Programme: B. Sc. Botany

SEMESTER - I			
Core I	**Cell Biology and Genetics**		
Code: 18UBOC11	**Hrs / Week: 4**	**Hrs / Sem: 60**	**Credits: 4**

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	C L
CO-1	understand the structure and function of basic organelles of plant cells	1	Un
CO-2	describe the structural organization and transport function of the plasma membrane	2	Un
CO-3	identify the non living inclusions and their significance	4	Re
CO-4	reveal morphogenetic events through mitosis and meiosis	2	Re
CO-5	understand theories of heredity through Mendel's hybridization experiment	2,4	Un,Cr
CO-6	draw checker boards and predict the outcome of offspring of hybridization	8	Ap
CO-7	infer inter allelic and inter genic interaction in determination of specific characters including blood groupings in man	4	Re,Un
CO-8	comprehend the polygenic inheritance and mechanism of sex determination in plants	4	An

SEMESTER – I			
Core II	**Algae and Bryophytes**		
Code:18UBOC12	**Hrs / Week: 4**	**Hrs / Sem: 60**	**Credits: 4**

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	find out the general characteristics of Algae and Bryophytes and structure of them.	1	An
CO-2	evaluate the importance of algae and Bryophytes and their role in everyday life and environment.	7	Ev
CO-3	distinguish mosses and thallose liverworts	3	An
CO-4	compare and contrast different classes of algae and bryophytes	2	Un
CO-5	identify Algae and Bryophytes samples collected from the field	8	Re
CO-6	distinguish life cycle pattern in different groups of Algae and Bryophytes	7	Ap
CO-7	understand the criteria behind the classification of Algae and Bryophytes	1	Un
CO-8	apply the knowledge for self employability	6	Ap

SEMESTER I			
Allied I Animal Biology			
Code: 18UZOA11	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 3**

Course Outcome:

CO.No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	acquire basic knowledge of animal diversity and its organisation	1	Un
CO-2	compare common and distinctive features of invertebrate phyla	1	Un
CO-3	understand the parasitic adaptations and management of nematodes	1	Un
CO-4	ability to control the insect pests	1	Ap
CO-5	characterize the major classes of subphylum vertebrata	1	Re
CO-6	assess the interaction of organisms with environment and their adaptive mechanism	1, 11	Re
CO-7	distinguish the unique features and evolutionary relationship between each chordate group	1	Cr
CO-8	apply the knowledge of biological diversity to our daily life and conservation of bioresources	1, 11	Ap

SEMESTER - I			
Ability Enhancement Course - Value Education			
Code : 18UAVE11	**Hrs/Week : 2**	**Hrs / Semester: 30**	**Credits : 2**

Unit I : Introduction

Value education and its Relevance to present day – Meaning of Value Education – Education and its role – Leading a fulfilling life of universal values

Unit II : Cultivation of Personal Values

Personal Values– Truth - Honesty and Integrity – Love –Compassion – Gratitude - Courage – Optimism – Friendship

Unit III : Elimination of Negative Emotions

Overcome fear – Jealousy is harmful – Sources of jealousy - Jealousy and compulsiveness- Be an optimist – Gossip is Dynamite – Anger

Unit IV : Family Values

Familial Responsibilities –Five Basic Functions of a Mother - Fathers' role in the family - Five Duties of Children to Parents - Indian Cultural Values

Unit V : Spiritual Value

Cultivating Good Manners – Being Persuasive – Being authentic – Professional Ethics – Work Culture – Code of Conduct

SEMESTER - II			
Core III	**Fungi, Lichens and Plant pathology**		
Code:18UBOC21	**Hrs / Week: 4**	**Hrs / Sem : 60**	**Credits: 4**

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	characterize and identify the diversity of fungal and lichen world and their adaptations	1	Un
CO-2	Identify fungal specimens microscopically	2	Ap
CO-3	Identify major groups of fungi and lichens based on morphology and anatomy	2	Ap
CO-4	understand and explain the ecological roles and trophic modes of major Fungal and Lichen groups	5	Ap
CO-5	evaluate the importance of Fungi and Lichens , their role in everyday life and environment	7	Ev
CO-6	understand the various plant diseases and their impact on agriculture	7	Un
CO-7	identify symptoms and diagnose different plant diseases and methods to control.	6	Ap
CO-8	identify pathogenecity with their specific symptoms	4	Ev

SEMESTER - II			
Core IV	**Anatomy and Embryology**		
Code:18UBOC21	**Hrs / Week: 4**	**Hrs / Sem: 60**	**Credits: 4**

Vision:

To understand the fundamental organization of tissues and developmental events of plants

Mission:

To understand the developmental process from flower to fruit

To gain knowledge on the histological architecture of plants

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	C L
CO-1	classify meristems and explain the organization of root apex	2	Ev ,An
CO-2	distinguish meristematic and permanent tissues	8	An
CO-3	compare the secondary growth in dicot stem and root(normal and anomalous)	3 , 7	An
CO-4	describe the structure of a microsporangium and pollengrains and	1 ,3	Un , E
CO-5	Explain the structure and development of male gametophyte.	1	Un
CO-6	Explain the structure and development of megasporangium	2 , 3	Ev
CO-7	understand fertilization and double fertilization.	2	Un
CO-8	differentiate dicot embryo from monocot embryo.	2 ,3	An

SEMESTER II			
Allied II	**Genetics, Developmental Biology and Physiology**		
Code: 18UZOA21	**Hrs/ Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

Course Outcome :

