

# **COURSE OUTCOMES**

## **FACULTY OF LIFE SCIENCES**

## UG Programmes in the Department of Water and Health- Faculty of Life Sciences

Sl. No.	Name of the Program	Name of the Course	Course Outcome
1.1	B.Sc. - Biotechnology - First Semester	<b>Languages</b> Part I - English I Part II - English I Part II - Kannada I	<ul style="list-style-type: none"> <li>• These courses are designed to develop the communication and vocabulary skills in the students</li> <li>• Upon completion of the course, the students have sufficient knowledge for professional communication to excel in the chosen profession</li> </ul>
1.2		Basics of Biostatistics	<ul style="list-style-type: none"> <li>• This course imparts the knowledge of basic statistical methods to solve problems</li> <li>• Students are taught to operate various statistical software packages</li> <li>• By the end of the course, the students are able to appreciate the importance of statistics in research and prepares them for a career in research</li> </ul>
1.3		Environmental Studies	<ul style="list-style-type: none"> <li>• The main objective of this paper is to create an awareness among the students about the environment</li> <li>• By the end of the course, the students will have a better appreciation for the environment and become responsible citizens</li> </ul>
1.4		Cell Biology	<ul style="list-style-type: none"> <li>• This course introduces the students to the basics of cell and its components.</li> <li>• This gives them a strong foundation on the basic unit of life.</li> <li>• At the end of the course, the student has a strong foundation on the functions of the cell.</li> </ul>
2.1	B.Sc. - Biotechnology - Second Semester	<b>Languages</b> Part I - English II Part II - English II Part II - Kannada II	<ul style="list-style-type: none"> <li>• These courses are designed to develop the communication and vocabulary skills in the students</li> <li>• Upon completion of the course, the students have sufficient</li> </ul>

			knowledge for professional communication to excel in the chosen profession
<b>2.2</b>		Principle of Biochemistry	<ul style="list-style-type: none"> <li>• Through this course the students are exposed to importance of biological macromolecules</li> <li>• They acquire knowledge in the quantitative and qualitative estimation of biomolecules</li> <li>• They study the influence and role of structure in reactivity of biomolecules</li> <li>• At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions</li> </ul>
<b>2.3</b>		Microbiology	<ul style="list-style-type: none"> <li>• This fundamental paper discusses the importance of microorganisms</li> <li>• The course throws light on types of microorganisms in and around humans</li> <li>• At the end of the course, the student has understanding on the metabolism and mechanism of microbial life</li> </ul>
<b>3.1</b>	B.Sc. - Biotechnology - Third Semester	<b>Languages</b> Part I - English III Part II - English III Part II - Kannada III	<ul style="list-style-type: none"> <li>• These courses are designed to develop the communication and vocabulary skills in the students</li> <li>• Upon completion of the course, the students have sufficient knowledge for professional communication to excel in the chosen profession</li> </ul>
<b>3.2</b>		Bioinformatics	<ul style="list-style-type: none"> <li>• This allied paper introduces the students to concepts in bioinformatics</li> <li>• The student will be able to apply basic principles of biology, computer science and mathematics to address complex biological problems</li> </ul>
<b>3.3</b>		Basics of Computers	<ul style="list-style-type: none"> <li>• This is a skill based paper that introduces the students to the basics of computer operations</li> <li>• The student is imparted with knowledge on both hardware and software.</li> <li>• The student has a better understanding on the use of</li> </ul>

			computers for various applications
<b>3.4</b>		Biochemistry	<ul style="list-style-type: none"> <li>• Through this course the students are exposed to importance of biological macromolecules</li> <li>• They acquire knowledge in the quantitative and qualitative estimation of biomolecules</li> <li>• They study the influence and role of structure in reactivity of biomolecules</li> <li>• At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions</li> </ul>
<b>3.5</b>		Classical Genetics	<ul style="list-style-type: none"> <li>• Students will be taught Mendelian genetics, their principles and gene interaction.</li> <li>• They learn about chromosomal aberrations and structure of chromosomes</li> <li>• The student will gain a basic understanding on human genetics and hereditary.</li> </ul>
<b>4.1</b>	B.Sc. - Biotechnology - Fourth Semester	Part I - English IV Part II - English IV Part II - Kannada IV	<ul style="list-style-type: none"> <li>• These courses are designed to develop the communication and vocabulary skills in the students</li> <li>• Upon completion of the course, the students have sufficient knowledge for professional communication to excel in the chosen profession</li> </ul>
<b>4.2</b>		Fundamentals of Nanotechnology	<ul style="list-style-type: none"> <li>• This is an interdisciplinary and emerging area</li> <li>• The students are taught the basics of nanotechnology and their applications</li> <li>• The course introduces the students to the new and novel applications to solve biomedical problems through nanotechnology</li> </ul>
<b>4.3</b>		Tissue Culture	<ul style="list-style-type: none"> <li>• This skill based course introduces the students to the concepts in tissue culture applicable to plants and animals</li> <li>• They are also taught their applications in biotechnology and biochemical research</li> </ul>

			<ul style="list-style-type: none"> <li>This course introduces the students to explore entrepreneurial avenues in this field</li> </ul>
<b>4.4</b>		Molecular Genetics	<ul style="list-style-type: none"> <li>The course teaches the students about genes at molecular level</li> <li>They learn about DNA, RNA and their replication, mutations, DNA repair mechanism.</li> <li>The course outcome is to train the students in understanding genetics and relate modern DNA technology for disease diagnostics and therapy</li> </ul>
<b>5.1</b>	B.Sc. - Biotechnology – Fifth Semester	Immunology	<ul style="list-style-type: none"> <li>This course gives an overview on the immune system including organs, cells and receptors</li> <li>The students learn about molecular basis of antigen recognition, hypersensitivity reaction, antigen-antibody reactions</li> <li>The course develops in the student an appreciation for principles of immunology and its applications in treating human diseases</li> </ul>
<b>5.2</b>		Plant And Animal Biotechnology	<ul style="list-style-type: none"> <li>This course teaches organization and expression of plant and animal genome and plant and animal tissue culture</li> <li>Students learn about transgenic animal, their application in pharmaceutical industry, cloning and its importance.</li> <li>This course prepares the students in appreciating the its benefits and applications in biotechnological, pharmaceutical, medical and agricultural field</li> </ul>
<b>5.3</b>		Medical Microbiology	<ul style="list-style-type: none"> <li>This interdisciplinary course teaches the students interactions between human and microbes, diseases caused by microbes.</li> <li>They learn about culture, collection, handling and transport of clinical samples</li> <li>They also learn about diagnosis of various microbial</li> </ul>

			<p>diseases</p> <ul style="list-style-type: none"> <li>At the end of the course students will be able to identify diseases and understand the treatment plan</li> </ul>
<b>5.4</b>		Agricultural Biotechnology	<ul style="list-style-type: none"> <li>This course teaches the students approaches to manipulate and improve plant yield, throws light on transgenic plants</li> <li>They are introduced to the concept of utilizing plants for production of vaccines and production of biofertilizers</li> <li>This students will be able to understand the relationship between science and society and will be able to give justification for biotechnological manipulation of plants for human use</li> </ul>
<b>5.5</b>		Medical Biotechnology	<ul style="list-style-type: none"> <li>The students are introduced to the biological revolutions in this field.</li> <li>They are taught the role of biotechnology in the world wide market</li> <li>They learn about biosensors, vaccine production, monoclonal antibodies, nanotechnology and its applications.</li> <li>The students will be able to demonstrate the use of biotechnology in solving various medical problems</li> </ul>
<b>5.6</b>		Advanced Instrumentation Techniques	<ul style="list-style-type: none"> <li>This skill based course will teach the students the various instrumentations that are used in the analytical laboratories.</li> <li>This course covers both fundamental and applications of the instruments that are routinely used for the characterization of biomolecules</li> <li>At the end of the course, the student has the basic knowledge on the theory, operation and function of analytical instruments.</li> </ul>

