Programme: B. Sc. Zoology

SEMESTER - I			
Core I	**Invertebrata I**		
Code :18UZOC11	**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	understand the basic concepts of animal taxonomy	1	Un
CO - 2	know the distinctive features of taxonomic classes within the phyla covered	1	Re
CO -3	recognize the common members of each phylum and of selected classes and orders	1	Re
CO - 4	analyze the important concepts in invertebrate body structure and organization, including body, symmetry, body cavity, gut formation, Segmentation	2	Un
CO - 5	invertebrates, including locomotion, body support, reproduction, development, feeding, digestion, excretion, osmoregulation, circulation, respiration, sensory perception, behavior etc.	2	Un
CO - 6	impart information on the ecological and economic importance of invertebrates.	1	Un
CO - 7	aware of the importance and diversity of invertebrates.	1	Un
CO - 8	develop basic laboratory skills including microscopy, dissection and careful observation.	8	Cr

SEMESTER - I			
Core II	**Invertebrata II**		
Code :18UZOC12	**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	identify common members of each phylum and of selected classes and orders	1	Un
CO- 2	understand the distinctive features of taxonomic classes within the phyla covered.	1	Un
CO -3	acquire knowledge on the importance, and diversity of the invertebrates	1	Un
CO – 4	analyze the important concepts in invertebrate body structure and organization, including body symmetry, cephalization, body cavity, gut formation, segmentation	2	Un
CO – 5	learn important biological processes in invertebrates, including locomotion, body support, reproduction, development, feeding, digestion, excretion, circulation, osmoregulation, respiration, sensory perception, behaviour. etc.	2	Re, Kn
CO – 6	aware of the ecological and economic importance of invertebrates	1	Un
CO – 7	develop basic laboratory skills including microscopy, dissection and careful observation.	8	Cr
CO – 8	use knowledge in invertebrates as basic course for further subjects on higher level study.	1	Ap

SEMESTER - I			
Allied	**Allied Chemistry - I**		
Code :18UCHA11	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 3**

Course Outcomes:

CO.No	Upon completion of this course, 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 - 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	**Chordata - I**		
Code :18UZOC21	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 4**

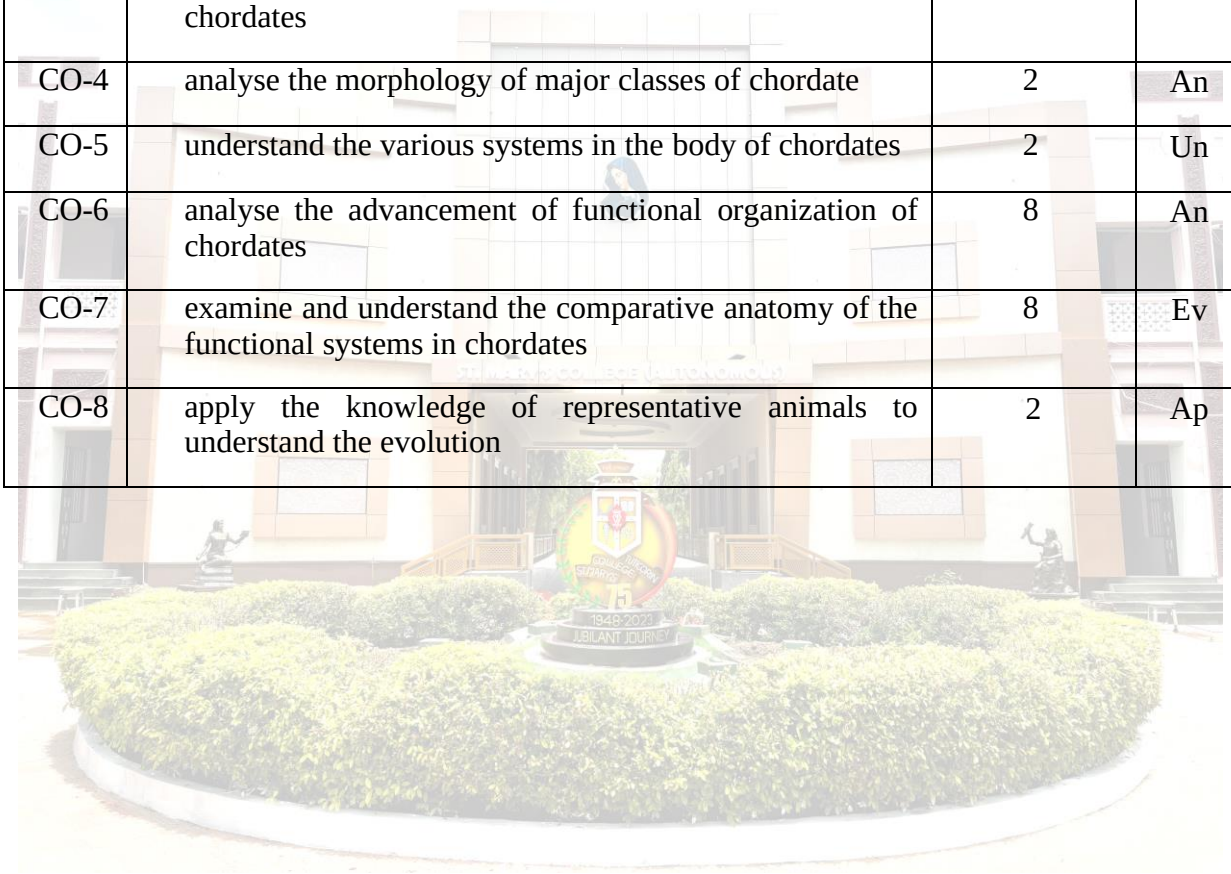
Course Outcomes:

CO.No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	acquire knowledge on the fundamental organization of chordates.	1	Un
CO-2	understand the functional organization and taxonomic position of animals	2	Un
CO-3	impart information on the basic concepts of chordate diversity	1	Un
CO-4	analyse the characters of different classes	2	An
CO-5	learn and identify the major groups within the phylum chordate	1	Un
CO-6	reason out the inclusion of different representative animals in particular class	8	An
CO-7	recognize the different structural organizations from evolutionary point of view	8	Ev
CO-8	compare the anatomy of different functional systems in chordate.	2	Ap

SEMESTER - II			
Core IV	**Chordata - II**		
Code :18UZOC22	**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	know the chordate diversity	1	Un
CO-2	aware of the origin of chordates	2	Un
CO-3	learn and recognize the major characteristics of chordates	1	Un
CO-4	analyse the morphology of major classes of chordate	2	An
CO-5	understand the various systems in the body of chordates	2	Un
CO-6	analyse the advancement of functional organization of chordates	8	An
CO-7	examine and understand the comparative anatomy of the functional systems in chordates	8	Ev
CO-8	apply the knowledge of representative animals to understand the evolution	2	Ap