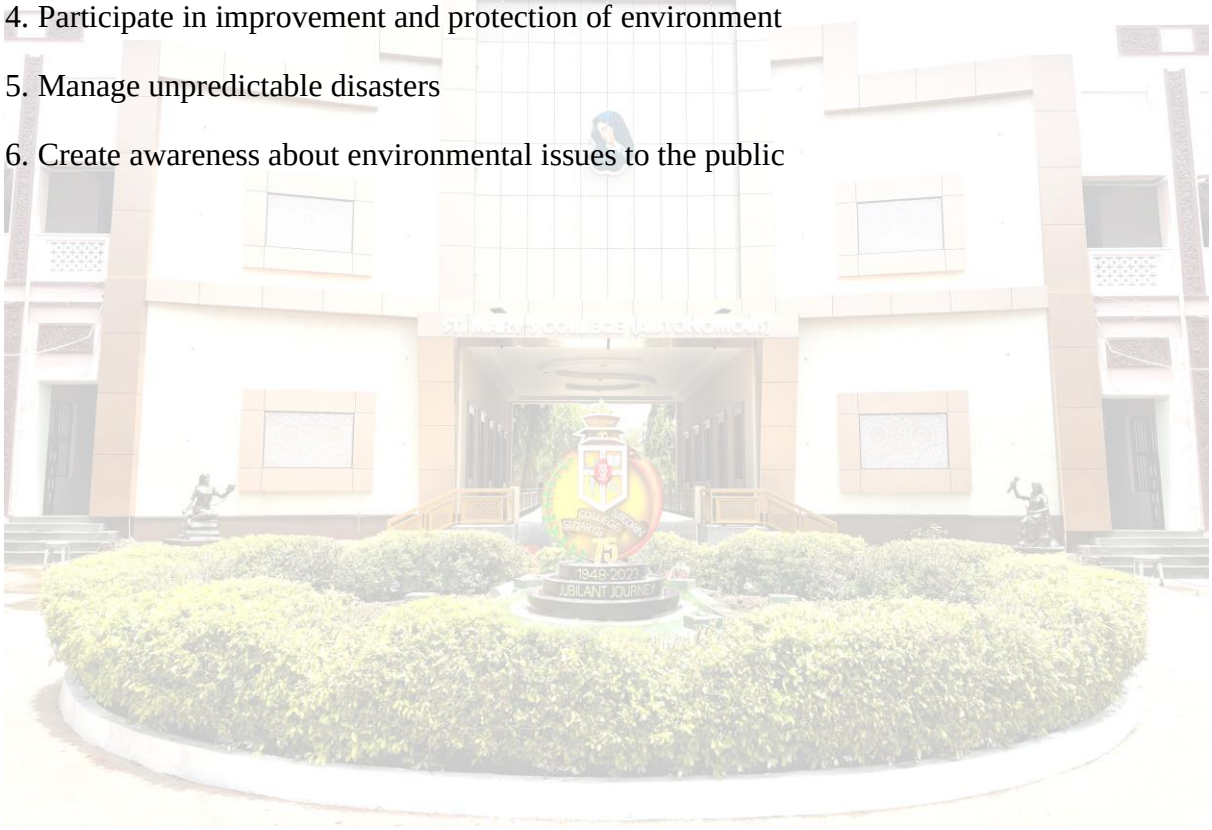
CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO - 1	compare and contrast the Mendelian inheritance and its modifications	4	An
CO - 2	highlight the importance of genetics and welfare of human society.	11	Ev
CO – 3	acquire competence skills in developmental process	1	Un
CO – 4	learn the technical skills in developmental biology	3	Re
CO – 5	understand the basic principles of digestion	2	Un
CO – 6	create knowledge about the nervous coordination	7	Cr
CO – 7	analyze the functions of urinary tract of human	9	Ap
CO - 8	comprehense the structure and functions of human reproductive system	9	Ap

Semester – II			
Environmental Studies			
Code : 18UAEV21	**Hrs/ Week : 2**	**Hrs/Sem:30**	**Credits : 2**

Course Outcomes:

Upon completion of this course, the students will be able to

1. Recognize the biotic and abiotic components of ecosystem and how they function
2. Use natural resources more efficiently and know more sustainable ways of living
3. Acquire an attitude of concern for the environment
4. Participate in improvement and protection of environment
5. Manage unpredictable disasters
6. Create awareness about environmental issues to the public



SEMESTER – III			
Core V	**Pteridophytes, Gymnosperms and Paleobotany**		
Code: 18UBOC31	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 4**

Course Outcome

CO.No.	Upon completion of this programme, students will be able to	PSO addressed	CL
CO-1	summarize the general characters of Pteridophytes and Gymnosperms	1	Cr
CO-2	critically analyse the affinities and differences between Pteridophytes and Gymnosperms and relate them to understand the evolutionary trends	1	Re
CO-3	outline and recall the classification of Gymnosperms and appraise the economic importance of Pteridophytes and Gymnosperms	3	Ev
CO-4	understand the different stages in the life cycle of Pteridophytes and Gymnosperms	2	Un
CO-5	identify the types of fossils and discuss the fossilization process.	2	An
CO-6	relate the geological era with evolution of plants	2	Un
CO-7	learn about some of the fossils of pteridophytes and Gymnosperms	2	Un
CO-8	justify and analyze the evolution of seed plants from pteidophytes	2	Ev

SEMESTER III			
Allied	**Allied Chemistry - I**		
Code : 18UCHA31	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credit : 3**

Course Outcome:

CO No.	Upon completion of this programme, students will be able to	PSO addressed	CL
CO 1	account for the filling of electron in orbitals and to inscribe the electronic configuration of elements	1, 3	Re, Ap
CO 2	recognize conductors, insulators and semiconductors	1, 3	Re
CO 3	adapt a method to purify organic compounds and to estimate the amount of Carbon, Hydrogen and sulphur in a sample	1,2, 3,7	Un
CO 4	evaluate molecular weight of a chemical compound	6	Cr
CO 5	correlate the importance of colloids in day to day life and to develop a basic understanding of emulsions	1, 5	An
CO 6	reframe glucose into fructose and vice versa and to identify protein by their colour reactions	1	Cr, An
CO 7	record the steps involved in Hoffmann's exhaustive Methylation	6	Re
CO 8	explain isoprene rule and its significance	1	Un

Semester III			
NME I	**Plant Resource Utilization**		
Code: 18UBON31	**Hrs/week:2**	**Hrs/Semester: 30**	**Credit: 2**

