

**The Kelkar Education Trust's
V. G. Vaze College of Arts, Science and Commerce
(Autonomous)**



**The Kelkar Education Trust's
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Syllabus for SYBSc.

(June 2020 Onwards)

Program: B.Sc.

Semester III

Course Title: BOTANY

Course Code	Paper Title	Credits
SBO301	PLANT DIVERSITY-III	02
SBO302	FORM AND FUNCTION -III	02
SBO303	CURRENT TRENDS IN PLANT SCIENCES -I	02
SBOP301	Practical's based on paper(301 & 302)	03



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1. Syllabus as per Choice Based Credit system

- i.** Name of the program: : S. Y. B. Sc Botany
 - ii.** Course code: : SBO301
 - iii.** Course title: : Botany I (Plant diversity)
 - iv.** Semester wise course content : Copy of syllabus enclosed
 - v.** References & additional references : Enclosed in syllabus
 - vi** **Credit Structure**
 - No. of credits per semester : (02+01)= 03
 - vii.** No. of lectures per unit : 15
 - viii.** No. of lectures per week : 03
 - ix.** No. of tutorials per week : ---
 - x.** No. of practicals per week : 01
- 2. Scheme of Examination** : Internal Examination (40 marks)
External Examination (60 marks)
- 3. Special notes if any** : No
- 4. Eligibility, if any for admission** : As laid down in the college brochure/website
- 5. Fee structure** : As per college fee structure specifications
- 6. Special ordinances/resolution (if any)** : No



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Program: S. Y. B. Sc
Course: Plant Diversity

Semester: III
Course Code: SBO301

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA) 40 marks					Semester End Examination	Total
L	T	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Written	
3	-	1	3	20	15	05		-	60	100
Max. Time: Semester End Examination (Theory).									2Hrs	

Course Objectives:

To understand the morphology, structure, life cycle and economic importance of the organisms of respective groups of plants

To acquaint the concept of Systematics and Nomenclature and their objectives.

To understand the principle, working and applications of various techniques like Microscopy Chromatography and electrophoresis techniques.





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Unit No.	Module No	Content	Lectures
		Paper I Course I: Plant Diversity	15
1.		Thallophyta (Algae) & Bryophyta	
	I	General Characters of Division Phaeophyta: Distribution, Cell structure, Range of thallus and Economic Importance.	
	II	Structure, life cycle and systematic position of <i>Sargassum</i> .	
	III	General characters of Class Anthocerotae and Musci	
	IV	Structure, life cycle and systematic position of <i>Anthoceros</i> <i>Funaria</i>	
2.		Angiosperms	15
	I	Introduction to plant Systematics: Objectives and Goals of Plant systematic Cladistics : Definition, Objectives and Applications	
	II	Botanical Nomenclature : History, Principles, Introduction to ICN	
	III	Fruit Morphology : Classification and Evolution	
	IV	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: <ul style="list-style-type: none"> • Magnoliaceae • Papillioideae • Rutaceae • Solanaceae • Amaranthaceae • Palmae (Arecaceae) 	
3.		Modern Techniques to Study Plant Diversity	15
	I	Preservation methods: Dry and wet methods of preservation	
	II	Microscopy – Principle and working of Light, and electron microscope (TEM and SEM)	
	III	Chromatography- Principles and techniques in paper and thin layer chromatography and HPTLC	
	IV	Principles and techniques of Horizontal and Vertical electrophoresis.	



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PRACTICALS BASED ON PAPER I- Plant Diversity

Program: S. Y. B. Sc
Course: Botany I

Semester: III
Course Code: SBO301

Sr. no	Title of Experiments	Credit: 01
1.	Algae and Bryophyta	
	<ul style="list-style-type: none">i. Study of stages in the life cycle of <i>Sargassum</i> from fresh/ preserved material and permanent slides.ii. Economic importance and range of thallus in Phaeophytaiii. Study of stages in the life cycle of <i>Anthoceros</i> from fresh/ preserved material and permanent slides.iv. Study of stages in the life cycle of <i>Funaria</i> from fresh/ preserved material and permanent slides.	
2.	Angiosperms	
	<ul style="list-style-type: none">i. Fruit Morphology – As per theoryii. Study of one plant from each family prescribed for theory: Morphological peculiarities and economic importance of the members of these families. (As per Theory)	
3.	Techniques to study Plant Diversity	
	<ul style="list-style-type: none">i. Preparation of herbarium and wet preservation techniqueii. Separation of amino by circular paper chromatographyiii. Separation of Carotenoids by thin layer chromatographyiv. Horizontal and Vertical Gel Electrophoresis – Demonstration	



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1. Syllabus as per Choice Based Credit system

- i.** Name of the program: : S. Y. B. Sc Botany
 - ii.** Course code: : SBO302
 - iii.** Course title: : Botany II (Form and Function)
 - iv.** Semester wise course content : Copy of syllabus enclosed
 - v.** References & additional references : Enclosed in syllabus
 - vi** **Credit Structure**
 - No. of credits per semester : (02+01)= 03
 - vii.** No. of lectures per unit : 15
 - viii.** No. of lectures per week : 03
 - ix.** No. of tutorials per week : ---
 - x.** No. of practicals per week : 01
- 2. Scheme of Examination** : Internal Examination (40 marks)
External Examination (60 marks)
- 3. Special notes if any** : No
- 4. Eligibility, if any for admission** : As laid down in the college brochure/website
- 5. Fee structure** : As per college fee structure specifications
- 6. Special ordinances/resolution (if any)** : No