6.1	B.Sc. - Biotechnology – Sixth Semester	Environmental Biotechnology	<ul style="list-style-type: none"> <li>• The students in the course are exposed to the diversity, function, ecological adaptation of microorganisms within the environment</li> <li>• This course gives the importance of microbial life to key ecosystem process and teaches the role of biotechnology to address environmental issues</li> <li>• At the end of the course, students are able to analyze case studies representatives of key areas of environmental biotechnology</li> </ul>
6.2		Recombinant DNA Technology	<ul style="list-style-type: none"> <li>• This course teaches RDNA technology techniques and their application in the field of genetic engineering</li> <li>• They learn about plasmids, vectors and gain knowledge on the construction of cDNA libraries</li> <li>• Student of this course have knowledge on gene manipulation, gene expression, etc which prepares them for further studies in the area of genetic engineering</li> </ul>
6.3		Bio-Processing and Separation	<ul style="list-style-type: none"> <li>• The course introduces the analytical methods used in separation science</li> <li>• They learn about various analytical techniques that are routinely used for separation of biomolecules and their components</li> <li>• The course teaches students the advantages of separation science as applied to biotechnology</li> </ul>
6.4		Biotechnological Application in Waste Water Management	<ul style="list-style-type: none"> <li>• The objective of this course is to introduce the students to the role of biotechnology in waste water management</li> <li>• The students learn about role of microbes in biodegradation, bioremediation and composting</li> <li>• At the end of the course will be able to understand the treatment processes of waste water and also the knowledge</li> </ul>

			of production of biogas.
<b>6.5</b>		Genomics and Proteomics	<ul style="list-style-type: none"> <li>• This course aims to provide the knowledge and practical skills of functional genomics and proteomics</li> <li>• The course also teaches the techniques used in functional genomics such as microarrays, NGST, mRNA expression and miRNA expression.</li> <li>• By the end of the course, students will have the necessary learning to radically advance our understanding of life and transform medicine</li> </ul>
<b>6.6</b>		Industrial Biotechnology	<ul style="list-style-type: none"> <li>• The course aims to provide fundamental insights to exploit microbes for manufacturing of products which have huge industrial significance.</li> <li>• The course blends science and engineering with various biochemical processes to obtain products such as food, chemicals, vaccines, medicine</li> <li>• At the end of the course, the student will have a better appreciation for the role of biotechnology in industry using microbes</li> </ul>

<b>Sl. No.</b>	<b>Name of the Program</b>	<b>Name of the Course</b>	<b>Course Outcome</b>
<b>1.1</b>	B.Sc. – Microbiology – First Semester	<b>Languages</b> Part I - English I Part II - English I Part II - Kannada I	<ul style="list-style-type: none"> <li>• These courses are designed to develop the communication and vocabulary skills in the students</li> <li>• Upon completion of the course, the students have sufficient knowledge for professional communication to excel in the chosen profession</li> </ul>



1.2		Basics of Biostatistics	<ul style="list-style-type: none"> <li>• This course imparts the knowledge of basic statistical methods to solve problems</li> <li>• Students are taught to operate various statistical software packages</li> <li>• By the end of the course, the students are able to appreciate the importance of statistics in research and prepares them for a career in research</li> </ul>
1.3		Environmental Studies	<ul style="list-style-type: none"> <li>• The main objective of this paper is to create an awareness among the students about the environment</li> <li>• By the end of the course, the students will have a better appreciation for the environment and become responsible citizens</li> </ul>
1.4		Fundamentals of Microbiology	<ul style="list-style-type: none"> <li>• This fundamental paper discusses the importance of microorganisms</li> <li>• The course throws light on types of microorganisms in and around humans</li> <li>• At the end of the course, the student has understanding on the concept of culturing microbes, sterilization techniques and estimating the number of microbes in a given sample</li> </ul>
2.1		B.Sc. - Microbiology – Second Semester	<b>Languages</b> Part I - English II Part II - English II Part II - Kannada II
2.2	Principle of Biochemistry		<ul style="list-style-type: none"> <li>• Through this course the students are exposed to importance of biological macromolecules</li> <li>• They acquire knowledge in the quantitative and qualitative estimation of biomolecules</li> <li>• They study the influence and role of structure in reactivity of biomolecules</li> </ul>

			<ul style="list-style-type: none"> <li>At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions</li> </ul>
<b>2.3</b>		Microbial Diversity	<ul style="list-style-type: none"> <li>The students learn the important and diversified groups of microorganism in nature and their classification</li> <li>They learn about the interactions within the microbial communities and between microorganism and plants and animals</li> <li>At the end of the course, the student will be able to describe genomic based methods to study microbial diversity in nature and the mechanisms behind it.</li> </ul>
<b>3.1</b>	B.Sc. - Microbiology – Third Semester	<b>Languages</b> Part I - English III Part II - English III Part II - Kannada III	<ul style="list-style-type: none"> <li>These courses are designed to develop the communication and vocabulary skills in the students</li> <li>Upon completion of the course, the students have sufficient knowledge for professional communication to excel in the chosen profession</li> </ul>
<b>3.2</b>		Bioinformatics	<ul style="list-style-type: none"> <li>This allied paper introduces the students to concepts in bioinformatics</li> <li>The student will be able to apply basic principles of biology, computer science and mathematics to address complex biological problems</li> </ul>
<b>3.3</b>		Basics of Computers	<ul style="list-style-type: none"> <li>This is a skill based paper that introduces the students to the basics of computer operations</li> <li>The student is imparted with knowledge on both hardware and software.</li> <li>The student has a better understanding on the use of computers for various applications</li> </ul>
<b>3.4</b>		Microbial Physiology	<ul style="list-style-type: none"> <li>This course teaches the students about microbial nutrition, microbial growth, enzymes involved in microbial metabolism</li> <li>The course also covers</li> </ul>

			<p>bacterial photosynthesis, aerobic and anaerobic respiration and net energy gain in these processes.</p> <ul style="list-style-type: none"> <li>The student through this course will be able to explain the principle of energy yielding and consuming reactions, various anabolic and catabolic pathways, transport systems and the mechanisms of energy conservation in microbial metabolism</li> </ul>
<b>3.5</b>		Microbial Genetics	<ul style="list-style-type: none"> <li>Students will be taught cell division, genetic materials, their structure and types, mechanism of replication of DNA.</li> <li>Students gain knowledge in gene concepts and genetic code, gene expression, gene regulation and also learn about mutation.</li> <li>By the end of study in this course, the student will be able to identify and distinguish genetic regulatory mechanism at different levels</li> </ul>
<b>4.1</b>	B.Sc. - Microbiology - Fourth Semester	Part I - English IV Part II - English IV Part II - Kannada IV	<ul style="list-style-type: none"> <li>These courses are designed to develop the communication and vocabulary skills in the students</li> <li>Upon completion of the course, the students have sufficient knowledge for professional communication to excel in the chosen profession</li> </ul>
<b>4.2</b>		Fundamentals of Nanotechnology	<ul style="list-style-type: none"> <li>This is an interdisciplinary and emerging area</li> <li>The students are taught the basics of nanotechnology and their applications</li> <li>The course introduces the students to the new and novel applications to solve biomedical problems through nanotechnology</li> </ul>
<b>4.3</b>		Tissue Culture	<ul style="list-style-type: none"> <li>This skill based course introduces the students to the concepts in tissue culture applicable to plants and animals</li> <li>They are also taught their</li> </ul>

			<p>applications in biotechnology and biochemical research</p> <ul style="list-style-type: none"> <li>• This course introduces the students to explore entrepreneurial avenues in this field</li> </ul>
<b>4.4</b>		Microbial Metabolism and Technology	<ul style="list-style-type: none"> <li>• The student in the course learn the biochemical aspects of metabolic pathways of microorganisms</li> <li>• They also learn the application of microbial cells in bioremediation and mineral recovery</li> <li>• At the end of the course, the students will be able to appreciate the aspects of microbial metabolism and their application in industries</li> </ul>
<b>5.1</b>	B.Sc. - Microbiology – Fifth Semester	Immunology	<ul style="list-style-type: none"> <li>• This course gives an overview on the immune system including organs, cells and receptors</li> <li>• The students learns about molecular basis of antigen recognition, hypersensitivity reaction, antigen-antibody reactions</li> <li>• The course develops in the student an appreciation for principles of immunology and its applications in treating human diseases</li> </ul>
<b>5.2</b>		Recombinant DNA Technology	<ul style="list-style-type: none"> <li>• This course teaches RDNA technology techniques and their application in the field of genetic engineering</li> <li>• They learn about plasmids, vectors and gain knowledge on the construction of cDNA libraries</li> <li>• Student of this course have knowledge on gene manipulation, gene expression, etc which prepares them for further studies in the area of genetic engineering</li> </ul>
<b>5.3</b>		Medical Microbiology	<ul style="list-style-type: none"> <li>• This interdisciplinary course teaches the students interactions between human and microbes, diseases caused by microbes.</li> <li>• They learn about culture,</li> </ul>