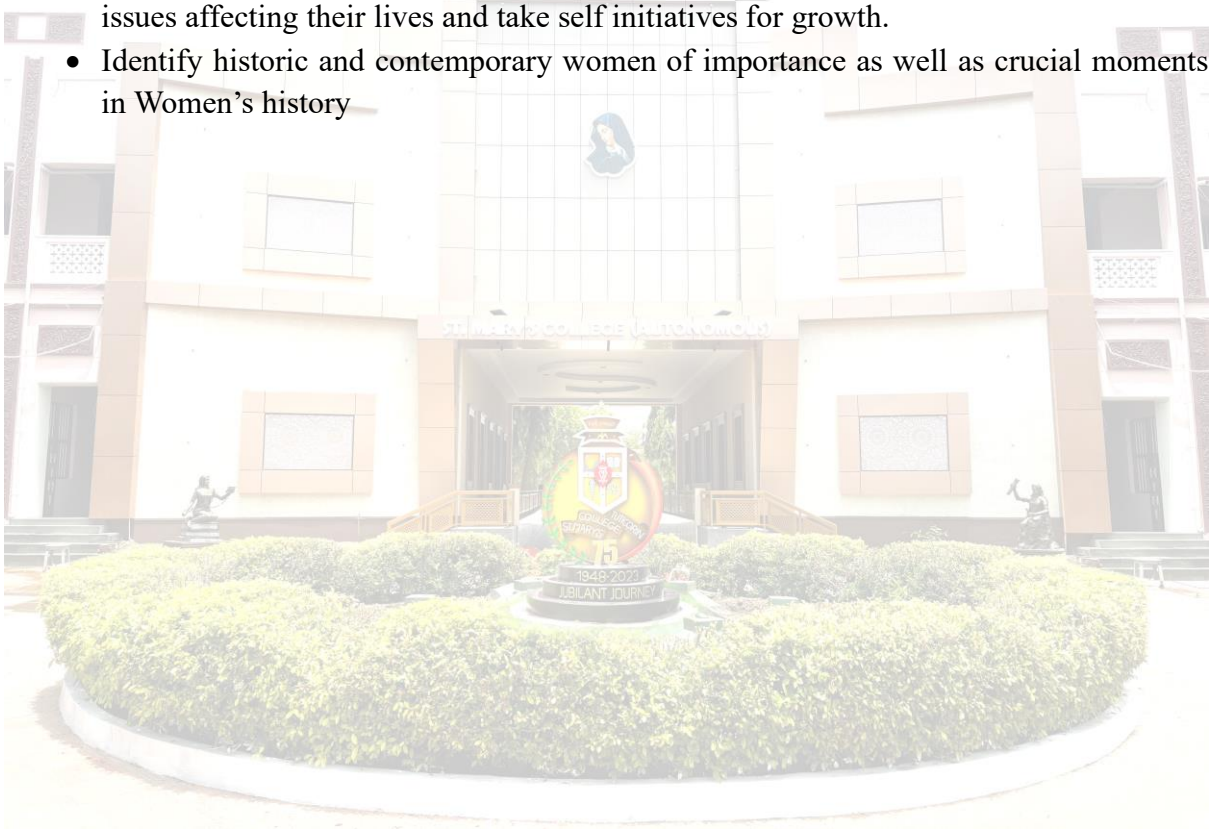
Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	acquire knowledge of useful plant parts	3	Re
CO-2	to acquire the knowledge on geographical area of cultivation, production and marketing varriable food crops and their finished goods	1	Un
CO-3	able to differentiate importance of tropical and temperate fruits for human well being	3	Ap
CO-4	able to access the value of spices, contiments and beverage crops in international trads and confectionery industries	3	Ev
CO-5	understand the wealth of cash crops in India and their importance in improving trade and industrial growth	3	Ev
CO-6	comment on fibres as an alternative source of plastics	5	Un
CO-7	explain the use of beverages and their production	6	Un
CO-8	able to learn about the cultivation practices and extraction of oil from oil crops	6	Cr

Semester – III			
Women's Synergy			
Code : 18UAWS31	**Hrs/ Week : 2**	**Hrs/Sem:30**	**Credits : 2**

Course Outcome

- To know about Women's health issues including menstruation, pregnancy, child birth etc, thereby taking care of themselves.
- Create awareness about their own biases, fears and comfort levels and encourage to dream and fuel their own growth and self development.
- Engage in promoting social justice and women rights
- Create platforms and facilitate the young women to operate symbiotically towards issues affecting their lives and take self initiatives for growth.
- Identify historic and contemporary women of importance as well as crucial moments in Women's history



SEMESTER IV			
Core VI	**Taxonomy of Angiosperms**		
Coe: 18UBOC41	**Hrs/week: 4**	**Hrs/Semester: 60**	**Credit: 4**

Course Outcome :

CO.No.	Upon completion of this programme, students will be able to	PSO addressed	CL
CO-1	describe the general principles of classification	1	Cr
CO-2	Apply binomial nomenclature for species naming	4	Un
CO-3	learn floristic features in technical term and extend an illustrious explanation on floral components of the flower.	6	Ap
CO-4	familiarise and evaluate the economic importance of angiosperms	6	Ev
CO-5	attain field experience and preparation of herbaria	6	An
CO-6	develop skill in plant identification.	6	Ap
CO-7	gain the art of plant collection and preservation.	8	Cr
CO-8	Compare and contrast different families of angiosperms	1	An

SEMESTER IV			
Allied	**Allied Chemistry - II**		
Code :18UCHA41	**Hrs/Week : 4**	**Hrs/ Sem : 60**	**Credit : 3**

Course Outcome

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO 1	explain the methods of purification of ores and to differentiate ores and minerals	1	An
CO 2	know the extracting methods , properties and uses of titanium, vanadium ,thorium and their compounds	1	Re,Un
CO 3	synthesise some industrially important organic compounds such as Freon , rayon , polyester , nylon , thiokol Dacron	1, 5	Ev
CO 4	classify fuels and know its industrial uses	1, 4	Ap
CO 5	identify the techniques for sterilising water for domestic use	1, 4	An
CO 6	know the basics of abrasives	1,4	Re
CO 7	describe the role of micro and macro nutrients in plant growth and Identify the implication of biofertilizers on soil	1,5	Un
CO 8	classify fatty acids and analyse Cholesterol and know its biochemical significance	1	Ap, An

SEMESTER V			
Core VII	**Biotechnology (Common Core)**		
Code: 18UBCC51	**Hrs/Week:4**	**Hrs/Sem: 60**	**Credits: 3**

Course Outcome

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	describe different cloning vehicles and learn the different type of vectors	1	Kn, Un
CO-2	gain knowledge about techniques of biotechnology.	2	Un
CO-3	summarise the different techniques in animal biotechnology	2	Un, An
CO-4	compare the various techniques in plant and animal biotechnology	4	Cr
CO-5	enumerate cell culture, organ culture and stem cell culture and point out implications in health care	6	Kn, An
CO-6	distinguishes methods of alleviating environmental pollution and understand the synthesis of industrial products	5	An
CO-7	relate biotechnology and its benefits to mankind	6	Ap, Ev
CO-8	design, conduct experiments, analyze and interpret data for investigating problems in biotechnology and allied fields	7,8	Ap

SEMESTER V			
Core VIII	**Microbiology**		
Code: 18UBOC52	**Hrs/week: 5**	**Hrs/semester: 75**	**Credits: 4**

Course Outcome

CO.No.	Upon completion of this programme, students will be able to	PSO addressed	CL
CO-1	realise the history and scope of microbiology	3	Un
CO-2	understand the structure and growth characteristics of microorganism that enabling the learner to identify and classify microorganisms by themselves	4	Cr
CO-3	use various microbiological techniques to isolate, characterize and identify bacterial and viral pathogens of plants.	6	An
CO-4	provide a thorough knowledge about the microbes causing human diseases , their symptoms and preventive measures	4	Ap
CO-5	understand the role of microorganisms in biotechnology, fermentation, medicine and other industries for human well being	4	Ap
CO-6	discuss the role of microorganism in food, milk and water	4	An
CO-7	identify and control food borne disease and food spoilage	4	An
CO-8	test the quality of milk and enumerate microorganisms found in milk and soil	6	Ev