SEMESTER III			
Core V: Developmental Biology and Evolution			
Code: 18UZOC31	**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	acquire knowledge about the developmental process and the sequential changes from cellular grade of organization to organ grade of organization in multi-cellular organisms.	1,2	Un
CO- 2	compare and contrast developmental processes in different model organisms.	8	Un
CO-3	analyse the ultimate and penultimate causes of human female and male sub fertility.	6	Un, An
CO-4	provide an detailed explanations of the theories and processes of evolution.	7	Un
CO-5	examine and apply the major genetic and ecological processes underlying evolution and selection.	3	Un, An
CO-6	list and describe the evidences for evolution and its required corollaries.	1,7	Un
CO-7	recognise and explain the processes driving speciation	1,3	Un
CO-8	outline the evolution of the modern humans of the processes of social and cultural change through time	2,3	Un

SEMESTER - III			
Allied II	**Plant Diversity**		
18UBOA31	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 3**

Course Outcome

CO. No.	Upon completion of this course ,students will be able to	PSO addressed	CL
1.	distinguish between diverse groups of algae, fungi, and bryophytes using their characteristic features	1, 2	An
2.	discuss different life cycle patterns in different groups	1, 2	Cr
3.	apply the practical knowledge to identify a particular group from a mixed group in the laboratory or in the field	1, 6	Ap
4.	know the basic skills and techniques in micropreparation and formulate methods to identify different groups	6	Ap
5.	understand the status of cryptogams are unique in plant kingdom	1, 2	Un
6.	infer pteridophytes are pioneer in the evolution of seed habit	1, 2	Re
7.	compare and contrast the origin and evolution of steles, foliage, seed and seedless plants.	1, 2	An
8.	understand the phylogenetic relationship between the different groups	1, 2	Un

SEMESTER - III			
NME I - Basic Biotechnology			
Code :18UZON31	**Hrs /Week: 2**	**Hrs/ Sem : 30**	**Credits : 2**

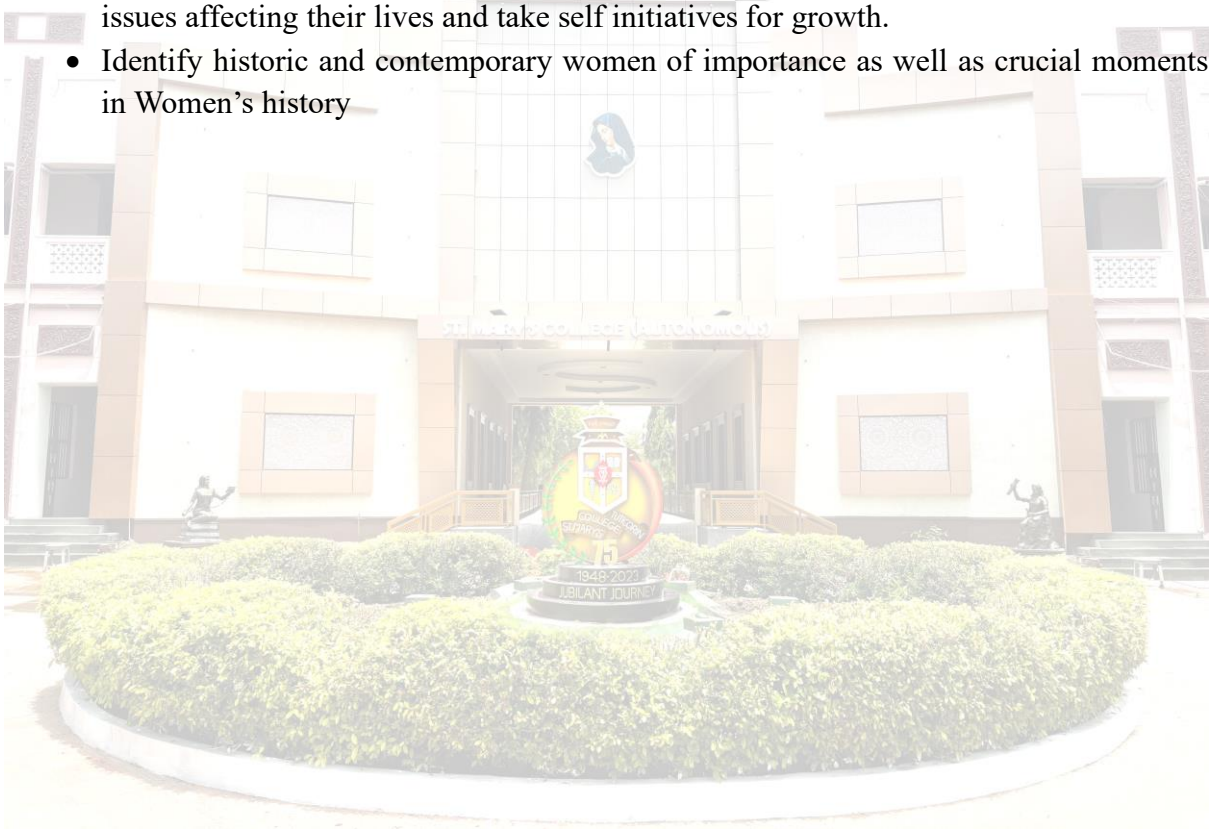
Course Outcome

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
Co-1	understand the basic principles of Biotechnology	1	Un
CO-2	distinguish between prokaryotic and eukaryotic cells from their structural studies	2	An
CO-3	understand the restriction enzymes and cloning vectors and assess their use in genetic engineering.	4	Un, Ev
CO-4	demonstrate the structure of DNA, its replication, amplification and separation of fragments	4, 5	Un
CO-5	analyse different culture media and techniques to cater the need for cell culture.	6	An
CO-6	evaluate techniques of gene delivery and cloning to adapt in manipulation of genes	5	Ev
CO-7	discuss the preparation and characterization of appropriate nano materials in the field of nanotechnology	7	Cr
CO-8	develop proficiency in aseptic laboratory techniques and standard procedures for cell culture.	8	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 IV - Biochemistry			
Code :18UZOC41	**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	demonstrate an understanding of the structure of biomolecules such as carbohydrate, protein and lipids	4	Un
CO-2	evaluate significance of biomolecules in the processes that occur within living cells	4	Ev
CO-3	analyse enzymes as biological catalysts and the mechanism of their action and develop the ability to comprehend life processes	4	An
CO-4	discuss the beneficial effects of vitamins and foods that contain vitamins required for the healthy functioning of the body	2	Cr
CO-5	recall, relate and deploy knowledge in identifying deficiency diseases of vitamins from symptoms and find the remedy	6	Ap
CO-6	understand the principle, working mechanism and application of standard laboratory equipments and modern instruments	6	Un
CO-7	develop proficiency in basic laboratory techniques in biochemistry and maintain records of lab activities	7	Ap
CO-8	apply appropriate biochemical techniques to plan and carryout experiments, test hypotheses and draw conclusions to conduct project works in near future	8	Ap

