cycle of Pinnularia	Pathogenicity and Disease Development of Alternaria	Emerging Plant Diseases and Global Challenges Overview of emerging plant diseases		
15	Applied Microbiology Applications of Microbiology in Various Fields: Medicine, Agriculture, Industry, and Environmental Protection	Review of Previous Lectures and Concepts	Applied Mycology Industrial Applications of Fungi: Biotechnology and Bioremediation Medical Mycology: Fungal Infections and Treatments	Review and Discussion Recap of key concepts covered in the course Student presentations or discussions on related topics	October	

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Department: Botany | Lecture Plan: Year-2022-23 | Class: T.Y. Bsc

Name of the Lecturer: Mr. Nitin Shelake | (Semester-VI) Subject / Paper: **Paper –I** | Units - I, II, III , IV

(Term: 7th November 2022 to 1st May 2023)

Lecture No.	Key Points to be Covered:				Expected Months	Uni. allotted Lecture
	Unit I	Unit II	Unit III	Unit IV		
1	Introduction to Bryophytes Overview of Bryophytes Importance of Bryophytes in ecosystems Brief introduction to the G. M. Smith Classification system	Introduction to Pteridophytes Overview of Pteridophytes Importance of Pteridophytes in ecosystems Brief introduction to the G. M. Smith Classification system	Introduction to Applied Aspects of Bryophytes and Pteridophytes Overview of the course objectives and syllabus Importance of studying applied aspects of Bryophytes and Pteridophytes Introduction to key concepts: ecology, economic importance, indicators, evolution	Introduction to Gymnosperms Overview of Gymnosperms Historical background and significance Introduction to Chamberlain's Classification System	November	15 X 4 = 60 L
2	Introduction to *Marchantia* Taxonomy and classification of *Marchantia* with reasons Morphology of *Marchantia*	Introduction to Lepidophyta (Lycopodium) Taxonomy and classification of Lycopodium	Ecology of Bryophytes Habitat preferences and adaptations of Bryophytes	Life Cycle of Thuja Taxonomy and classification of Thuja		
3	Anatomy of *Marchantia* Asexual / Vegetative Reproduction in *Marchantia*	Morphology and Anatomy of Lycopodium	Role of Bryophytes in ecosystem processes Interactions with other organisms and environmental factors	Life Cycle of Thuja Morphology and anatomy of Thuja		
4	Life Cycle of *Marchantia* (Gametophyte) Introduction to the gametophyte generation Gametophyte structure and function Gametophyte development and growth	Gametophyte generation: structure and function Male and Female Gametophyte	Economic Importance of Bryophytes Commercial uses of Bryophytes: horticulture, medicine, cosmetics, etc. Contributions to ecosystem services and biodiversity conservation	Life Cycle of Thuja Reproductive structures and processes in Thuja	December	

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5	Life Cycle of *Marchantia* (Sporophyte) Introduction to the sporophyte generation Sporophyte structure and function	Sporophyte generation: structure and function and development	Bryophytes as Indicators Use of Bryophytes in environmental monitoring and assessment Indicators of habitat quality, pollution, and climate change	Life Cycle of Thuja Sporophyte generation: structure, function, and development Gametophyte generation: structure, function, and development Alternation of generations in Thuja		
6	Sporophyte development and growth Alternation of Generation in *Marchantia*	Introduction to Calamophyta (Equisetum) Taxonomy and classification of *Equisetum*	Evolution of Sporophyte and Gametophyte in Bryophytes Evolutionary history of Bryophytes	Life Cycle of Thuja Sprophyte generation: structure, function, and development Gametophyte generation: structure, function, and development Alternation of generations in Thuja		
7	Introduction to *Pelia* Taxonomy and classification of Pelia with reasons, Morphology of Pelia	Morphology And anatomy of *Equisetum*	Comparative morphology and development of sporophyte and gametophyte generations Significance of alternation of generations in Bryophytes	Life Cycle of Gnetum Taxonomy and classification of Gnetum	January	
8	Anatomy of *Pelia* ia Asexual / Vegetative Reproduction in *Pelia*	Reproduction in *Equisetum*, *Equisetum* Gametophyte structure and function Male Gametophyte, and Development	Economic Importance of Pteridophytes Commercial uses of Pteridophytes: ornamental plants, food, medicine, etc. Contributions to ecosystem services and restoration projects	Life Cycle of Gnetum Morphology and anatomy of Gnetum		
9	Life Cycle of *Pelia* (Gametophyte)	*Equisetum* Gametophyte generation: structure and	Diversity and Distribution of Indian Pteridophytes	Life Cycle of Gnetum Reproductive structures and		

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	Introduction to the gametophyte generation Gametophyte structure and function Gametophyte development and growth	function Female Gametophyte and Development	Overview of Pteridophyte diversity in India	processes in Gnetum		
10	Life Cycle of *Pelia* (Sporophyte) Introduction to the sporophyte generation Sporophyte structure and function	*Equisetum* Sporophyte generation: structure and function and Development	Factors influencing distribution patterns Conservation status and threats to Indian Pteridophytes	Life Cycle of Gnetum Sporophyte generation: structure, function, and development Gametophyte generation: structure, function, and development Alternation of generations in Gnetum		
11	Sporophyte development and growth & Alternation of Generation in *Pelia*	Introduction to Pterophyta Taxonomy and classification of Pterophyta Morphology of Adiantum and Marsilea	Types of Sori and Evolution of Sori in Pteridophytes Definition and significance of sori in Pteridophytes	Life Cycle of Ephedra Taxonomy and classification of Ephedra	February	
12	Introduction to *Sphagnum* Taxonomy and classification of *Sphagnum* with reasons Morphology of *Sphagnum*	Introduction to the life cycle of Adiantum Gametophyte generation: structure and function and development of Male and female gametophyte	Diversity of sorus types and their evolutionary adaptations Role of sori in reproductive strategies and dispersal	Life Cycle of Ephedra Morphology and anatomy of Ephedra		
13	Anatomy of *Sphagnum* ia Asexual / Vegetative Reproduction in *Sphagnum*	Sporophyte generation of Adiantum : structure and function and development	applications of Bryophytes and Pteridophytes in various fields such as forestry, agriculture, pharmaceuticals, and environmental management	Life Cycle of Ephedra Reproductive structures and processes in Ephedra		
14	Life Cycle of *Sphagnum*	Introduction to the life cycle of	Summary of key takeaways and	Life Cycle of Ephedra		

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	(Gametophyte) Introduction to the gametophyte generation Gametophyte structure and function Gametophyte development and growth	Marsilea Gametophyte generation: structure and function and development of Male and female gametophyte	conclusion of the course	Sporophyte generation: structure, function, and development Gametophyte generation: structure, function, and development Alternation of generations in Ephedra		
15	Life Cycle of *Sphagnum* (Sporophyte) Introduction to the sporophyte generation Sporophyte structure and function Sporophyte development and growth	Sporophyte generation Marsilea : structure and function and development	Revision of the course	Economic Importance of Gymnosperms Timber and wood products Medicinal uses Ornamental and landscaping value Ecological significance and conservation efforts	**March**	

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