Semester V			
Core IX	**Biochemistry**		
Code: 18UBOC53	**Hrs/week: 5**	**Hrs/ Semester: 75**	**Credit: 4**

Course Outcome

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the types of chemical bonds involved in the structure of biomolecules and basic concepts of acid, base and buffer	2	Un
CO-2	classify carbohydrates of different domain based on their physical and chemical organization	2	An
CO-3	understand the structure and properties of amino acids	2	Un
CO-4	describe the structural details and properties of protein	2	Un
CO-5	explain the nomenclature, mechanism of enzyme activity	2,4	Un
CO-6	discuss the sources of vitamins and symptoms specific to vitamin deficiency in human begins.	4	Re
CO-7	categorize lipids based on their structure	2	Un
CO-8	acquire skill in qualitative and quantitative estimation of the biomolecules	6	Ap

SEMESTER - V			
Core Integral I	**Biostatistics and Biological Techniques**		
Code: 18UBOI51	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 4**

Course Outcome

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the fundamentals of statistical analysis	4	Un
CO-2	apply the learned procedure for collecting data, presenting data and analyze the same.	6	An
CO-3	able to interpret the results and find solution to the problems.	8	Ev
CO-4	understand the principles, working methodology and applications of instruments used in biology	4	Cr
CO-5	apply micro techniques for permanent mounting of biological samples.	8	Cr
CO-6	apply the learned techniques to carry out basic research in biology.	4	Ap
CO-7	understand the importance of data collection and their organization	8	Un
CO-8	communicate the results of statistical analyses accurately and effectively	8	Ev

SEMESTER V			
Core Integral II	**Pharmacognosy**		
Code:18UBOI52	**Hrs/week:4**	**Hrs/semester: 60**	**Credit: 4**

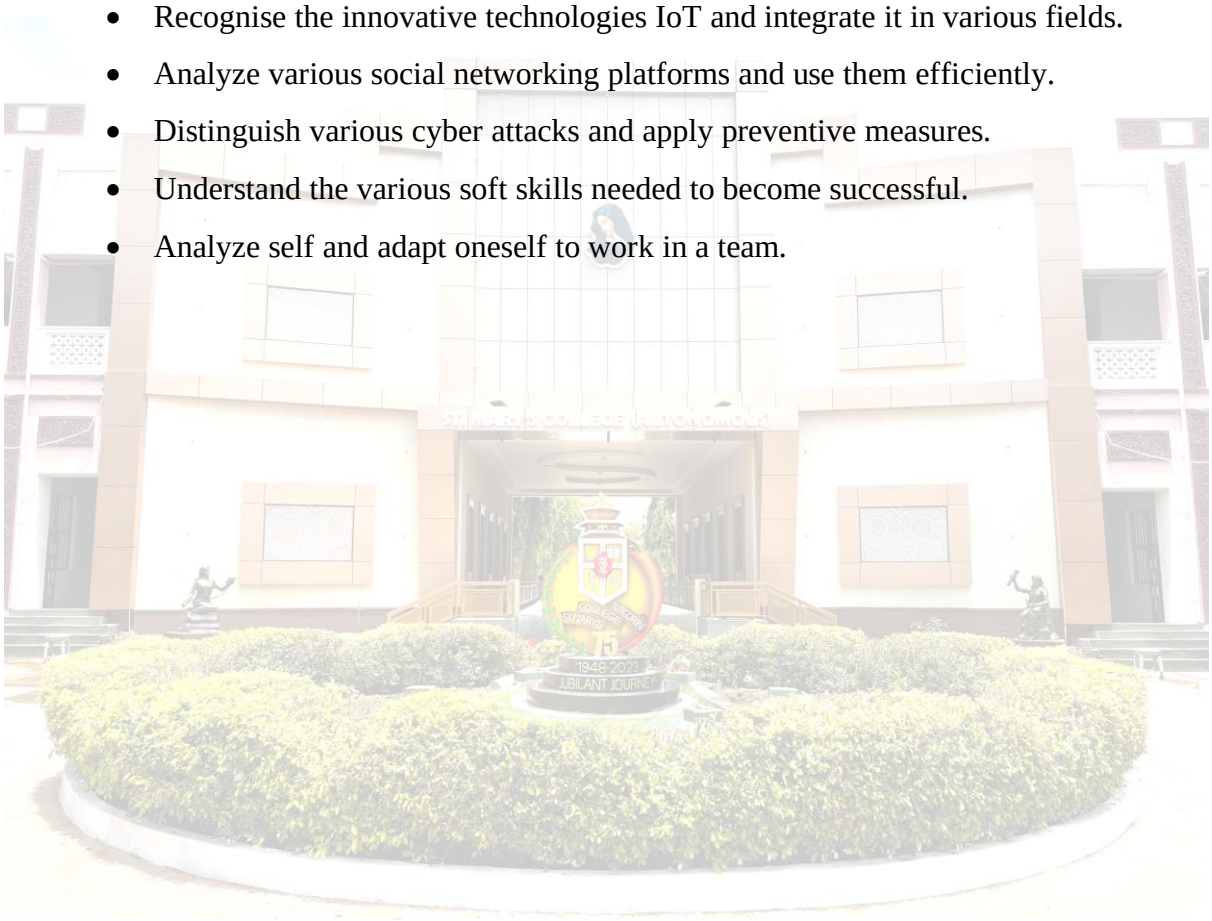
Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	define and identify the more valuable medicinal plants based on their pharmaceutically active compounds	3	Ap
CO-2	formulate medicinal product and apply the knowledge for proper storage and distribution	8	Ap
CO-3	assess and evaluate the purity of herbal medicine.	7	Ev
CO-4	elaborate the cultural practices of important medicinal plants.	6	Re
CO-5	assess the trade opportunities of medicinal plants.	6	Ap
CO-6	define, classify and explain the importance of herbal medicine.	6	Re
CO-7	identify the crude drugs by morphological, organoleptic and histological characters.	6	Un
CO-8	know and expain the important phytoconstituents of therapeutic value.	6	Un

Semester - V			
Common Skill Based Core	**Computer for Digital Era and Soft Skills**		
Code : 18UCSB51	**Hrs / Week : 2**	**Hrs / Sem : 30**	**Credits : 2**

Course Outcome

- Identify different types of computer systems.
- Classify various types of software being used.
- Compare various digital payments and use them in day to day life.
- Recognise the innovative technologies IoT and integrate it in various fields.
- Analyze various social networking platforms and use them efficiently.
- Distinguish various cyber attacks and apply preventive measures.
- Understand the various soft skills needed to become successful.
- Analyze self and adapt oneself to work in a team.