			<p>collection, handling and transport of clinical samples</p> <ul style="list-style-type: none"> <li>• They also learn about diagnosis of various microbial diseases</li> <li>• At the end of the course students will be able to identify diseases and understand the treatment plan</li> </ul>
<b>5.4</b>		Fermentation Technology	<ul style="list-style-type: none"> <li>• The course aims to provide fundamental insights to exploit microbes for manufacturing of products which have huge industrial significance.</li> <li>• The course blends science and engineering with various biochemical processes to obtain products such as food, chemicals, vaccines, medicine</li> <li>• At the end of the course, the student will have a better appreciation for the role of microbes in industry using technology</li> </ul>
<b>5.5</b>		Microbial Culture Techniques	<ul style="list-style-type: none"> <li>• The students in this course learn different types of pure culture techniques, preservation of pure culture and culture collection centers.</li> <li>• This course also introduces the students to the different types of media and teaches about isolation of strain and improvement.</li> <li>• By the end of the course, the students will be able to isolate cultures in pure form and preserve cultures for further use in research studies</li> </ul>
<b>5.6</b>		Advanced Instrumentation Techniques	<ul style="list-style-type: none"> <li>• This skill based course will teach the students the various instrumentations that are used in the analytical laboratories.</li> <li>• This course covers both fundamental and applications of the instruments that are routinely used for the characterization of biomolecules</li> <li>• At the end of the course, the student has the basic knowledge on the theory, operation and function of</li> </ul>

			analytical instruments.
<b>6.1</b>	B.Sc. - Microbiology – Sixth Semester	Environmental and Agricultural Microbiology	<ul style="list-style-type: none"> <li>• The aim of this course is to impart knowledge in soil microflora, plant pathology and post harvest pathology.</li> <li>• The students learn about water and waste water microbiology, air microbiology and their treatment processes.</li> <li>• The student at the end of the course would have gained knowledge about microbial associations with soil and plants, plant diseases and their management, water treatment techniques and solid waste recycling</li> </ul>
<b>6.2</b>		Food Dairy and Industrial Microbiology	<ul style="list-style-type: none"> <li>• Students in this course will learn about microbes in food, spoilage of food and preservation techniques of food.</li> <li>• Through this course, they also learn about microbiology of milk, fermented dairy products, industrially important microorganisms and process of industrial production of alcohol, beer, wine, SEP and mushrooms.</li> <li>• At the end of the course, the student will be able to use the preservation techniques for food and use this experience to be employed as quality control experts</li> </ul>
<b>6.3</b>		Bioethics and Biosafety	<ul style="list-style-type: none"> <li>• This course is an introduction to the students on the ethical aspects of conducting research and safety aspects to be adhered in a research setting.</li> <li>• This course also introduces the students to effective management of available resources and footprint of research activities.</li> <li>• At the end of the course, the student would have gained sufficient knowledge to act as a responsible scientist and environmentally conscious.</li> </ul>
<b>6.4</b>		Microbial Disease Control	<ul style="list-style-type: none"> <li>• This course is designed to impart knowledge on infectious</li> </ul>

			<p>disease epidemiology, investigating the outbreak and the role of public health laboratories in disease surveillance.</p> <ul style="list-style-type: none"> <li>• The students are taught on the various infectious diseases, mode of transmission and different evaluation and control strategies. The students would also be able to appreciate behavioral changes in HIV patients, blood safety and immigrant health.</li> <li>• The student at the end of the course will be able to gain knowledge about vaccination, screening of various diseases and modeling infectious disease data.</li> </ul>
<b>6.5</b>		Vermiculture Technology	<ul style="list-style-type: none"> <li>• This course teaches about earthworm biology and role of earthworm in soil in association with microorganism.</li> <li>• They also study the different earthworm species used in vermicompost production and importance of vermicompost in organic farming.</li> <li>• At the end of the course, the students will be able to use vermicomposting as a tool for solid waste management, organic farming and be able to set up small-scale industry.</li> </ul>
<b>6.6</b>		Biopesticide and Biofertilizer	<ul style="list-style-type: none"> <li>• The aim of this course is to introduce the students to the role of biopesticides and biofertilizers in enhancing the fertility of soil</li> <li>• The students also learn about the large scale production of biofertilizers and biopesticides and their mechanism of action and application.</li> <li>• By the end of the course, the student will be able to gain knowledge about their commercialization.</li> </ul>

Sl. No.	Name of the Program	Name of the Course	• Course Outcome
1.1	B.Sc. – Environmental Sciences – First Semester	<b>Languages</b> Part I - English I Part II - English I Part II - Kannada I	<ul style="list-style-type: none"> <li>• These courses are designed to develop the communication and vocabulary skills in the students</li> <li>• Upon completion of the course, the students have sufficient knowledge for professional communication to excel in the chosen profession</li> </ul>
1.2		Basics of Biostatistics	<ul style="list-style-type: none"> <li>• This course imparts the knowledge of basic statistical methods to solve problems</li> <li>• Students are taught to operate various statistical software packages</li> <li>• By the end of the course, the students are able to appreciate the importance of statistics in research and prepares them for a career in research</li> </ul>
1.3		Environmental Studies	<ul style="list-style-type: none"> <li>• The main objective of this paper is to create an awareness among the students about the environment</li> <li>• By the end of the course, the students will have a better appreciation for the environment and become responsible citizens</li> </ul>
1.4		Introduction to Environmental Studies	<ul style="list-style-type: none"> <li>• This course introduces the students to the interdisciplinary nature of environmental studies</li> <li>• The students learn about rock types, basic concepts of community, pollution and biodiversity.</li> <li>• At the end of the course, the students are able to appreciate the intricate nature of ecosystem and its role in maintenance of health earth.</li> </ul>
2.1	B.Sc. - Environmental Sciences – Second Semester	<b>Languages</b> Part I - English II Part II - English II Part II - Kannada II	<ul style="list-style-type: none"> <li>• These courses are designed to develop the communication and vocabulary skills in the students</li> <li>• Upon completion of the course, the students have sufficient knowledge for professional</li> </ul>



			communication to excel in the chosen profession
<b>2.2</b>		Principle of Biochemistry	<ul style="list-style-type: none"> <li>• Through this course the students are exposed to importance of biological macromolecules</li> <li>• They acquire knowledge in the quantitative and qualitative estimation of biomolecules</li> <li>• They study the influence and role of structure in reactivity of biomolecules</li> <li>• At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions</li> </ul>
<b>2.3</b>		Ecosystem Dynamics	<ul style="list-style-type: none"> <li>• This introductory course introduces the students to the basic concepts in ecosystem dynamics</li> <li>• The students learn about ecology, biogeochemical cycles, evolution and biomes.</li> <li>• At the end of the course, the students have a clear understanding on the importance of ecosystem</li> </ul>
<b>3.1</b>	B.Sc. - Environmental Sciences – Third Semester	<b>Languages</b> Part I - English III Part II - English III Part II - Kannada III	<ul style="list-style-type: none"> <li>• These courses are designed to develop the communication and vocabulary skills in the students</li> <li>• Upon completion of the course, the students have sufficient knowledge for professional communication to excel in the chosen profession</li> </ul>
<b>3.2</b>		Bioinformatics	<ul style="list-style-type: none"> <li>• This allied paper introduces the students to concepts in bioinformatics</li> <li>• The student will be able to apply basic principles of biology, computer science and mathematics to address complex biological problems</li> </ul>
<b>3.3</b>		Basics of Computers	<ul style="list-style-type: none"> <li>• This is a skill based paper that introduces the students to the basics of computer operations</li> <li>• The student is imparted with knowledge on both hardware and software.</li> <li>• The student has a better understanding on the use of</li> </ul>

			computers for various applications
<b>3.4</b>		Components of Biodiversity and Conservation	<ul style="list-style-type: none"> <li>• The aim of this course is to impart the knowledge of biodiversity and conservation of environmental resources</li> <li>• The students study the taxonomic nomenclature, global biodiversity, endangered species and approaches in their conservation.</li> <li>• At the end of the course, the students have a thorough understanding on the components in biodiversity and the methodology in conservations.</li> </ul>
<b>3.5</b>		Natural Resources	<ul style="list-style-type: none"> <li>• In this course, the students study about the various types of natural resources</li> <li>• The course also covers aspects of renewable energy resources, biological resources, water resources and sustainable development.</li> <li>• At the end of the course, the students have a clear understanding on the various natural resources and methodology in the effective management.</li> </ul>
<b>4.1</b>	B.Sc. – Environmental Sciences – Fourth Semester	Part I - English IV Part II - English IV Part II - Kannada IV	<ul style="list-style-type: none"> <li>• These courses are designed to develop the communication and vocabulary skills in the students</li> <li>• Upon completion of the course, the students have sufficient knowledge for professional communication to excel in the chosen profession</li> </ul>
<b>4.2</b>		Fundamentals of Nanotechnology	<ul style="list-style-type: none"> <li>• This is an interdisciplinary and emerging area</li> <li>• The students are taught the basics of nanotechnology and their applications</li> <li>• The course introduces the students to the new and novel applications to solve biomedical problems through nanotechnology</li> </ul>
<b>4.3</b>		Tissue Culture	<ul style="list-style-type: none"> <li>• This skill based course introduces the students to the</li> </ul>