SEMESTER - IV			
Allied II	**Angiosperm Taxonomy and Plant Physiology**		
18UBOA41	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits: 3**

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	recall the botanical names	1	Un
CO-2	evaluate the distribution, evolution and phylogenetic relationship among plants.	2	Ev
CO-3	study the contribution of taxonomist in plant systamatics	1	Un
CO-4	outline and recall the natural systems of classification of angiosperms	2	Re
CO-5	explain the floristic features of families in technical terms	2	An
CO-6	understand the physiological mechanisms involved in the uptake and transfer of water	2 ,3	Un
CO-7	comment on the major effects and physiological mechanisms of growth hormones in plants	2	An
CO-8	design and conduct scientific experiments and analyse the data critically	4, 8	Cr

SEMESTER - IV			
Core Skill Based: Clinical Laboratory Technology			
Code : 18UZOS41	**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 laboratory practices and know how to maintain the laboratory instruments	1	Un
CO - 2	analyse and distinguish various types of blood cells	2	An
CO - 3	understand the pathological diseases and explain the test for hepatitis, AIDS and intestinal parasite	3	An
CO - 4	evaluate critical thinking of biochemical test	5	Un
CO - 5	demonstrate the proficiency in basic methods of instrumentation and quantitative analytical skills used to conduct biological research	6	Un
CO - 6	develop skills in various lab techniques	7	Cr
CO - 7	acquire knowledge to handle clinical equipments	4	Un
CO - 8	design, carry out and interpret scientific experiments	8	Ap

SEMESTER - IV			
NME II Applied Biotechnology			
Code :18UZON41	**Hrs /Week: 2**	**Hrs/ Sem :30**	**Credit : 2**

Course Outcome

CO.No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the production of different Bio-products	1	Un
CO-2	examine the nature and feature of SCP and aerobic and anaerobic digestion	3,5	An
CO-3	apply the techniques to clean up the environment through various treatment methods	2,6	Ap
CO-4	create awareness to cure cancer	7	Cr
CO-5	understand the importance of biosafety and IPR	2	Un
CO-6	evaluate the synthesis and applications of bio-products	8	Ev
CO-7	adapt appropriate tools and techniques in biotechnological manipulation	7	Cr
CO-8	apply the experimental procedures to the spectrum of fields making use of Biotechnology	8	Ap

SEMESTER V			
Core VII Biotechnology (Common Core)			
Code: 18UBCC51	**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	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, analyse and interpret data for investigating problems in Biotechnology and allied fields	7,8	Ap

SEMESTER V			
Core VIII: Animal Physiology			
Code: 18UZOC52	**Hrs/Week: 5**	**Hrs/Sem: 75**	**Credits: 4**

Course outcome

CO.No	Upon completion of this course, students will be able to	PSO addressed	CL
CO – 1	compare the structure and functions and co-ordination of organs and organ systems	1	Un
CO – 2	assess the causes, diagnosis, prevention and treatment of illnesses	2	Ev
CO – 3	develop personal healthy life style	6	Cr
CO – 4	demonstrate the different lab experiments	5	Un
CO – 5	experiential learning, analysis and drawing conclusion	4	Cr
CO-6	find way for scientific investigation	6	Ev
CO-7	develop various skills which will be helpful in expressing ideas and views clearly and effectively	7	Ap
CO-8	imbibe ethical, moral and social values in personal and social life leading to highly cultured and civilized personality	8	Cr

SEMESTER -V			
Core IX Cell Biology and Genetics			
Code: 18UZOC53	**Hrs/week : 5**	**Hrs/Sem: 75**	**Credits: 4**