Semester VI			
Core X	**Plant Physiology**		
Code: 18UBOC61	**Hrs/week: 5**	**Hrs/ Semester: 75**	**Credit : 4**

Course Outcome

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the water relation and root structure and functions that influence the transfer of inorganic nutrients from the soil into the plants	2,3	Un
CO-2	assess the symptom specific nutritional deficiencies and discuss the need of fertilisers for crop improvement	2	An,Ap
CO-3	analyse the mechanism of their assimilation of inorganic molecules into organic molecular components.	3	Un
CO-4	analyse light enhanced photochemical reactions that culminates in the synthesis of ATP and NADPH and fixation of carbon dioxide into organic compounds	3	Un
CO-5	describe respiration with its associated carbon metabolism and releasing of energy stored in chemical bonds in a controlled manner for cellular use	3	Re,Cr
CO-6	investigate plant's functions and adaptations under altered environmental conditions	2	Cr
CO-7	comment on the hormone controlled and light mediated morphogenetic events in plants	2	An
CO-8	design and conduct scientific experiments and analyse the data critically	4,8	Cr

Semester VI			
Core XII	**Ecology and Phytogeography**		
Code;18UBOC63	**hrs/week:4**	**Hrs/semester: 60**	**Credit : 4**

Course Outcome

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	reveal the range of plant diversity in terms of structure, function and their environmental relationships.	5	Un
CO-2	describe the climatic and edaphic factors and ecological succession	5	Un
CO-3	categorize the plants based on adaptation	3	An
CO-4	address the global environment crisis and the strategies applicable for environmental problem mitigation	7	Ev
CO-5	learn the global level environmental summit organized that focused for sustainable future	7	Cr
CO-6	know the importance of remote sensing in finding the current status of global health	7	Cr
CO-7	recognize the causes of environmental problems	7	Un
CO-8	discuss ecological issues and concept	5	Re

SEMESTER - VI			
Core Integral III	**Molecular Biology and Bioinformatics**		
Code:18UBOI61	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 4**

Course Outcome

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	know chemistry of genetic material and details of its replication at molecular level	2	Un
CO-2	understand the general principles of chromosome organization at different phases of cell cycle	2	Un
CO-3	explain gene regulation mechanisms at various levels by which she can learn how it controls growth and development of an organism	4	Cr
CO-4	know complexity of gene expression in eukaryotes over prokaryotes	3	Un
CO-5	understand vector mediated gene transfer techniques including screening and identification of recombinants	6	Un
CO-6	know the gene cloning tools and their mysteries in success of gene cloning technology	8	Un
CO-7	attain hands on experiences in the techniques associated there of	4	Cr
CO-8	practice the advanced techniques in genetic engineering such as dna sequencing, blotting, dna amplification and fingerprinting	3	Ap

SEMESTER – I			
Core I	**Plant Diversity I (Algae, Bryophytes, Fungi and Lichens)**		
Course Code: 21UBOC11	**Hrs / Week: 6**	**Hrs / Sem: 90**	**Credits: 6**

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	illustrate general characteristics of algae, fungi, lichen and bryophytes	1	Un
CO-2	compare and contrast algae, fungi, lichen and bryophytes	2, 3	Un
CO-3	critique the importance of algae, fungi, lichen and bryophytes and their role in everyday life and environment.	3	Ev
CO-4	distinguish life cycle pattern in algae, fungi and bryophytes	2	An
CO-5	identify algal, fungal, lichen and bryophytes samples and compare adaptive feature of the specified plant groups	1	Un, Re
CO-6	implement the knowledge acquired for self-employability	6, 7	Un, Ap

SEMESTER I			
Allied I	**Invertebrate & Chordate Zoology**		
Course Code: 21UZOA11	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credits : 3**

Course Outcomes:

Co. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	differentiate the invertebrate and chordate animals	1	Un
CO-2	identify the common and distinctive features of invertebrate phyla	2	Re
CO-3	associate the parasitic adaptation through their mode of life	3	Un
CO-4	analyse the unique features and evolutionary relationship between each chordate group	1	An
CO-5	apply the knowledge of biological diversity to our daily life and conservation of bioresources	5	Ap
CO-6	evaluate the interaction of organisms with environment and their adaptive mechanisms	3	Ev

SEMESTER – I			
Skill Enhancement Course - I Professional English for Botany – I			
Course Code: 21UBOPE1	**Hrs / Week: 2**	**Hrs / Sem: 30**	**Credits: 2**

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	organize the words used in life science and improve their competence in using the language	1	An
CO-2	critique unfamiliar texts and describe biological processes and appraise critical and theoretical approaches to the reading and analysis of various texts in life science	7, 3	Ev, An
CO-3	discuss critically, negotiate and present without committing errors and develop entrepreneurship skills	2	Un
CO-4	describe the technical words used life science laboratory settings and construct error free sentences for content writing	8	Re
CO-5	present simple sentences without spelling or grammatical error and develop strategic competence through active listening	7	Ap
CO-6	construct English proficiency with good vocabulary and speak confidently in academic/ professional environment and face interviews with confidence	7	Ap

SEMESTER - I			
Ability Enhancement Course -Value Education			
Code : 21UAVE11	**Hrs/Week : 2**	**Hrs / Semester: 30**	**Credits : 2**

Unit I: Introduction to Value Education

Concept of Values -Types of Values- Approaches to values - Benefits of Value Education-Characteristics of Values

Unit II: Human Values

Human Values -Sources of Human Values - Love - Compassion - Gratitude - Courage - Optimism - Forgiveness- the need and urgency to reinforce Human Values

Unit III: Social Values

Role of family and society in teaching values - Role of educational institutions in inculcating values-Three general functions of education for society-Self-Reflection- Our society's needs - Social Responsibilities of a student

Unit IV: Spiritual Values

Spiritual Values - Spiritual Development -Moral Development - Importance of Spiritual Values - Cultivation of Spiritual Values -Five most common spiritual values - Spiritual Resources

Unit V: Values for Life Enrichment

Goal Setting - Building relationship - Friendship - Love relationship - Family relationship - Professional relationship Interpersonal Relationship -Essential Life Skills that Help in Students Future Development-Life Enrichment Skills Domain

Books for Reference:

1. Sneha M. & K. Pushpanadham Joshi. *Value Based Leadership in Education Perspective and Approaches,* Anmol Publications Pvt. Limited, 2002.