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Program: S. Y. B. Sc
Course: Form and Function

Semester: III
Course Code: SBO302

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA) 40 marks					Semester End Examination	Total
L	T	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Written	
3	-	1	3	20	15	05		-	60	100
Max. Time: Semester End Examination (Theory).									2Hrs	

Course Objectives:

To understand the structure and functioning of cell organelles, their mechanism, role and importance of cell division.

To recognize the importance of cytogenetics in understanding concepts of variations in chromosomal aberrations, chromosome number and their adverse effects in humans and the concept of sex determination and sex linked traits.

To understand the fundamental life processes like DNA replication and protein synthesis



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Program: S. Y. B. Sc
Course: Form and Function

Semester: III
Course Code: SBO302

Unit No.	Module No	Content	Lectures
Paper II Course: FORM AND FUNCTION			
1.		Cell Biology	15
	I	Ultra Structure and functions of the following Cell organelles: <ul style="list-style-type: none"> • Mitochondrion(membranes, cristae, F1 particles and matrix) • Peroxisomes and Glyoxysomes • Ribosomes (prokaryotic, eukaryotic and subunits) 	
	II	Cell Division and its significance: <ul style="list-style-type: none"> • Cell Cycle, structure of Interphase Nucleus(nuclear envelop, chromatin network, nucleolus and nucleoplasm) • Mitosis & Meiosis • Differences between Mitosis and Meiosis 	
	III	Nucleic Acids: Types, structure and functions of DNA and RNA	
2.	I	Cytogenetics Variation in Chromosome structure (Chromosomal Aberrations) Definition, Origin, Cytological and Genetic Effects of the following: Deletions, Duplications, Inversions and Translocations.	15
	II	Variation in Chromosome number Changes in one or few chromosomes – Aneuploidy (Nullisomy, Monosomy, Trisomy, Tetrasomy). Changes in complete set of chromosomes - Monoploidy, Polyploidy (Autopolyploidy, Allopolyploidy)	
	III	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 <i>Drosophila</i> , Lyon's Hypothesis of X chromosome inactivation. Sex linked- eye color in <i>Drosophila</i> , Haemophilia, color blindness Sex influenced- baldness in man	
3.		Molecular Biology	15
	I	DNA replication : <ul style="list-style-type: none"> • Modes of Replication, Messelson and Stahl Experiment. DNA replication in prokaryotes and eukaryotes:	



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		<ul style="list-style-type: none">• Enzymes involved and molecular mechanism of replication.	
	II	Protein Synthesis: <ul style="list-style-type: none">• Central dogma of Protein synthesis• Transcription in prokaryotes and eukaryotes: promoter sites, initiation, elongation and termination.• RNA processing: Adenylation & Capping	



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PRACTICALS BASED ON PAPER II- FORM AND FUNCTION

Program: S. Y. B. Sc

Semester: III

Course: FORM AND FUNCTION

Course Code: SBO301

Sr. No	Title of Experiments	Credit 01
1.	Cell Biology	
	i. Study of the ultra-structure of cell organelles prescribed for theory from Photomicrographs	
	ii. Estimation of DNA from plant material (one Std & one Unknown, No Std Graph)	
	iii. Estimation of RNA from plant material (one Std & one Unknown, No Std Graph)	
2.	Cytogenetics	
	i. Study of cytological consequences of chromosomal aberrations (Laggards, Chromosomal Bridge, Ring chromosome, Chromosomal ring) from permanent slides or photomicrographs. Chromosomal Abberations : Cri-du-chat Syndrome, Down Syndrome (Trisomy)	
	ii. Changes in complete set of chromosomes - Monoploidy, Polyploidy (Autopolyploidy, Allopolyploidy) from permanent slides or photomicrographs.	
	iii. Study of mitosis and meiosis from suitable plant material	
3.	Molecular Biology	
	i. DNA sequencing- Sanger's method	
	ii. Determining the sequence of amino acids in the protein molecule synthesized from the given m- RNA strand (prokaryotic and eukaryotic)	
	iii. Extraction and visualization of DNA and RNA by Electrophoresis (Demo)	



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1. Syllabus as per Choice Based Credit system

- i.** Name of the program: : S. Y. B. Sc Botany
 - ii.** Course code: : SBO303
 - iii.** Course title: : Botany III (**Current trends in Plant Science I**)
 - iv.** Semester wise course content : Copy of syllabus enclosed
 - v.** References & additional references : Enclosed in syllabus
 - vi** **Credit Structure**
 - No. of credits per semester : (02+01)= 03
 - vii.** No. of lectures per unit : 15
 - viii.** No. of lectures per week : 03
 - ix.** No. of tutorials per week : ---
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- 2. Scheme of Examination** : Internal Examination (40 marks)
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Program: S. Y. B. Sc

Semester: III

Course: Current trends in Plant Science

Course Code: SBO303

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA) 40 marks					Semester End Examination	Total
L	T	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Written	
3	-	1	3	20	15	05		-	60	100
Max. Time: Semester End Examination (Theory).									2Hrs	

Course Objectives:

To understand the importance of different pharmacopie used in herbal medicines, importance of various secondary metabolites, its functions, applications and also evaluation of different drugs as adulterants and substituent's.