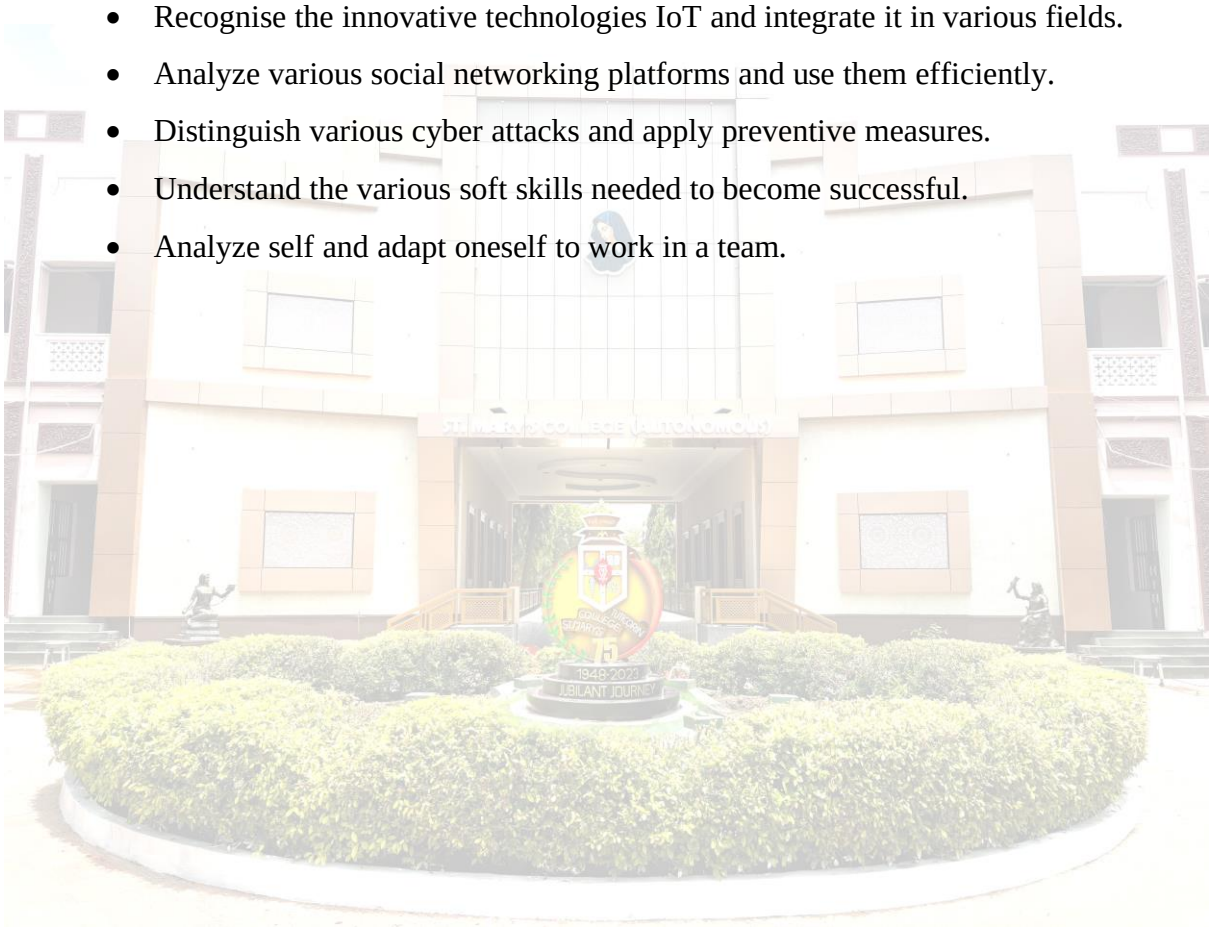
Course Outcome

CO.No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the organization of the cell and to differentiate between prokaryotic and eukaryotic cell.	2	Un
CO-2	describe the structure and functioning of cell organelles as a system to carry out cellular processes	2	Un
CO-3	analyse the complexity and harmony of the cell from the acquired knowledge	2	An
CO-4	explain the types of chromosome; composition, structure, and replication of DNA	4	Ev
CO-5	demonstrate the genetic basis of Mendelian and non-Mendelian inheritance	5	Un
CO-6	develop the ability to think critically, analyse and use the information gained to solve problems related to genetics	6	Cr
CO-7	evaluate hereditary patterns for genetic disorders by applying genetic information to innovate solutions for health related issues	6	Ev
CO-8	apply the practical and conceptual knowledge of Cell biology and Genetics to understand other fields of biology	8	Ap

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: Immunology and Microbiology			
Code: 18UZOC61	**Hrs/week : 5**	**Hrs/sem: 75**	**Credits: 4**

Course outcome

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the importance of immune system, immune organs and immunoglobulins.	2	Cr
CO -2	identify structure and characteristics of different types of Lymphoid organs	3	Un
CO-3	analyse the structure and functions of immune systems	4	Un
CO-4	narrate and explain antigen and antibody	5	Un
CO-5	analyse the types of immunoglobulins	2	Cr
CO-6	understand the structure, classification and culture techniques of microbes	7	Un
CO-7	analyse and distinguish food poisoning, food spoilage and preservation methods	8	An
CO-8	determine the nature of the microbes and to realize their beneficial and harmful effects	3	Un

SEMESTER - VI			
Core XI : Biostatistics and Bioinformatics			
Code : 18UZOC62	**Hrs/Week : 5**	**Hrs/Sem : 75**	**Credits : 4**

Course Outcome

CO No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO 1	attain an insight on statistical methods for analysis of biological data	1	Kn
CO 2	acquire knowledge on the bio informatics concepts for analyzing molecular data	1	Kn
CO 3	identify the problems in data analysis and match the appropriate statistical method and corresponding software	4	Un
CO 4	analyse and use the bioinformatics tools for advanced sequence alignment, database searches, genome analysis and protein structure studies	8	Ap
CO 5	undertake statistical operations in biology	7	Ap
CO 6	operate commonly used bioinformatic tools and statistical methods and understand their limitations	8	Ap
CO 7	apply bioinformatics in life science research	8	Ap
CO 8	understand and critically evaluate the data analysis procedures in publications of molecular biology research	2,3	Un

SEMESTER VI			
Core XII Ecology and Biodiversity			
Code: 18UZOC63	**Hrs/Week: 4**	**Hrs/Sem: 60**	**Credits:4**

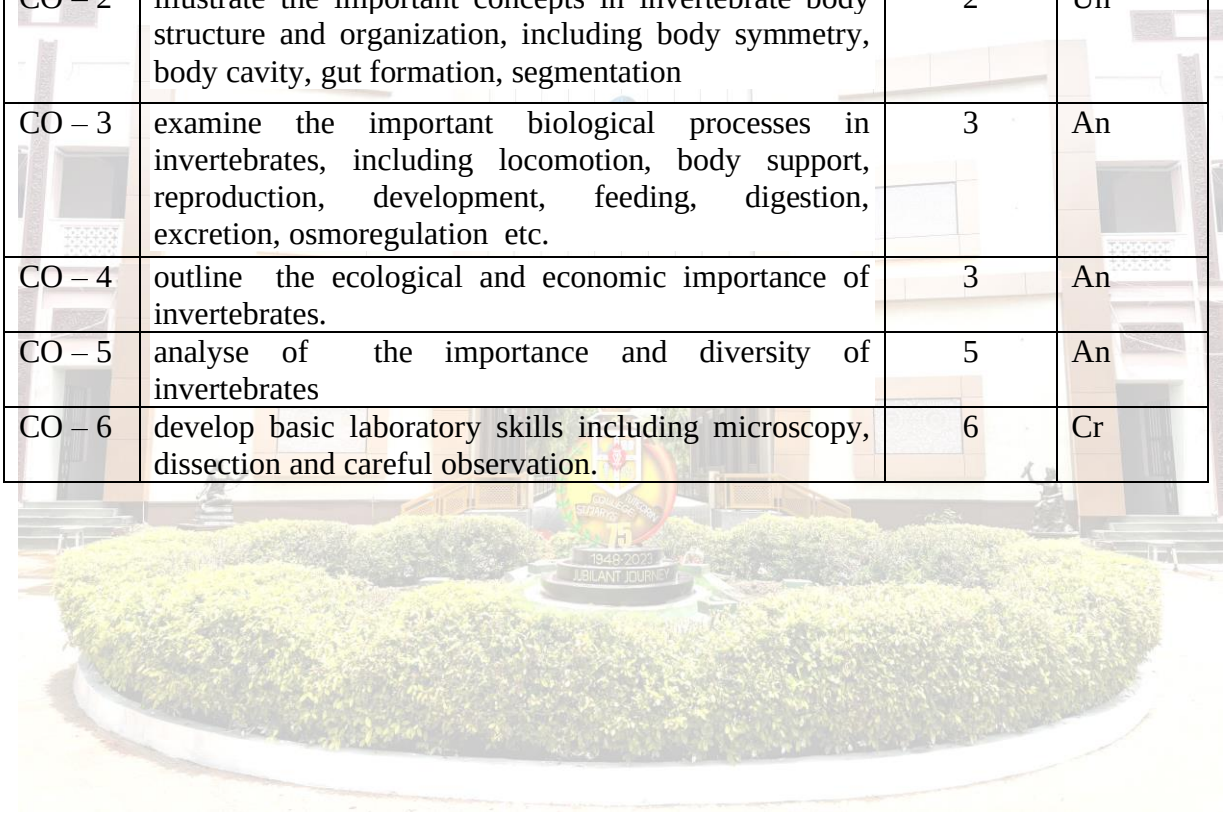
Course Outcome

CO.No	Upon completion of this course, students will be able to	PSO addressed	CL
CO – 1	understand and relate the interactions and the interdependence among environmental factors and living organisms.	1,2	Un
CO – 2	compare the adaptations of the organisms in different habitats	2	Un
CO – 3	analyse the mechanisms regulating the dynamics composition and organization of communities	2	Un,An
CO – 4	explore the interactions between organisms, the dynamics of populations and environment	1,3	Un,An
CO –5	explain different levels of biodiversity	1	Un,
CO – 6	discuss the direct and indirect values of biodiversity	1,3	Cr
CO-7	identify key threats to biodiversity evaluate management options for conserving biodiversity	1,3	Ap,Ev
CO-8	develop skills and competencies for career in eco-conservation and Eco- tourism	7	Ap