2. Venkataiah.N. *Value Education,* APH Publishing, 1998

3. Pramod Kumar M. *A Handbook on Value Education*, Ramakrishna Mission Institute of Culture (RMIC) 2007

4. Jagdosh Chand, *Value Education*, Shipra Publication 2007

5. Indrani Majhi (Shit) Ganesh Das, *Value Education*, Laxmi Publication Pvt. Ltd., 2017

6. Arumugam, N. S. Mohana, Lr.Palkani, *Value Based Education*, Saras Publication2014

SEMESTER – II			
Core II	**Anatomy, Embryology and Microtechniques**		
Course Code: 21UBOC21	**Hrs / Week: 6**	**Hrs / Sem: 90**	**Credits: 6**

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	C L
CO-1	classify tissue system and explain the organization of root and shoot apex	2	Ev, An
CO-2	distinguish the organization of tissues and cellular archiceture between root and stem and learn the process of secondary growth in plants	2	An
CO-3	describe the cytological events associated with the flower development	2	Un , E
CO-4	explain the physiological changes during pollen pistil interaction.	1	Un
CO-5	understand fertilization and double fertilization.	3	Ev
CO-6	explain the development of seed and dispersal mechanism	1	Un

SEMESTER II			
Allied II	**Genetics, Physiology and Developmental Zoology**		
Course Code: 21UZOA21	**Hrs/ Week : 4**	**Hrs/ Sem : 60**	**Credits : 3**

Course outcomes

CO. No	Upon completion of this course, students will be able to	PSO Addressed	CL
CO-1	explain the importance of genetics and welfare of human society	2	Un
CO-2	list out the nutritive components in the food	2	Re
CO-3	describe the physiology of digestion, respiration and excretion	3	Re
CO-4	appraise the structure and function of human nervous system and the process of nervous conduction	1,2	An
CO-5	illustrate the anatomy, physiology of human reproductive system, fertilization and post fertilization events	3	Un
CO-6	categorize the types of contraceptive devices and suggest treatment for infertility.	3,8	An

SEMESTER – II			
Skill Enhancement Course - II Professional English for Botany – II			
Course Code: 21UBOPE2	**Hrs / Week: 2**	**Hrs / Sem: 30**	**Credits: 2**

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	categorize the words used in life science and improve their competence in using the language in daily life	1	An
CO-2	appraise the critical and theoretical approaches to the reading and analysis of various texts in life science and critique the biological processes	3, 7	An, Ev
CO-3	discuss critically, negotiate and present without committing errors and develop entrepreneurship skills	2, 6	Un
CO-4	prepare reports and minutes for various academic events	7	Cr
CO-5	write essays creatively and innovatively on view of images	7	Ap
CO-6	develop script for topics on interest	7	Cr

SEMESTER – III			
Core III Plant Diversity II (Pteridophytes, Gymnosperms and Paleobotany)			
Course Code: 21UBOC31	**Hrs / Week:4**	**Hrs / Semester: 60**	**Credits:4**

Course Outcomes:

CO.No.	Upon completion of this programme, students will be able to	PSO addressed	CL
CO-1	summarize the general characters of pteridophytes and gymnosperms and outline the classification of these groups of plants	1,2	Un
CO-2	specify the criteria of classification and assign the taxonomic hierarchical rank to the taxa	2,3	Un, Ap
CO-3	explore the ecological and economic significance of pteridophytes and gymnosperms	1,3	An
CO-4	highlight the phenomenon of heterospory in pteridophytes and infer its significance in origin of seed habit	2	An
CO-5	examine microscopically the key characteristics of (morphological, anatomical and ecological) pteridophytes and gymnosperms and make sketches of the same.	6	Ap
CO-6	record the geological time scale and relate the geological era with evolution of plants	2.4	Un

SEMESTER - III			
NMEI	**Plant Resource Utilization**		
Course Code:21UBON31	**Hrs/week: 2**	**Hrs/Semester:30**	**Credit:2**

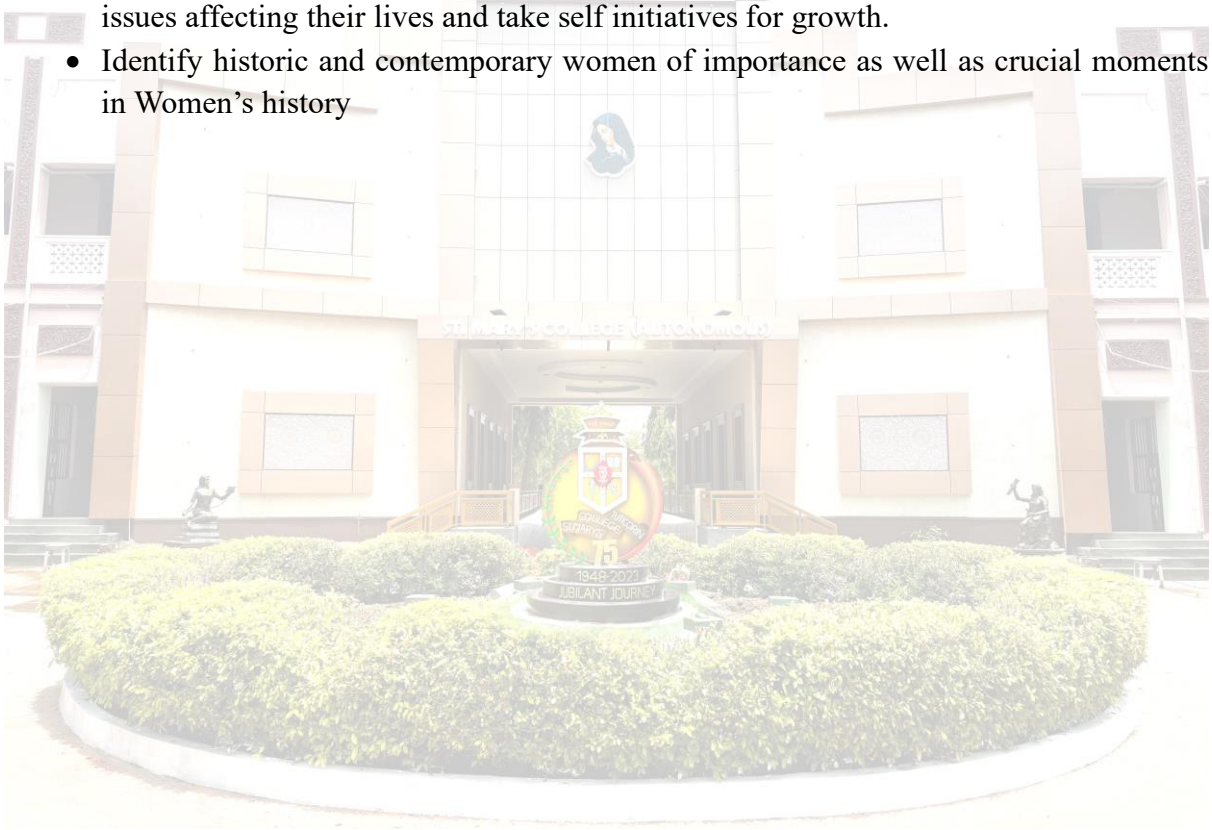
Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	recall the history of agriculture and scope of agricultural crops	1	Re
CO-2	discuss the knowledge on geographical area of cultivation, production and marketing of various food crops and their finished goods	1	Un
CO-3	present the importance of tropical and temperate fruits for human wellbeing, cultivation practices and extraction of oil from oil crops	3	Ap
CO-4	critique the value of spices, condiments and beverage in international trades and confectionery industries	3	Ev
CO-5	evaluate the wealth of cash crops in India and their importance in improving trade and industrial growth	3	Ev
CO-6	indicate fibers are an alternative source of plastics, explain the use of beverages and their production	5, 6	Un