			<p>concepts in tissue culture applicable to plants and animals</p> <ul style="list-style-type: none"> <li>• They are also taught their applications in biotechnology and biochemical research</li> <li>• This course introduces the students to explore entrepreneurial avenues in this field</li> </ul>
<b>4.4</b>		Environmental Microbiology	<ul style="list-style-type: none"> <li>• This is an interdisciplinary course that focuses on the application of microbiology in environmental remediation.</li> <li>• The student in the course study microorganisms, their classification, metabolism, their role in biogeochemical cycles and waste water treatment</li> <li>• Through this course, the students will have the basic knowledge in understanding the role of microbes in waste water treatment</li> </ul>
<b>5.1</b>	B.Sc. – Environmental Sciences – Fifth Semester	Environmental Chemistry	<ul style="list-style-type: none"> <li>• This course describes the chemistry of atmosphere, water bodies, soil, oxidation and reduction, fates of organic compounds in the environment.</li> <li>• The student learn about the role of chemistry in understanding the atmosphere, water bodies and soil.</li> <li>• At the end of the course, the students will have an understanding on the chemistry of water bodies, greenhouse effects and soil chemistry</li> </ul>
<b>5.2</b>		Environmental Pollution	<ul style="list-style-type: none"> <li>• The students in this course learn about the various kinds of pollution that occur in the environment.</li> <li>• They learn about air, water and soil pollution, climate change and health and environment.</li> <li>• Through this course, the students learn the importance of environment and methods to minimize the pollution. This</li> </ul>

			course prepares the students to be responsible citizens
<b>5.3</b>		Environmental Monitoring and Techniques	<ul style="list-style-type: none"> <li>• The aim of this course is to impart the knowledge of the various methodologies that are adapted for effective monitoring of environmental parameters.</li> <li>• The students learn about data collection, water quality parameters, sampling methods, modeling in environmental sciences and application of computer technology in monitoring.</li> <li>• At the end of the course, the students are well versed in the various monitoring technologies for sampling environmental samples.</li> </ul>
<b>5.4</b>		Water and Waste Water Treatment	<ul style="list-style-type: none"> <li>• The purpose of this course is to introduce the concept of water and waste water treatment techniques</li> <li>• The students learn about water resources, water treatment methods, waste water treatment and techniques for water treatment.</li> <li>• At the end of the course, the student is well aware on the principles involved in proper treatment of both water and waste water.</li> </ul>
<b>5.5</b>		Environmental Biotechnology	<ul style="list-style-type: none"> <li>• The students are introduced to the biological revolutions in this field.</li> <li>• They are taught about the microbial populations, biogeomagnification. They learn about biosensors, vaccine production, monoclonal antibodies, nanotechnology and its applications.</li> <li>• The students will be able to demonstrate the use of environmental science principle in solving various environmental problems</li> </ul>
<b>5.6</b>		Advanced Instrumentation Techniques	<ul style="list-style-type: none"> <li>• This skill based course will teach the students the various instrumentations that are used</li> </ul>

			<p>in the analytical laboratories.</p> <ul style="list-style-type: none"> <li>• This course covers both fundamental and applications of the instruments that are routinely used for the characterization of biomolecules</li> <li>• At the end of the course, the student has the basic knowledge on the theory, operation and function of analytical instruments.</li> </ul>
<b>6.1</b>	B.Sc. – Environmental Sciences – Sixth Semester	Environmental Management	<ul style="list-style-type: none"> <li>• This course introduces the students to the principles of environmental management</li> <li>• In the course, the students are taught environmental audits, environmental economics and environmental ethics.</li> <li>• By the end of the course, the students have a better understanding on how to be responsible citizens by managing the environment around us.</li> </ul>
<b>6.2</b>		Eco-restoration and Development	<ul style="list-style-type: none"> <li>• Eco-restoration course teaches the students the methodology to reclaim waste land, soil conservation, green technology, environmental policy and sustainability.</li> <li>• The students in this course understand the role of restoration processes to reclaim degraded land, help soil conservation, familiarity with environmental policies at state, national and international level</li> </ul>
<b>6.3</b>		Ecotourism	<ul style="list-style-type: none"> <li>• This course introduces the students to the basics of healthy promotion of tourism with environmental perspective.</li> <li>• At the end of the course, the student will be able to apply these learning to practical use.</li> </ul>
<b>6.4</b>		Environmental Toxicology	<ul style="list-style-type: none"> <li>• This course is designed to impart the basics in toxicological aspects that effect the environment.</li> <li>• The students learn about toxicology, chemical</li> </ul>

			<p>carcinogenesis, epidemiology and environmental health.</p> <ul style="list-style-type: none"> <li>The outcome of this course is to provide the necessary knowledge to the students to understand the basic toxicological aspects</li> </ul>
<b>6.5</b>		Solid Waste Management	<ul style="list-style-type: none"> <li>This course introduces the students on the various methods available for solid waste management.</li> <li>The course covers topics on composition, properties, transportation, separation, transfer and recycling of solid waste.</li> <li>At the end of the course, the students will be able to appreciate all the aspects involved in solid waste creation, minimization and complete environmentally safe method of their disposal.</li> </ul>
<b>6.6</b>		Hydrology	<ul style="list-style-type: none"> <li>The objective of the course is to introduce the concept of hydrology and its role in environment.</li> <li>The students learn about precipitation, ground water hydrology, water resource management and rain harvesting techniques.</li> </ul>

<b>Sl. No.</b>	<b>Name of the Program</b>	<b>Name of the Course</b>	<b>Course Outcome</b>
<b>1.1</b>	B.Sc. – Food, Nutrition and Dietetics – First Semester	<b>Languages</b> Part I - English I Part II - English I Part II - Kannada I	<ul style="list-style-type: none"> <li>These courses are designed to develop the communication and vocabulary skills in the students</li> <li>Upon completion of the course, the students have sufficient knowledge for professional communication to excel in the chosen profession</li> </ul>

1.2		Basics of Biostatistics	<ul style="list-style-type: none"> <li>• This course imparts the knowledge of basic statistical methods to solve problems</li> <li>• Students are taught to operate various statistical software packages</li> <li>• By the end of the course, the students are able to appreciate the importance of statistics in research and prepares them for a career in research</li> </ul>
1.3		Environmental Studies	<ul style="list-style-type: none"> <li>• The main objective of this paper is to create an awareness among the students about the environment</li> <li>• By the end of the course, the students will have a better appreciation for the environment and become responsible citizens</li> </ul>
1.4		Introduction to Food and Nutrition	<ul style="list-style-type: none"> <li>• The course imbibes an understanding of the changes that occur in the components during food preparation whether natural or induced by handling procedures.</li> <li>• The students are made to understand the various Physical and chemical reactions occur during food preparation with the medium of cooking.</li> <li>• 3. At the end, the students understand the nutritive value of different foods and methods of preserving them during cooking.</li> </ul>
2.1		B.Sc. - Food, Nutrition and Dietetics – Second Semester	<b>Languages</b> Part I - English II Part II - English II Part II - Kannada II
2.2		Principle of Biochemistry	<ul style="list-style-type: none"> <li>• Through this course the students are exposed to importance of biological macromolecules</li> <li>• They acquire knowledge in the quantitative and qualitative</li> </ul>

			<p>estimation of biomolecules</p> <ul style="list-style-type: none"> <li>• They study the influence and role of structure in reactivity of biomolecules</li> <li>• At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions</li> </ul>
<b>2.3</b>		Applied Physiology	<ul style="list-style-type: none"> <li>• The paper covers the working of internal organ and system.</li> <li>• The students will be exposed to anatomy of different organs</li> <li>• Paper helps the students to understand the physiological functions of the biological systems</li> </ul>