SEMESTER I			
Core I	**Invertebrata**		
Course Code: 21UZOC11	**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	explain the distinctive features of taxonomic classes within the phyla covered	1	Un
CO – 2	illustrate the important concepts in invertebrate body structure and organization, including body symmetry, body cavity, gut formation, segmentation	2	Un
CO – 3	examine the important biological processes in invertebrates, including locomotion, body support, reproduction, development, feeding, digestion, excretion, osmoregulation etc.	3	An
CO – 4	outline the ecological and economic importance of invertebrates.	3	An
CO – 5	analyse of the importance and diversity of invertebrates	5	An
CO – 6	develop basic laboratory skills including microscopy, dissection and careful observation.	6	Cr



SEMESTER I			
PROFESSIONAL ENGLISH FOR ZOOLOGY – I			
Course Code:21UZOPE1	**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	implement their skills in conversing with confidence in an intelligible and acceptable manner	7,8	Ap
CO-2	apply their reading skills to read unfamiliar scientific texts independently and comprehend it	7,8	Ap
CO-3	infer the significance of scientific writing and apply it for writing scientific articles in journals	7,8	Un
CO-4	identify the various types of sentences and use them in the relevant context	7,8	Ap
CO-5	listen to lectures and interpret critically	7,8	Ev
CO-6	develop their communication and presentation skills	7,8	Cr

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	**Chordata**		
Course Code: 21UZOC21	**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	explain the fundamental organization of chordates.	1	
CO-2	discuss the basic concepts of chordate diversity	3	Un
CO-3	analyze the characters of different classes of the chordates	2,3	An
CO-4	categorize the inclusion of different representative animals in particular class	2	An
CO-5	evaluate the correlation of structural organization of chordates from evolutionary point of view	1	Ev
CO-6	compare the anatomical features and their respective functions in chordate animals	2	An

SEMESTER II			
PROFESSIONAL ENGLISH FOR ZOOLOGY – II			
Course Code: 21UZOPE2	**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	interpret scientific illustrations and develop paragraphs and essays	2,7	Un
CO-2	write passages by comparing and contrasting the salient features of living organisms	2,7,8	Re
CO-3	illustrate descriptive processes in the biological system	2,8	Un
CO-4	identify problems and suggest solutions for environmental sustainability by case studies	7	Re
CO-5	deliver lectures on various scientific topics by identifying the context	8	Re
CO-6	integrate the different methods of notes making for efficient annotation of lectures	6,8	Cr

SEMESTER III			
Core III	**Developmental Zoology**		
Course Code: 21UZOC31	**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	understand the concepts of developmental biology	2	Un
CO-2	describe the developmental process and embryogenesis	3	Re
CO-3	explain the sequential changes from cellular grade of organization to organ grade of organization	2	Un
CO-4	compare the types of extra embryonic membrane and the nature and physiology of placenta	3	An
CO-5	implement the new technologies in embryology	6	Ap
CO-6	recommended the advanced reproductive technologies for the welfare of man	6	Ev

SEMESTER - III			
Allied III	**Plant Diversity**		
Course Code: 21UBOA31	**Hrs / Week: 4**	**Hrs / Semester: 60**	**Credits:3**

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
1.	consider the criteria of classification and outline the system of classification (algae, fungi, bryophytes, pteridophytes and gymnosperms) as proposed by different taxonomist	1	An
2.	work out micropreparation techniques to study the specimen and to reveal the histological architecture using compound light microscope	5	An
3.	illustrate the key features of these plants and explain their characters and life cycle pattern to distinguish different plant groups	3	Un, Ap
4.	explore and express the ecosystem services and economic benefits of these groups of plants	3	Ap
5.	assign the taxonomic ranks to indicate its systematic position and evaluate the evolution of plant species	1, 2	Un, Ev
6.	trace the origin and evolution of steles, foliage and seed from seedless plant groups and comment pteridophytes are pioneer in the evolution of seed habit	1, 2	Re

SEMESTER III			
NME I	**Basic Biotechnology**		
Course Code: 21UZON31	**Hrs/ Week : 2**	**Hrs/ Sem: 30**	**Credit: 2**