Semester – III			
Women's Synergy			
Code : 21UAWS31	**Hrs/ Week : 2**	**Hrs/Sem:30**	**Credits : 2**

Course Outcome

- To know about Women's health issues including menstruation, pregnancy, child birth etc, thereby taking care of themselves.
- Create awareness about their own biases, fears and comfort levels and encourage to dream and fuel their own growth and self development.
- Engage in promoting social justice and women rights
- Create platforms and facilitate the young women to operate symbiotically towards issues affecting their lives and take self initiatives for growth.
- Identify historic and contemporary women of importance as well as crucial moments in Women's history



SEMESTER IV			
Core IV	**Taxonomy of Angiosperms and Economic Botany**		
Course Code: 21UBOC41	**Hrs/week: 4**	**Hrs/Semester: 60**	**Credit: 4**

Course Outcomes:

CO. No.	Upon completion of this programme, students will be able to	PSO addressed	CL
CO-1	describe the general principles of classification and outline the systems of classification	1	Cr
CO-2	apply binomial nomenclature for species naming	4	Un
CO-3	learn floristic features in technical term and provide an illustrious explanation on floral components of the flower and develop skill in plant identification.	4,6	Ap
CO-4	familiarise and evaluate the economic importance of angiosperms	6	Ev
CO-5	attain field experience and preparation of herbaria for digital database and gain the art of plant collection and protection	6, 8	An, Cr
CO-6	compare and contrast the diagnostic features of different families of angiosperms prescribed in the syllabus	1	An

SEMESTER -V			
Core V	**Common Core - Biotechnology**		
Course Code: 21UBCC51	**Hrs/Week:4**	**Hrs/Sem: 60**	**Credit: 3**

Course Outcomes:

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	discuss different types of animal and plant cloning vectors and scan the role of restriction enzyme in genetic modification	1,2	Un
CO-2	clarify the human genome sequences and its application in human welfare	4,7	Un, An
CO-3	apply various gene transfer techniques to generate genetically modified organisms	2,7	Ap
CO-4	perform cell culture, organ culture and stem cell culture to realize the positive impact in health care	6	Un, Ap
CO-5	encapsulate the characteristic features of microbes and their role in production of industrial products and environmental reacalamtation	5,6	An
CO-6	get hands on experience to conduct experiments, analyze and interpret data for investigating problems in biotechnology and allied fields	7,8	Ap

SEMESTER V			
Core VI	**Biochemistry**		
Course Code: 21UBOC51	**Hrs/Week: 4**	**Hrs/Semester: 60**	**Credit: 4**

Course Outcomes:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the types of chemical bonds involved in the structure of biomolecules and basic concepts of acid, base and buffer	1	Un
CO-2	classify carbohydrates of different domain based on their physical, chemical organization and their biological significance	8	An
CO-3	understand and describe the structure and properties of amino acids, protein and lipids and their role in organization of life	8	Un
CO-4	layout enzyme groups and know the nomenclature that enables to deduce the specificity of enzyme's action	8	Un
CO-5	discuss the sources of vitamins and symptoms specific to vitamin deficiency in human beings.	8	Re
CO-6	apply theoretical knowledge in biochemical laboratory techniques	3, 5	Ap

SEMESTER V			
Core VII	**Ecology and Phytogeography**		
Course Code:21UBOC52	**Hrs/week:4**	**Hrs/semester:60**	**Credit:4**

Course Outcomes:

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the ecological, edaphic and biotic factor of the community	3	Re, Un
CO-2	reveal the range of plant community and their relationship in the environment	1	Un
CO-3	enable the students to understand how the plant interact with their environment	1	An
CO-4	categorize the plants based on adaptation to its environments	1	An
CO-5	understand the concept of various plant Communities and their characteristics	2	Un
CO-6	understanding of geographical region and vegetation types of India	2	Un

SEMESTER – V			
Core VIII	**Biostatistics and Bioinformatics**		
Course Code: 21UBOC53	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 4**

Course Outcomes:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	define and comment on fundamentals of statistical analysis	4	Un
CO-2	apply the learned procedure for collecting data, presenting data	6	An
CO-3	choose necessary tool to interpret the results and find solution to the problems and work with computer skill especially in MS Excel	6	Ev, Un
CO-4	understand the relationships among living things and analyze biological problems using biological concepts, algorithms, and tools available in computer science	2,4	Un
CO-5	apply molecular methods to study genetic variation within and between species	3	Ap
CO-6	apply knowledge of bioinformatics in a practical project	4	Ap

SEMESTER V			
Core Elective	**Genetics and Evolution**		
Course Code:21UBOE51	**Hrs/Weeks:4**	**Hrs/Semester:60**	**Credits:3**

Course Outcomes:

CO. No.	Upon completion of this course the students will be able to	PSO addressed	CL
CO – 1	design genetic crosses to get information about genes, alleles and gene function	1	U
CO – 2	compare the phenotypes that results from Mendelian principles of inheritance, X linked and cytoplasmic model of inheritance.	3	U
CO – 3	explain how the quantitative traits and the results of many gene combination that each can contribute a varying amount to a phenotype	3	U
CO – 4	explain diagrammatically the process of homologous recombination during meiosis and interpret how it can it lead to re combination of genes and there by variation.	3	C
CO – 5	evaluate how Darwin's theory of natural selection helped to study organic evolution and able to detect evolutionary forces (natural selection, genetic drift, recombination, migration, mutaion) that drive the pattern and process of organic evolution at different levels	5	C
CO -6	answer the scientific questions how organism have evolved overtime and formulate a hypothesis about origin of life on the earth.	6	U

SEMESTER V			
Core Elective	**Pharmacognosy**		
Course Code:21UBOE52	**Hrs/week:4**	**Hrs/semester:60**	**Credit:3**