## PG Programmes in the Department of Water and Health- Faculty of Life Sciences

Sl. No.	Name of the Program	Name of the Subject	Course Outcome
1.1	MSc Biochemistry- I semester	Fundamentals of Molecular Biology	<ul style="list-style-type: none"> <li>• It deals with understanding the molecular aspects of the biology.</li> <li>• It majorly emphasizes the concepts of central dogma of molecular biology spanning from DNA Replication till Protein Synthesis and Reverse transcription.</li> <li>• It also helps in understanding the concepts of cellular function.</li> </ul>
1.2		Fundamentals of Nanotechnology	<ul style="list-style-type: none"> <li>• This is an interdisciplinary and emerging area</li> <li>• The students are taught the basics of nanotechnology and their applications</li> <li>• 3. The course introduces the students to the new and novel applications to solve biomedical problems through nanotechnology</li> </ul>
1.3		Fundamentals of Biochemistry and Biomolecules	<ul style="list-style-type: none"> <li>• This paper trains students to appreciate the salient features of biomolecules in the organization of life.</li> <li>• It spans over the significance and methodology involved in characterizing major biomolecules.</li> <li>• It helps the students in understanding the classification, functions and application aspects of</li> </ul>

			biomolecules.
<b>1.4</b>		Biochemical Techniques	<ul style="list-style-type: none"> <li>• The units of this paper are crucial for implementation of research ideas at molecular level.</li> <li>• It trains the students in adopting various techniques in biological research.</li> <li>• This significantly enhances the employability of the candidates in Biotechnological, Pharmaceutical Industries and Analytical Laboratories and research institutes.</li> </ul>
<b>1.5</b>		Statistical Methods for Biology	<ul style="list-style-type: none"> <li>• It provides an introduction to selected important topics in biostatistical concepts and reasoning.</li> <li>• This course represents an introduction to the field of data and data types.</li> <li>• The students learn specific topics including tools for describing central tendency and variability in data; methods for performing inference on population means and proportions via sample data; statistical hypothesis testing and its application to group comparisons; issues of power and sample size in study designs; and random sample and other study types.</li> </ul>
<b>2.1</b>	MSc Biochemistry- II semester	Human Physiology and Anatomy	<ul style="list-style-type: none"> <li>• This course teaches the basic anatomy and</li> </ul>

			<p>physiology of human body.</p> <ul style="list-style-type: none"> <li>• The students are taught the functioning aspects of the human body at molecular level.</li> <li>• At the end of this course the students will be able to appreciate the anatomical and physiological aspects of the human body.</li> </ul>
<b>2.2</b>		Nutritional Biochemistry	<ul style="list-style-type: none"> <li>• The paper provides the structural and functional role of cell organelles and cell membrane at the biological level.</li> <li>• Students will be exposed classification, biochemical and required quantities of nutrients in diet.</li> <li>• It helps students to understand the nutritive roles of macro and micro nutrients.</li> </ul>
<b>2.3</b>		Immunology	<ul style="list-style-type: none"> <li>• This course provides you with knowledge and understanding of immunology and the way it is applied in diagnostic and therapeutic techniques and research.</li> <li>• It trains the students with essentiality of molecules, cells, tissues, and organs involved in the defense mechanism.</li> <li>• It's a paper which accomplishes the learning of techniques involved in understanding the immunological aspects of physiology and biological samples.</li> </ul>
<b>2.4</b>		Genetics	<ul style="list-style-type: none"> <li>• The paper helps in</li> </ul>

			<p>highlighting the scope and significance of genetics by imbibing the principles of hereditary genetic transmission and interactions of gene with environment.</p> <ul style="list-style-type: none"> <li>• It also helps students to learn the molecular aspects of genetics disorders and mutations.</li> <li>• It helps the students to appreciate the concepts of gene and relationship between genotype and phenotype.</li> </ul>
<b>2.5</b>		Cancer Biology	<ul style="list-style-type: none"> <li>• It is an elective paper which deals with fundamentals required for understanding the cancer at molecular level.</li> <li>• It helps the students to appreciate the phases of cell cycle and mechanisms involved in apoptosis.</li> <li>• It helps students to learn the updated therapeutics of cancer as well.</li> </ul>
<b>3.1</b>	MSc Biochemistry- III semester	Plant Biochemistry and Genetic Engineering	<ul style="list-style-type: none"> <li>• The paper conglomerates the physiological processes of plant at molecular level.</li> <li>• It explains the biochemical and cellular aspects of photosynthesis and respiration of plants.</li> <li>• It enables the students to appreciate the functioning of plants by specialized molecular processes.</li> </ul>
<b>3.2</b>		Enzymology	<ul style="list-style-type: none"> <li>• It helps the students to learn the significant features of the biochemical catalysts.</li> <li>• It helps the students to</li> </ul>

			<p>learn the methodology involved in assessing the enzyme activity and mechanism of enzyme action.</p> <ul style="list-style-type: none"> <li>• It illustrates the enzyme catalysis, kinetics and regulatory aspects.</li> </ul>
<b>3.3</b>	MSc Biochemistry- III semester	Metabolism	<ul style="list-style-type: none"> <li>• It helps the students in appreciating the integrated approach of interrelated pathways of catabolism and anabolism.</li> <li>• It also emphasizes on metabolic disorders at molecular level.</li> <li>• It features the regulatory aspects of metabolism for better understanding of physiology and therapeutic applications.</li> </ul>
<b>3.4</b>		Clinical Biochemistry	<ul style="list-style-type: none"> <li>• It trains the students to gain concepts of assessing the human physiology using biological fluid.</li> <li>• It illustrates the mechanism of metabolic disorders at molecular level.</li> <li>• It facilitates in employability in diagnostic and research institutes.</li> </ul>
<b>3.5</b>		Proteomics	<ul style="list-style-type: none"> <li>• This paper introduces to the basic biology of proteins and the new advanced science called as proteomics which aims to look into entire set of proteins in the milieu.</li> <li>• The paper will cover details of the two major aspects of proteomics i.e., Gel-based</li> </ul>

			<p>proteomics and Mass spectrometry-based proteomics.</p> <ul style="list-style-type: none"> <li>• The techniques involved at large in major contribution in transition from protein chemistry to proteomics are learnt.</li> </ul>
<b>1.1</b>	MSc Bioinformatics-I semester	Fundamentals of Statistics	<ul style="list-style-type: none"> <li>• It provides an introduction to selected important topics in biostatistical concepts and reasoning.</li> <li>• This course represents an introduction to the field of data and data types.</li> <li>• The students learn specific topics including tools for describing central tendency and variability in data; statistical hypothesis testing and its application to group comparisons; issues of power and sample size in study designs; and random sample and other study types.</li> </ul>
<b>1.2</b>		Fundamentals of Computer Science	<ul style="list-style-type: none"> <li>• It deals with understanding the molecular aspects of the biology.</li> <li>• It majorly emphasizes the concepts of central dogma of molecular biology spanning from DNA Replication till Protein Synthesis and Reverse transcription.</li> <li>• It also helps in understanding the concepts of cellular function.</li> </ul>
<b>1.3</b>		Fundamentals of Molecular Biology	<ul style="list-style-type: none"> <li>• It deals with understanding the</li> </ul>

			<p>molecular aspects of the biology.</p> <ul style="list-style-type: none"> <li>• It majorly emphasizes the concepts of central dogma of molecular biology spanning from DNA Replication till Protein Synthesis and Reverse transcription.</li> <li>• It also helps in understanding the concepts of cellular function.</li> </ul>
<b>1.4</b>		Recombinant DNA technology	<ul style="list-style-type: none"> <li>• The course leads to the understanding of procedures that have been developed to exploit our knowledge of the replication and expression of genetic information.</li> <li>• The paper helps the students to understand the processes involved to identify, isolate, amplify, analyze and express virtually any genetic material, whether it is DNA or RNA.</li> <li>• It enables the detailed understanding of databases used in biological research.</li> </ul>
<b>1.5</b>		Statistical computing using Excel and SPSS	<ul style="list-style-type: none"> <li>• Students in this course study a wide variety of statistical and graphical techniques, including linear and nonlinear modeling, classical statistical tests, time-series analysis, and classification and clustering.</li> <li>• The course will impart training to students who seek to acquire and refine their skills relating to data</li> </ul>

			analysis and manipulation.
<b>2.1</b>	MSc Bioinformatics- II semester	Visual basics with RDBMS	<ul style="list-style-type: none"> <li>• This course uses computer based database management for bioinformatics.</li> <li>• Outcome of the course is to train the students in the use of RDBMS as a tool for retrieve data from databases.</li> </ul>
<b>2.2</b>		Multivariate analysis	<ul style="list-style-type: none"> <li>• Students in this course learn principle component analysis, clustering, applications in test on mean vectors and MANOVA.</li> <li>• Outcome of this course is that it prepares the students to apply these methodologies to actual real world data.</li> </ul>
<b>2.3</b>		PERL for Bioinformatics	<ul style="list-style-type: none"> <li>• The course provides the introduction to PERL scripting language and its use in bioinformatics.</li> <li>• At the end of the course, the students are able to utilize the power of PERL for disease diagnostics and therapy.</li> </ul>
<b>2.4</b>		System Biology	<ul style="list-style-type: none"> <li>• The paper enables the students to learn the basic concepts, models, and measures to characterize the properties of analyzing metabolic networks.</li> <li>• It helps the students to understand the integrating aspects of multi-omics datasets and thereby understanding the biological systems.</li> </ul>
<b>2.5</b>		Molecular statistical model using 'R'	<ul style="list-style-type: none"> <li>• Students in this course study a wide variety of Molecular statistical and</li> </ul>