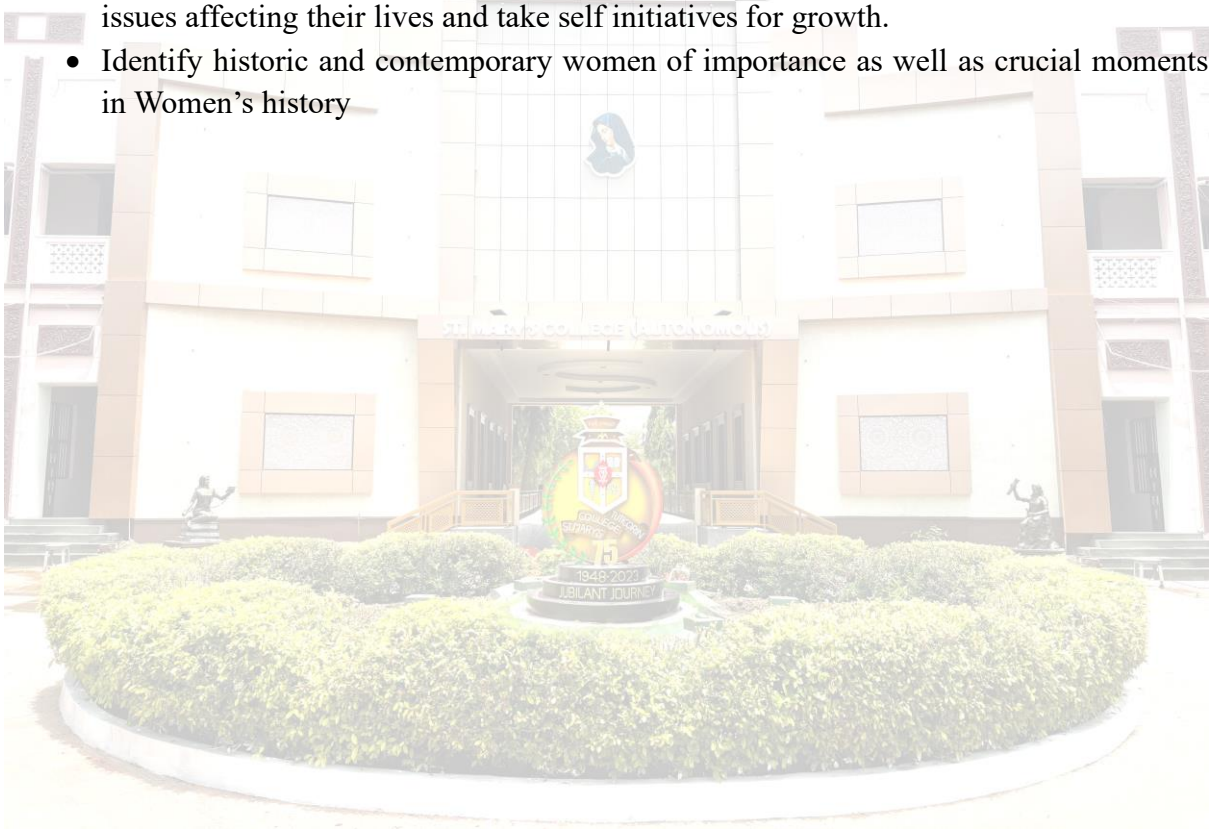
Course Outcome

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	appraise the scope and importance of biotechnology by understanding the basic structure and functions of cells	1,2	An
CO-2	outline the structure of DNA, and use various techniques to visualize, manipulate and separate the DNA molecules	2	An
CO-3	summarize the basics of restriction enzymes and cloning vectors and apply the various gene manipulation techniques to generate genetically modified organisms	1,6	Un
CO-4	evaluate techniques of gene delivery and cloning to adapt in generation of genetically modified organisms	1,6,8	Ev
CO-5	discuss the preparation and characterization of nano materials in the field of nanotechnology	6,7	Un
CO-6	develop proficiency in aseptic laboratory techniques and standard procedures for cell culture.	6	Cr

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 I	**Biochemistry and Bioinstrumentation**		
Course Code: 21UZOC41	**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	understand the structure and significance of biomolecules in life processes	2	Un
CO-2	understand the principle, working mechanism and application of standard laboratory equipments and modern instruments	6	Un
CO-3	analyze enzymes as biocatalysts, the mechanism of their action and develop the ability to comprehend life processes	4	An
CO-4	demonstrate the beneficial effects of vitamins, their sources for the healthy functioning of the body	5	Ap
CO-5	relate and deploy knowledge in identifying deficiency diseases of vitamins from symptoms and find the remedy	8	An
CO-6	apply appropriate biochemical techniques to plan and carryout experiments, test hypotheses and draw conclusions to conduct project works in near future	6	Ap

SEMESTER - IV			
Allied IV	**Angiosperm Taxonomy and Plant Physiology**		
Course Code: 21UBOA41	**Hrs / Week : 4**	**Hrs / Semester: 60**	**Credits:3**

Course Outcomes:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	study the morphological variation of vegetative part of angiosperms in relation to environmental condition	1	Un
CO-2	characterize the morphological features and architecture of floral components and categorize the types of inflorescences	2	Ev
CO-3	layout and recall the natural systems of classification of angiosperms as proposed by Bentham and Hooker	1,2,4	Re
CO-4	understand the physical process associated with water absorption, transport and transpiration	2 ,3	Un
CO-5	analyze light enhance photochemical reaction, synthesis of ATP and NADPH and fixation of carbon dioxide into organic compound	2, 3	An
CO-6	conduct scientific experiments to record the data	4, 8	Ev

SEMESTER IV			
Skill Based Elective	**A. Clinical Laboratory Technology**		
Course Code: 21UZOS41	**Hrs/ Week: 2**	**Hrs/ Sem: 30**	**Credits: 2**

Course Outcome

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the laboratory practices and to develop skills in various lab techniques	6,7	Un
CO-2	analyze and distinguish various types of blood cells	2,6	An
CO-3	understand the pathological diseases and explain the test for hepatitis,AIDS and intestinal parasite	5,6	Un
CO-4	demonstrate the proficiency in basic methods of instrumentation and quantitative analytical skills used to conduct biological research	6,7	Ap
CO-5	acquire knowledge to handle clinical equipments	6	Ap
CO-6	design,carryout and interpret scientific experiments	6,7	Ap

SEMESTER IV			
NME II	**Applied Biotechnology**		
Course Coe: 21UZON41	**Hrs/ Week: 2**	**Hrs/ Sem: 30**	**Credit: 2**