To recognize the importance of forests, their location and importance of forest products along with the significance of forestry and its types.

To evaluate the significance of different fibres, spieces and paper yielding plants

To make students aware of the importance of plants in aromatheraphy, nutraceuticals and in enzyme industry.



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Program: S. Y. B. Sc

Semester: III

Course: Current trends in Plant Science

Course Code: SBO303

Unit No.	Module No	Content	Lectures
		Course: CURRENT TRENDS IN PLANT SCIENCE	
1.		Pharmacognosy and Phytochemistry	15
	I	Introduction to pharmacopoeia Indian pharmacopoeia, Indian Herbal Pharmacopoeia and Ayurvedic Pharmacopoeia. Study of Monograph from pharmacopoeia.	
	II	Secondary Metabolites: Types; Sources, properties, uses and adulterants of Alkaloids and tannins	
	III	Adulterants: <i>Saraca asoca, Polyalthia longifolia</i> <i>Terminalia arjuna, Terminalia tomentosa</i> <i>Bacopa monnieri, Centella asiatica</i> <i>Abrus, Glycyrrhiza Phyllanthus amarus (Bhuiamla)</i>	
2.		Forestry and Economic Botany	15
	I	Forestry: Introduction of Forestry, Methods of Classification of forest. Forestry: Social forestry, Agro-forestry, Urban forestry, Silviculture, organic farming	
	II	Economic Botany: Types of fibers: Jute and cotton, Types of Papers : Paper yielding plants, Process of pulping and paper making Spices and condiments: Saffron and cardamom	
	III	Commercial market of spices	
3.		Industry based on plant products	15
	I	Aromatherapy: Introduction, Uses with few examples. Coconut, lemon, jasmin Botanical and nutraceuticals - <i>Spirulina, Vanillin, Garcinia indica/ Garcinia cambogia, Chlorella, and Kale.</i>	
	II	Enzymes industry: Cellulases, Papain, Bromelain	
	III	Biofuels (Bioethanol, Biomethanol)	

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PRACTICALS BASED ON PAPER III- Current Trends in Plant Science

Program: S. Y. B. Sc

Semester: III

Course: Current trends in Plant Science

Course Code: SBO301

Sr. no	Title of Experiments	Credit 01
1.	Pharmacognosy and Phytochemistry	
	i. Study of macroscopic and microscopic characteristic <ul style="list-style-type: none"> • <i>Phyllanthus amarus</i> • <i>Saraca asoka</i> • <i>Bacopa monieri</i> HPTLC (Demo)	
2.	Forestry and Economic Botany	
	ii. Study of different type of forest found in India.	
	iii. Visit to different types of forests /Botanical gardens.	
	iv. Sources of Fibres, Paper, Spices & condiments	
3.	Industry based on plant products	
	v. Preparation of herbal cosmetics (Face pack/ De-tanning cream)	
	vi. Estimation of crude fibre in cereals & their products	
	vii. Evaluation of nutraceutical value of mushroom/ wheat germ	
	viii.Extraction of cellulase from Trichoderma and Aspergillus	

Dr. Aparna Saraf
 (VC Nominee)



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Program: S. Y. B. Sc	Semester III
Course: Botany	Course Code: SBO301/302/303
(Internal Assessment)	Marks: 40
1 Class Test : (Based on Theory Unit 1, 2 and 3)	20 marks
2 Assignment:	15 marks
3 Class Participation and Overall conduct	05 Marks

Semester III (Plant Diversity)	(Internal Class Test Paper Pattern)
Duration:	Marks: 20
Q. 1. a) Fill in the blanks:	05 marks
Q. 1. b) Match the column/Find out the correlation / complete the chart /draw neat labeled diagram.	05 marks
Q. 2. Answer in one Sentence.	10 marks

Semester III (Plant Diversity) Paper I	(Theory Paper Pattern)
Duration: 02 hrs	Marks: 60
Q.1. Multiple choice questions / Fill in the blanks / Match the column / Define / Answer in one sentence.	12 Marks
Q.2. Answer the following: (Unit 1) OR a) Answer in brief: (Unit 1) b) Answer in brief: (Unit 1)	12 Marks 06 Marks 06 Marks
Q. 3. Answer the following: (Unit 2) OR a) Answer in brief: (Unit 2) b) Answer in brief: (Unit 2)	12 Marks 06 Marks 06 Marks
Q.4. Answer the following: (Unit 3) OR a) Answer in brief: (Unit 3) b) Answer in brief: (Unit 3)	12 Marks 06 Mark 06 Marks
Q.5. Write Short notes on: Any four	12 Marks



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Syllabus Prepared by:

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