			<p>graphical techniques, including linear and nonlinear modeling, classical statistical tests, time-series analysis, and classification and clustering.</p> <ul style="list-style-type: none"> <li>The course will impart training to students who seek to acquire and refine their skills relating to data analysis and manipulation.</li> </ul>
<b>3.1</b>	MSc Bioinformatics-III semester	Protein structure and function	<ul style="list-style-type: none"> <li>It enables the students to appreciate structural and functional aspects of proteins.</li> <li>It also elaborates on the protein characterization methodology and studies of protein-drug and protein protein interaction.</li> <li>At the end the student will gain thorough knowledge of fundamentals and applications involved in protein chemistry.</li> </ul>
<b>3.2</b>		Advances in structural Bioinformatics	<ul style="list-style-type: none"> <li>This course talks about databases used in bioinformatics.</li> <li>This includes NDB, MMDB, PROSEARCH, and Molecular mechanics.</li> <li>The outcome of the course is to train the students in the use of databases for structure determination for diagnostic therapeutic application.</li> </ul>
<b>3.3</b>		CADD (Drug Designing)	<ul style="list-style-type: none"> <li>This interdisciplinary course introduces the students with molecular dynamics, simulation, and</li> </ul>

			<p>modeling for drug discovery.</p> <ul style="list-style-type: none"> <li>The outcome of the course is to train the students in use of computer aided technology to fasten the drug discovery through simulation and modeling.</li> </ul>
<b>3.4</b>		Molecular Interactions	<ul style="list-style-type: none"> <li>This course describes the various interactions between biomolecules, bonds, biophysics, and catalysis.</li> <li>By the end of the course, the student would have gained sufficient knowledge in molecular interactions for the better understanding of structural biology.</li> </ul>
<b>3.5</b>		Bioinformatics tools in MatLab	<ul style="list-style-type: none"> <li>The computer based course introduces the students to the use of MatLab as a tool for bioinformatics.</li> <li>Outcome of the course is to provide knowledge to student through additional toolbox of bioinformatics in MatLab for image processing, simulation, pharmacokinetics, and biological data analysis.</li> </ul>
<b>1.1</b>	MSc Cognitive Neuroscience- I semester	Developmental Cognitive Science	<ul style="list-style-type: none"> <li>The course helps the students to understand the principles of cognitive neuroscience.</li> <li>It enables them to learn the development of perception, spatial recognition, memory, speech, decision making and reasoning.</li> <li>The student builds up</li> </ul>

			practical knowledge on applications of cognitive psychology in improving memory processes.
<b>1.2</b>		Principles of Neuro Science	<ul style="list-style-type: none"> <li>• This paper enables the students to learn anatomical and physiological aspects of brain.</li> <li>• The students will also appreciate the biochemical aspects of the nervous system and learn to identify the metabolic defects.</li> <li>• At the end the students will learn to correlate all the neurological functions at molecular level.</li> </ul>
<b>1.3</b>		Mathematical Models of Cognitive Science	<ul style="list-style-type: none"> <li>• The paper enables the students to get trained in understanding the philosophy.</li> <li>• The student gets trained in Analogy and conceptual systems.</li> </ul>
<b>1.4</b>		Research Methods	<ul style="list-style-type: none"> <li>• This paper trains the students in designing and analyzing the experiments pertaining to human cognition with special emphasis on neuropsychological assessment.</li> <li>• The students also learn the Brain imaging techniques, methods of recording and analyzing human movements. They are also trained in computational models of cognitive processes.</li> <li>• At the end of the course the students develop skills in designing their experiments for assessing</li> </ul>

			the cognitive parameters for their area of research.
<b>1.5</b>		Statistical Methods for Biology	<ul style="list-style-type: none"> <li>• It provides an introduction to selected important topics in biostatistical concepts and reasoning.</li> <li>• This course represents an introduction to the field of data and data types.</li> <li>• The students learn specific topics including tools for describing central tendency and variability in data; methods for performing inference on population means and proportions via sample data; statistical hypothesis testing and its application to group comparisons; issues of power and sample size in study designs; and random sample and other study types.</li> </ul>
<b>2.1</b>	MSc Cognitive Neuroscience- II semester	Social Cognition and Culture	<ul style="list-style-type: none"> <li>• The students in this course understand the concepts of social reality and social cognition across the cultures.</li> <li>• The students are trained to design experiments in attitude research, models of social cognition, judgment, and decision making.</li> <li>• At the end, the student will appreciate the science and research methodology behind studying the importance of social cognition and the factors influencing it.</li> </ul>
<b>2.2</b>		Neuro Basis of Cognitive	<ul style="list-style-type: none"> <li>• This paper enables the</li> </ul>

		Science	<p>students to learn the syndromes, disorders, and diseases of nervous system.</p> <ul style="list-style-type: none"> <li>• The students will learn to appreciate the importance of normal neuronal physiology while understanding the abnormal physiology.</li> </ul>
<b>2.3</b>		Computational Intelligence	<ul style="list-style-type: none"> <li>• This course will enable the students with the most upcoming field of science i.e., artificial intelligence.</li> <li>• It makes the students to have a computational approach with multidisciplinary view in linking neuroscience with artificial intelligence.</li> <li>• After completion, the students will learn the design and role of cognition and computation in development of technologies in aviation, air traffic control, diagnostic and robotics.</li> </ul>
<b>2.4</b>		Philosophy of Mind	<ul style="list-style-type: none"> <li>• This course enables the students to understand the theories proposed by Indian and Western philosophers.</li> <li>• It provides an understanding of moral problems and psychology by spanning over the concepts of ethics, sympathy, empathy, will, weakness, guilt, shame, and regret to enable good life.</li> <li>• At the end, the students will appreciate the</li> </ul>

			genesis and implementation of various philosophies in real life.
<b>3.1</b>	MSc Cognitive Neuroscience- III semester	Consciousness Studies	<ul style="list-style-type: none"> <li>• This paper provides a detailed view on history, evolution, and evaluation of consciousness by making the students to have assertive approach in the philosophies of consciousness.</li> <li>• The students will learn the concepts of quantum mechanics at philosophical level.</li> <li>• On completion, the students will be able to appreciate the concept of consciousness, status and traits of consciousness and spiritual basis of cognition.</li> </ul>
<b>3.2</b>		Cognitive Neuro psychological Rehabilitation	<ul style="list-style-type: none"> <li>• It enables the students to learn the processes involved in cognitive rehabilitation and remediation.</li> <li>• It provides the students with concepts of, and protocols in assessment of injury to brain.</li> <li>• At the end, the student learns to diagnose, treat neuropsychological conditions by standardizing the methodology involved in cognitive neuropsychological rehabilitation.</li> </ul>
<b>3.3</b>		Research Methods	<ul style="list-style-type: none"> <li>• This course provides students with modeling of memory, concepts of intelligence and memory retrieval of memory.</li> <li>• It also helps the students</li> </ul>

			<p>to represent knowledge using imaging and mapping techniques.</p> <ul style="list-style-type: none"> <li>• On completion, the students will learn the principles involved in evaluating and manipulating the mental representation of knowledge.</li> </ul>
<b>3.4</b>		Psychometrics	<ul style="list-style-type: none"> <li>• This paper enables the students to learn the generation of construction, uses, limitations of psychological testing and scaling methods.</li> <li>• It trains the students for classifying , analyzing, and testing the items.</li> <li>• At the end, students will learn to check the reliability, validity and normality for assessment in their cognitive research.</li> </ul>
<b>1.1</b>	MSc Cosmetic Science I semester	Basic human Anatomy and Physiology	<ul style="list-style-type: none"> <li>• This course teaches the basic anatomy and physiology of human body.</li> <li>• The students are taught the functioning aspects of the human body at molecular level.</li> <li>• At the end of this course the students will be able to appreciate the anatomical and physiological aspects of the human body.</li> </ul>
<b>1.2</b>		Cosmetics Principles	<ul style="list-style-type: none"> <li>• This paper facilitates the students in learning the technical aspects of cosmetic formula preparation upto a product level.</li> </ul>