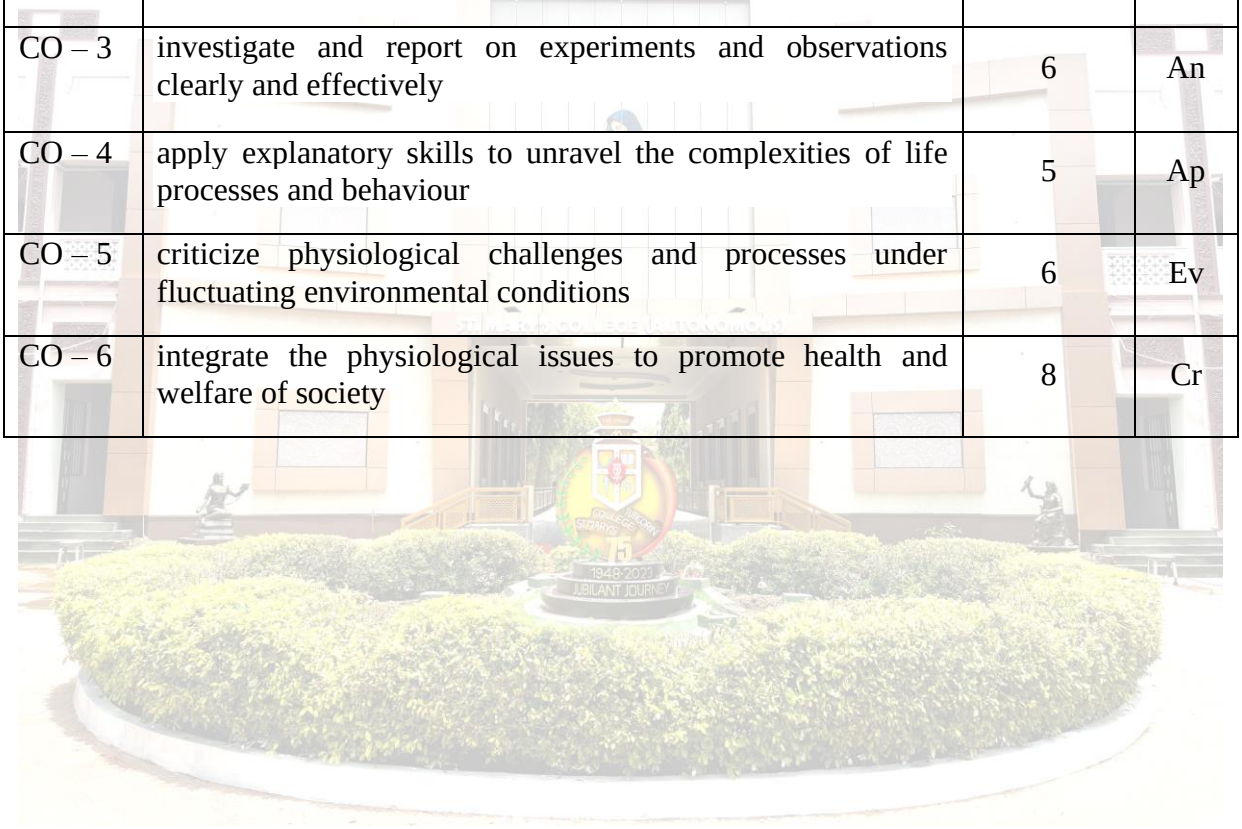
Course Outcomes

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the production of different bio-products	2	Un
CO-2	apply the techniques to clean up the environment through various treatment methods	5	Ap
CO-3	implement gene therapy methodology for treatment of cancer	8	Ap
CO-4	interpret the importance of bio safety and IPR	6	Un
CO-5	evaluate the synthesis and applications of bio-products	6	Ev
CO-6	adopt appropriate tools and technique in biotechnological manipulation	8	Ap

SEMESTER V			
Core VI	**Animal Physiology**		
Course Code : 21UZOC51	**Hrs / Week : 4**	**Hrs /Sem : 60**	**Credits : 4**

Course Outcomes

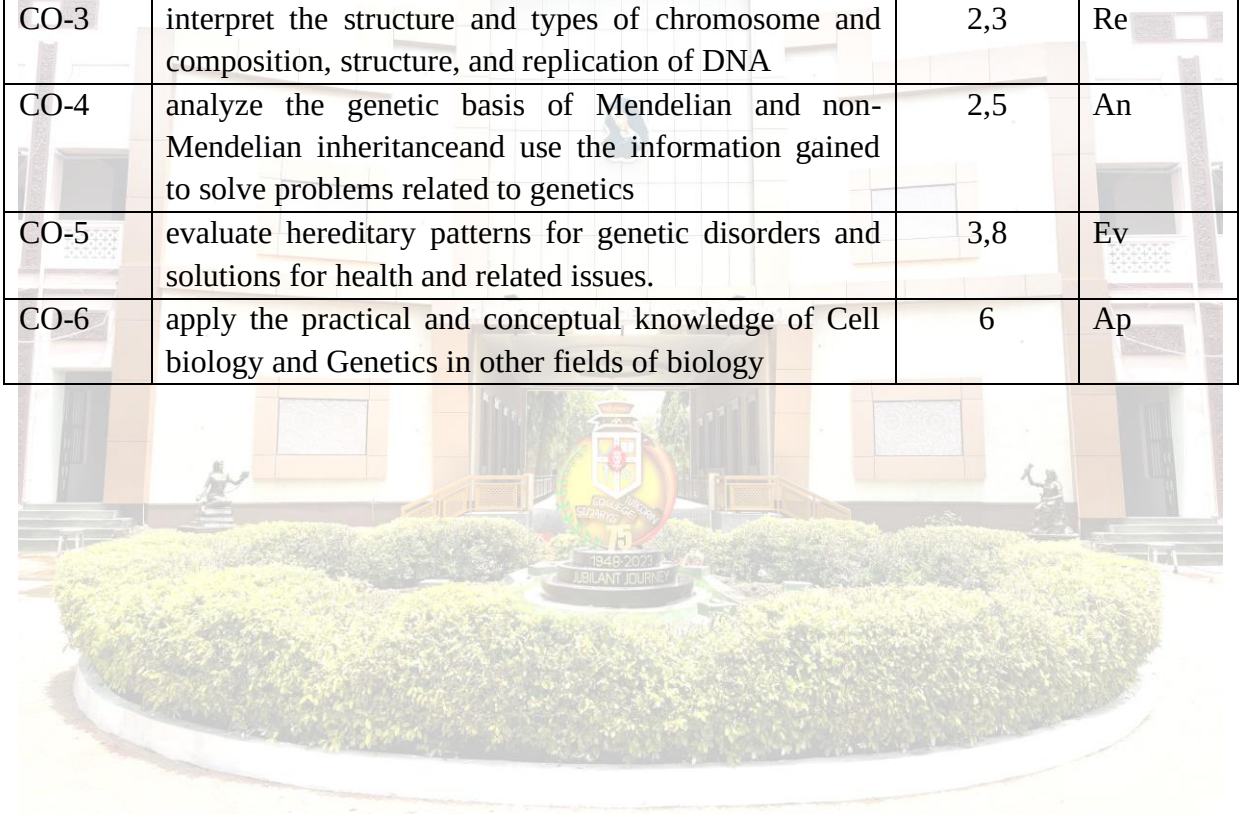
CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO– 1	identify the structure and functions and co-ordination of organs and organ systems	1	Re
CO -2	indicate the causes, diagnosis, prevention and treatment of illnesses	3	Un
CO – 3	investigate and report on experiments and observations clearly and effectively	6	An
CO – 4	apply explanatory skills to unravel the complexities of life processes and behaviour	5	Ap
CO – 5	criticize physiological challenges and processes under fluctuating environmental conditions	6	Ev
CO – 6	integrate the physiological issues to promote health and welfare of society	8	Cr



SEMESTER V			
Core VII	**Cell Biology and Genetics**		
Course Code: 21UZOC52	**Hrs/week : 4**	**Hrs/sem: 60**	**Credit: 4**

Course Outcomes

CO.No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the organization of the cell and to differentiate between prokaryotic and eukaryotic cell.	2	Un
CO-2	describe the structure and functioning of cell organelles as a system to carry out cellular processes	1,2	Re
CO-3	interpret the structure and types of chromosome and composition, structure, and replication of DNA	2,3	Re
CO-4	analyze the genetic basis of Mendelian and non-Mendelian inheritanceand use the information gained to solve problems related to genetics	2,5	An
CO-5	evaluate hereditary patterns for genetic disorders and solutions for health and related issues.	3,8	Ev
CO-6	apply the practical and conceptual knowledge of Cell biology and Genetics in other fields of biology	6	Ap