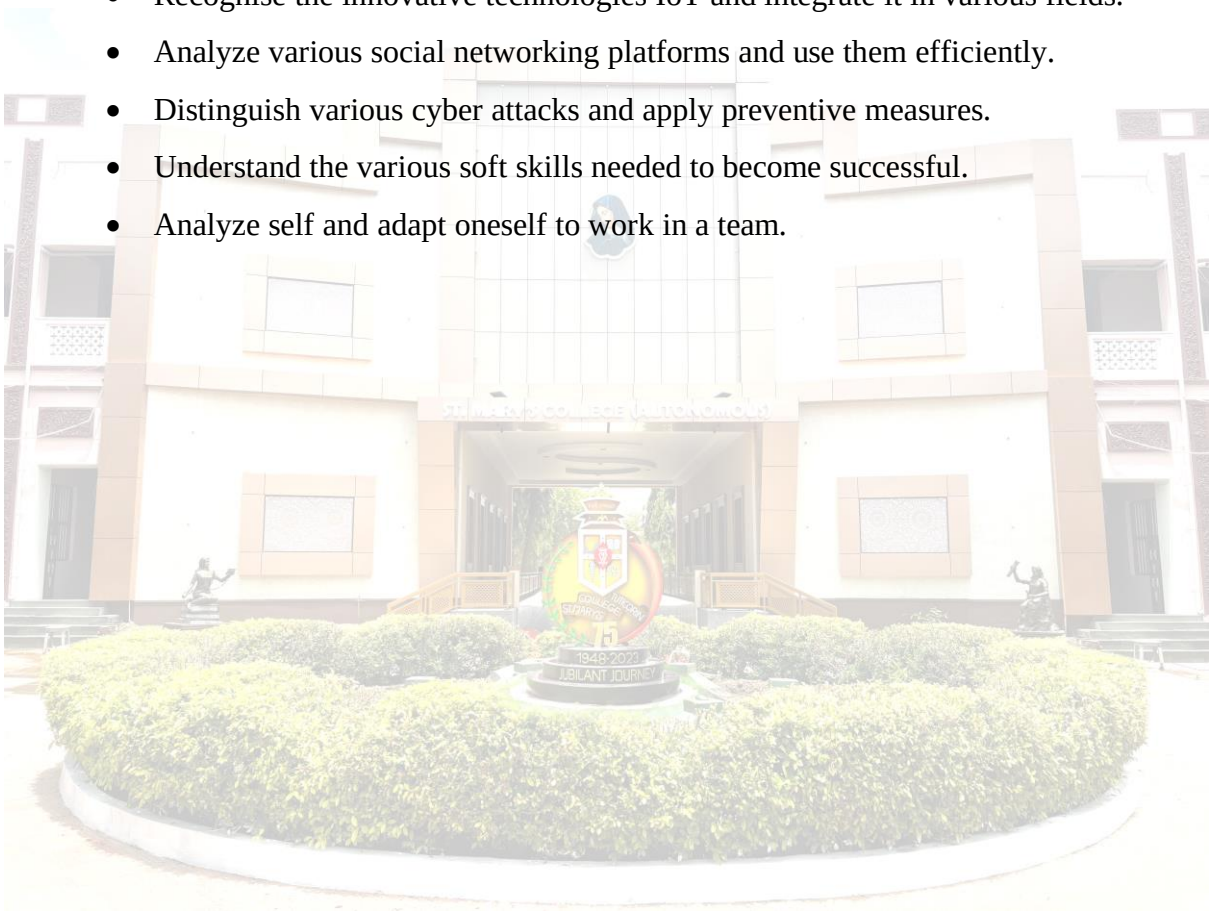
Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	define and identify the more valuable medicinal plants based on their pharmaceutically active compounds	3	Re,
CO-2	formulate medicinal product and apply the knowledge for proper storage and distribution	8	Ap
CO-3	analyse and evaluate the purity of herbal medicine.	5	Ev
CO-4	define, classify and explain the importance of herbal medicine.	6	An
CO-5	identify the crude drugs by morphological, organoleptic and histological characters.	1	Un
CO-6	know and explain the important phyto constituents of therapeutic value.	6	Un

Semester - V			
Common Skill Based Core	**Computer for Digital Era and Soft Skills**		
Code : 21UCSB51	**Hrs / Week : 2**	**Hrs / Sem : 30**	**Credits : 2**

Course Outcome

- Identify different types of computer systems.
- Classify various types of software being used.
- Compare various digital payments and use them in day to day life.
- Recognise the innovative technologies IoT and integrate it in various fields.
- Analyze various social networking platforms and use them efficiently.
- Distinguish various cyber attacks and apply preventive measures.
- Understand the various soft skills needed to become successful.
- Analyze self and adapt oneself to work in a team.



SEMESTER – VI			
Core IX	**Plant Physiology**		
Course Code: 21UBOC61	**Hrs/week: 4**	**Hrs/Semester: 60**	**Credit: 4**

Course Outcomes:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the plant's water relation and functions of root that influence the transfer of inorganic nutrients from the soil into the plants	2,3	Un
CO-2	analyse the mechanism of their assimilation of inorganic molecules into organic molecular components.	2,3,8	Un
CO-3	analyse light enhanced photochemical reactions that culminates in the synthesis of ATP and NADPH and fixation of carbon dioxide into organic compounds	2,3,8	Un
CO-4	describe respiration with its associated carbon metabolism and releasing of energy stored in chemical bonds in the controlled manner for cellular use	2	Re, Cr
CO-5	comment on the hormone controlled and light mediated morphogenetic events in plants	2	An
CO-6	design and conduct scientific experiments and analyse the data critically	4,8	Cr

SEMESTER VI			
Core X	**Microbiology and Plant Pathology**		
Course Code: 21UBOC62	**Hrs/week: 4**	**Hrs/semester: 60**	**Credits: 4**

Course Outcomes:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	acquire knowledge on the basic concept of microbes, their taxonomy, mode of nutrient and give insight on microbial culture	1	Un
CO-2	understand the structure and growth characteristics of microorganism that enabling the learner to identify and classify microorganisms by themselves	2	Un
CO-3	use various microbiological techniques to isolate bacterial species for morphological and physiological studies	6	An
CO-4	understand the role of microorganisms in fermentation technology for production of food based and pharmaceutical products	6	Ap
CO-5	enumerate the microbial flora of milk and determine milk quality	2	Ev
CO-6	provide a thorough knowledge about the microbes causing plant diseases, their symptoms and preventive measures	7	Ap

SEMESTER - VI			
Core XI	**Cell and Molecular Biology**		
Course Code: 21UBOC63	**Hrs/Week:4**	**Hrs/Sem:60**	**Credits:4**

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	indicate the structure and function of basic organelles of plant cells	1, 2	Un
CO-2	illustrate the structural organization and function of nucleus	1, 2	Un
CO-3	infer and quote the general principles of chromosome organization	1, 4	Un, Re
CO-4	sequence the gene regulation mechanisms at various levels	2	Un
CO-5	compare the complexity of gene expression in eukaryotes over prokaryotes and infer molecular mechanism of dna replication	5	An, Re
CO-6	present laboratory skill in conducting experiment and draw data and interpret it	6	Ap

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