			<ul style="list-style-type: none"> <li>• It trains the students with the use of ingredients in cosmetics and methods of preparation of suspensions, emulsions and techniques involved in characterizing the preparation.</li> <li>• The student overall learns the vital concepts implemented in cosmetic development enabling them to have greater chances of employability.</li> </ul>
<b>1.3</b>		Fundamentals of Nanotechnology	<ul style="list-style-type: none"> <li>• This is an interdisciplinary and emerging area</li> <li>• The students are taught the basics of nanotechnology and their applications</li> <li>• 3. The course introduces the students to the new and novel applications to solve biomedical problems through nanotechnology</li> </ul>
<b>1.4</b>		Fundamentals of Biochemistry and Biomolecules	<ul style="list-style-type: none"> <li>• This paper trains students to appreciate the salient features of biomolecules in the organization of life.</li> <li>• It spans over the significance and methodology involved in characterizing major biomolecules.</li> <li>• It helps the students in understanding the classification, functions and application aspects of biomolecules.</li> </ul>
<b>1.5</b>		Biochemical Techniques	<ul style="list-style-type: none"> <li>• The units of this paper are crucial for implementation of research ideas at molecular level.</li> <li>• It trains the students in</li> </ul>



			<p>adopting various techniques in biological research.</p> <ul style="list-style-type: none"> <li>• This significantly enhances the employability of the candidates in Biotechnological, Pharmaceutical Industries and Analytical Laboratories and research institutes.</li> </ul>
<b>2.1</b>	MSc Cosmetic Science II semester	Cosmetics Biology	<ul style="list-style-type: none"> <li>• The students will learn the structural and functional aspects of skin.</li> <li>• The paper teaches the students to understand the various mechanisms of skin physiology at various levels of human growth.</li> <li>• The students at the end will learn the biology behind the use of cream and cosmetics which enables higher chances of employability in cosmetic companies.</li> </ul>
<b>2.2</b>		Cosmetics Formulation Science	<ul style="list-style-type: none"> <li>• The students learn various mechanism of delivery of active component to skin, hair, and toothpaste.</li> <li>• The students learn the important components of skin creams, baby powders, shampoos, and toothpastes.</li> <li>• The students at the end learn to appreciate the protocol followed in formulation and development of cosmetics.</li> </ul>
<b>2.3</b>		Cosmeceuticals	<ul style="list-style-type: none"> <li>• This course enables the students to know the</li> </ul>

			<p>evolution process of cosmetics into cosmeceuticals.</p> <ul style="list-style-type: none"> <li>• It explains the mechanism of ailments like skin pigmentation, wrinkles, acne, sun burns, prickly heat, and dandruff.</li> <li>• The students will learn the research aspects in developing a cosmetic into a cosmeceutical by studying the basis of treatment on par.</li> </ul>
<b>2.4</b>		Herbal Science	<ul style="list-style-type: none"> <li>• In this paper, the student learns the basic principles in use of alternative medicine.</li> <li>• It helps the students to span over the phytochemical importance of various herbs proposed by various medicine systems like Ayurveda, Unani, Siddha and Homeopathy.</li> </ul>
<b>2.5</b>		Genetics	<ul style="list-style-type: none"> <li>• The paper helps in highlighting the scope and significance of genetics by imbibing the principles of hereditary genetic transmission and interactions of gene with environment.</li> <li>• It also helps students to learn the molecular aspects of genetics disorders and mutations.</li> <li>• It helps the students to appreciate the concepts of gene and relationship between genotype and phenotype.</li> </ul>
<b>3.1</b>	MSc Cosmetic Science	Cosmetics Analysis and Evaluation	<ul style="list-style-type: none"> <li>• This trains the students to know the experimental</li> </ul>

	III semester		<p>basis of analysis and evaluation of cosmetics</p> <ul style="list-style-type: none"> <li>• The students also learn the standard specifications for sampling and testing of various cosmetics.</li> <li>• At the end, the students are trained towards evaluating cosmetic products.</li> </ul>
3.2		Applied Microbiology	<ul style="list-style-type: none"> <li>• This fundamental paper discusses the importance of applications of microorganisms</li> <li>• The course throws light on types of microorganisms in cosmetic products</li> <li>• At the end of the course, the student has understanding on the concept of culturing microbes, sterilization techniques and estimating the number of microbes in a given sample of cosmetic product.</li> </ul>
3.3		Industrial Cosmetics	<ul style="list-style-type: none"> <li>• This course explores the regulatory aspects, equipments, manufacturing process, packaging, and maintenance aspects related to cosmetic industry.</li> <li>• By the end of the course, the student is familiarized with regulatory guidelines to launch cosmetic products and equipment, packaging of cosmetics.</li> </ul>
3.4		Environmental Nanoscience	<ul style="list-style-type: none"> <li>• This course describes both the advantages and disadvantages of nano</li> </ul>

			<p>products to the environment.</p> <ul style="list-style-type: none"> <li>• By the end of the course, the students have an appreciation for the benefits of nanotechnology in improving the environment.</li> </ul>
<b>3.5</b>		Statistical Methods for Biology	<ul style="list-style-type: none"> <li>• It provides an introduction to selected important topics in biostatistical concepts and reasoning.</li> <li>• This course represents an introduction to the field of data and data types.</li> <li>• The students learn specific topics including tools for describing central tendency and variability in data; methods for performing inference on population means and proportions via sample data; statistical hypothesis testing and its application to group comparisons; issues of power and sample size in study designs; and random sample and other study types.</li> </ul>
<b>1.1</b>	MSc Environmental Science I semester	Principles of Environmental Sciences	<ul style="list-style-type: none"> <li>• This course introduces the students to the interdisciplinary nature of environmental studies</li> <li>• The students learn about biogeochemical cycles, ecology, biomes and habitat, and conservation biology.</li> <li>• At the end of the course, the students are able to appreciate the intricate</li> </ul>

			nature of ecosystem and its role in maintenance of health earth.
<b>1.2</b>		Environmental Microbiology and Biotechnology	<ul style="list-style-type: none"> <li>• This is an interdisciplinary course that focuses on the application of microbiology and biotechnology in environmental remediation.</li> <li>• The student in the course study microorganisms, their classification, their interaction, significance.</li> <li>• Through this course, the students will have the basic knowledge in understanding the role of microbes in waste water treatment</li> </ul>
<b>1.3</b>		Environmental Chemistry	<ul style="list-style-type: none"> <li>• This course describes the chemistry of atmosphere, water bodies, soil, oxidation and reduction, fates of organic compounds in the environment.</li> <li>• The student learn about the role of chemistry in understanding the atmosphere, water bodies and soil.</li> <li>• At the end of the course, the students will have an understanding on the chemistry of water bodies, greenhouse effects and soil chemistry</li> </ul>
<b>1.4</b>		Environmental Earth Science	<ul style="list-style-type: none"> <li>• This introductory course exposes the students to geographical features of the earth.</li> <li>• Through this course the students learn about the earth materials, surface features, interior of earth, natural hazards, oceans and atmosphere.</li> <li>• Outcome of the course is to inculcate sufficient knowledge in the student</li> </ul>

			on role of environmental earth science.
<b>1.5</b>		Statistical Methods for Biology	<ul style="list-style-type: none"> <li>• It provides an introduction to selected important topics in biostatistical concepts and reasoning.</li> <li>• This course represents an introduction to the field of data and data types.</li> <li>• The students learn specific topics including tools for describing central tendency and variability in data; methods for performing inference on population means and proportions via sample data; statistical hypothesis testing and its application to group comparisons; issues of power and sample size in study designs; and random sample and other study types.</li> </ul>
<b>2.1</b>	MSc Environmental Science II semester	Environmental Toxicology	<ul style="list-style-type: none"> <li>• This course is designed to impart the basics in toxicological aspects that effect the environment.</li> <li>• The students learn about toxicology, chemical carcinogenesis, epidemiology and environmental health.</li> <li>• The outcome of this course is to provide the necessary knowledge to the students to understand the basic toxicological aspects</li> </ul>
<b>2.2</b>		Remote Sensing & GIS	<ul style="list-style-type: none"> <li>• This fundamental course gives the foundation and application for remote sensing.</li> <li>• Students are taught about history of remote</li> </ul>

			<p>sensing, the systems, the technical aspects involved in the use of satellite data, its storage, editing, data analyzing and applications.</p> <ul style="list-style-type: none"> <li>• By the end of this course, the student is able to infer satellite related data, and would be well versed in the technical aspect behind GIS and its application through GPS.</li> </ul>
<b>2.3</b>		Water Resource and Ground Water Hydrology	<ul style="list-style-type: none"> <li>• The objective of the course is to introduce water resources, the concept of hydrology and its role in environment.</li> <li>• The students learn about precipitation, ground water hydrology, water resource management and rain harvesting techniques.</li> <li>• By the end of the course, the student is well versed in the understanding of ground water resources and its management.</li> </ul>
<b>2.4</b>		Environmental Economics and Management	<ul style="list-style-type: none"> <li>• This interdisciplinary course brings together environmental science, economics and management aspects.</li> <li>• The students learn about environmental economics, resource management, and environment management.</li> <li>• By the end of the course, the student is able to appreciate the value of economics and management In understanding the environment.</li> </ul>
<b>2.5</b>		Energy Technologies	<ul style="list-style-type: none"> <li>• This course highlights biomass, biogas, pyrolysis, and waste</li> </ul>