SEMESTER V			
Core VIII	**Ecology**		
Course Code: 21UZOC53	**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	recall variety of ways that organisms interact with both physical and the biological environment	1,2	Re
CO – 2	explain the structure and impact of biogeochemical cycles	1,2	Un
CO – 3	classify major habitats found on land and water	3	Ap
CO – 4	evaluate the global scale of environmental issues	5	Ev
CO – 5	select government policies and green economy for sustainable development	5	Ev
CO – 6	design field and laboratory experiments in a systematic way	6	Cr

SEMESTER V			
Core Elective	**A. Introduction to Research**		
Course Code: 21UZOE51	**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	explain the scientific ideas, tools, methods and techniques in research	4	Un
CO-2	identify appropriate research topics and parameters	8	Re
CO-3	apply the information regarding literature collection and citing the references	5	Ap
CO-4	analyze the components of scholarly writing in a thesis and research report	6	An
CO-5	evaluate critical thinking and scientific approach in the essentials of research	6	Ev
CO-6	develop new scientific tools, concepts and theories to understand and solve scientific problems	4	Cr

SEMESTER V			
Core Elective	**B. Evolutionary Biology**		
Course Code: 21UZOE52	**Hrs/ Week: 4**	**Hrs/ Sem: 60**	**Credits: 4**

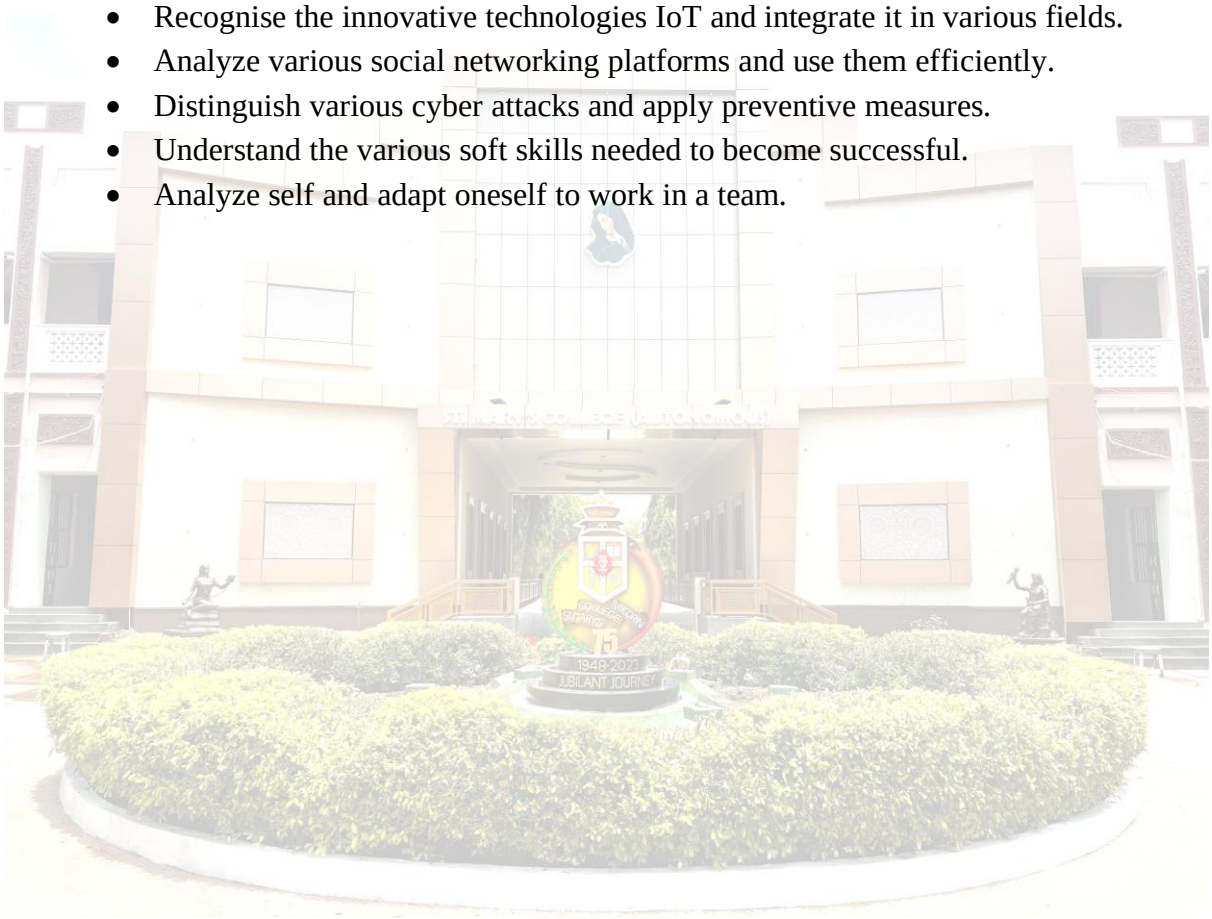
Course Outcomes

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	explain the theories and processes of evolution	1	Un
CO-2	recall the processes driving variation, natural selection and speciation	2	Re
CO-3	appraise the evolutionary significance of mimicry and protective colouration	6	An
CO-4	examine the evidences for evolution	5	An
CO-5	evaluate the various processes concerned with the evolution of man	6	Ev
CO-6	discuss the biological and cultural evolution of man	4	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	**Immunology and Microbiology**		
Course Code: 21UZOC61	**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	identify the basis of immune responsiveness and associated organs	2	Re
CO-2	compare the mechanism of B and T cell activation	5	An
CO-3	acquire knowledge on structure and functions of immunoglobulins and classify them.	2	Ap
CO-4	explain the basic structure of microbes, symptoms of microbial diseases and preventive measures	1	Un
CO-5	analyse the causes and prevention of food poisoning and food spoilage.	2	An
CO-6	develop skills in fundamental techniques in immunology and microbiology including identification of lymphocytes, sterilization, isolation and culture of bacteria	6	Cr

SEMESTER VI			
Core X	**Biostatistics and Bioinformatics**		
Course Code: 21UZOC62	**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	attain an insight on statistical methods for analysis of biological data using appropriate softwares	4	Un
CO-2	apply the knowledge on the usage of bioinformatics tools for sequence alignment, data base searches, genome analysis and protein structure studies	4	Ap
CO-3	undertake statistical operations in biological data analysis	4,8	Ap
CO-4	operate commonly used bioinformatic tools and statistical methods and understand their limitation	4	An
CO-5	apply bioinformatics in life science research	4,5	Ap
CO-6	critically evaluate the data analysis procedures in publications of molecular biology research	6	Ev

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