			<p>characteristics.</p> <ul style="list-style-type: none"> <li>• By the end of the course the student understands biogas production from waste, characteristics of biomass fuel and importance of biodiesel.</li> </ul>
<b>2.6</b>		Environmental Impact assessment	<ul style="list-style-type: none"> <li>• The students learn the components of EIA, Legal and regulatory aspects in India, Trends in Quality Control practices.</li> <li>• At the end of the course, through case studies, the students are trained in the EIA for various development projects.</li> </ul>
<b>3.1</b>	MSc Environmental Science III semester	Water and Waste Water Treatment Techniques	<ul style="list-style-type: none"> <li>• The purpose of this course is to introduce the concept of water and waste water treatment techniques</li> <li>• The students learn about water resources, water treatment methods, waste water treatment and techniques for water treatment.</li> <li>• At the end of the course, the student is well aware on the principles involved in proper treatment of both water and waste water.</li> </ul>
<b>3.2</b>		Waterborne Disease and Chemical Agents	<ul style="list-style-type: none"> <li>• This course introduces the students to the effect of microbes and chemical agents in spread of disease through water bodies.</li> <li>• At the end of the course, the students have a clear understanding on the role of water bodies in</li> </ul>



			spreading diseases through micro organisms and chemical agents.
<b>3.3</b>		Environmental Safety and Health Management	<ul style="list-style-type: none"> <li>• This interdisciplinary course highlights the importance of safety and management of environment and health</li> <li>• The students learn about OSHA, safe working environment, Govt. regulations required in workplace.</li> <li>• At the end of the course, the students can demonstrate an understanding on the importance, management of safety aspects in work environment.</li> </ul>
<b>3.4</b>		Environmental Pollution and Law	<ul style="list-style-type: none"> <li>• The students in this course learn about the various kinds of pollution that occur in the environment and the laws associated with these.</li> <li>• They learn about air, water and soil pollution, climate change and health and environment, government policies on minimizing pollution.</li> <li>• Through this course, the students learn the importance of environment and methods to minimize the pollution. This course prepares the students to be responsible citizens</li> </ul>
<b>3.5</b>		Water Resource Management and Sustainable Development	<ul style="list-style-type: none"> <li>• In this course, the students study about water as a resource and its management.</li> <li>• The course also covers aspects of water resources, its economic view and its role in food</li> </ul>

			<ul style="list-style-type: none"> <li>production.</li> <li>At the end of the course, the students have a clear understanding on the water resources and methodology in the effective management.</li> </ul>
<b>1.1</b>	MSc Geoinformatics I semester	Fundamentals of Mathematics	<ul style="list-style-type: none"> <li>The purpose of this course is to introduce the students to basics in mathematics as relevant to geoinformatics program</li> <li>The students learn trigonometry, elementary mathematics, matrices, numeral methods and vector algebra</li> <li>At the end of the course, the student is well versed in the necessary mathematics components to understand the field of geoinformatics</li> </ul>
<b>1.2</b>		Introduction to Spatial Data Sources	<ul style="list-style-type: none"> <li>In this course, the student is taught how to interpret maps.</li> <li>The students learn about scales, aerial photos, aerial photos and GPS data.</li> <li>Through this basic course, the students are introduced to interpreting basic information from maps.</li> </ul>
<b>1.3</b>		Introduction to Remote Sensing	<ul style="list-style-type: none"> <li>This fundamental course gives the foundation for remote sensing.</li> <li>Students are taught about history of remote sensing, the systems, and the various kinds of satellites.</li> <li>By the end of this course, the student is able to infer satellite related data.</li> </ul>
<b>1.4</b>			Statistical Methods for Biology

			<p>reasoning.</p> <ul style="list-style-type: none"> <li>• This course represents an introduction to the field of data and data types.</li> <li>• The students learn specific topics including tools for describing central tendency and variability in data; methods for performing inference on population means and proportions via sample data; statistical hypothesis testing and its application to group comparisons; issues of power and sample size in study designs; and random sample and other study types.</li> </ul>
<b>1.5</b>		Fundamentals of Computer Science	<ul style="list-style-type: none"> <li>• It deals with understanding the molecular aspects of the biology.</li> <li>• It majorly emphasizes the concepts of central dogma of molecular biology spanning from DNA Replication till Protein Synthesis and Reverse transcription.</li> <li>• It also helps in understanding the concepts of cellular function.</li> </ul>
<b>2.1</b>	MSc Geoinformatics II semester	Introduction to GIS and GPS	<ul style="list-style-type: none"> <li>• This course introduces the students to the application of remote sensing.</li> <li>• The students are taught the technical aspects involved in the use of satellite data, its storage, editing, data analyzing and applications.</li> <li>• The student at the end of</li> </ul>

			<p>this course would be well versed in the technical aspect behind GIS and its application through GPS.</p>
<b>2.2</b>		Introduction to Spatial Data Analysis	<ul style="list-style-type: none"> <li>• This is a course that deal with the data analysis from spatial information</li> <li>• The students learn about the organization of data, its analysis, line entity, spatial analysis of area entity.</li> <li>• The outcome of this course is to provide student sufficient introduction to the processes involved in spatial data analysis</li> </ul>
<b>2.3</b>		Digital Cartography	<ul style="list-style-type: none"> <li>• This introduction paper on cartography helps the student interpret, analyze and learn the science behind maps</li> <li>• In the course, the students are taught about map characteristics, geodesy, base data creation, map design and digital map making.</li> <li>• Through this course, the student is experienced with the role of maps and its interpretation.</li> </ul>
<b>2.4</b>		Digital Image Processing	<ul style="list-style-type: none"> <li>• The basis of this paper is to introduce to the students the techniques involved in digital images processing.</li> <li>• The students learn about satellite maps, preprocessing, rectification, image enhancement, image classification and multi-layer modeling.</li> <li>• The outcome of this course is to give sufficient training to the students to be able to understand all the necessary tools involved in digital image processing.</li> </ul>
<b>2.5</b>		Geoinformatics for	<ul style="list-style-type: none"> <li>• This interdisciplinary</li> </ul>

		Hydrology	<p>course involves principles of geoinformatics applied to environmental sciences.</p> <ul style="list-style-type: none"> <li>• The students learn about the use of remote sensing data for sub surface mapping, application in water resource management, modeling to understand natural phenomenon.</li> <li>• The student at the end of the course will be able to understand the role of geoinformatics in water resource management.</li> </ul>
<b>3.1</b>	MSc Geoinformatics III semester	Advances in Geo informatics	<ul style="list-style-type: none"> <li>• This course covers the latest trends in the field of geoinformatics.</li> <li>• Students learn about geospatial technology, standards, modeling, resource mapping, cloud computing and crowd sourcing.</li> <li>• The outcome of this course is to educate the students in the use of modern technologies in geoinformatics.</li> </ul>
<b>3.2</b>		Photogrammetry	<ul style="list-style-type: none"> <li>• The course outlines to cover the various aspects in photography as related to satellite data.</li> <li>• The students learn about aerial photographs, cameras, binocular vision, distortion, models, digital photogrammetry.</li> <li>• At the end of the course, the student will be able to demonstrate the proper handling of aerial photography.</li> </ul>
<b>3.3</b>		Application of GIS and Remote Sensing in Natural Resources Management	<ul style="list-style-type: none"> <li>• This interdisciplinary course covers the use to geoinformatics tools in natural resource management.</li> <li>• The students are introduced to land resource, bio-resource,</li> </ul>

			<p>energy resource and models used for prediction.</p> <ul style="list-style-type: none"> <li>The student of the course will be able to demonstrate the use of geoinformatic tools such as satellite data/images to help conserve, manage and predict changes to the natural resources.</li> </ul>
<b>3.4</b>		Geodatabase for GIS	<ul style="list-style-type: none"> <li>The objective of this course is to provide students knowledge in the area of databases to manage GIS information.</li> <li>The students are taught various databases that are available for archiving the GIS information, creating, managing and retrieving data from such sources.</li> <li>The student from this course will be able to demonstrate the ability to archive data, manage and retrieve the necessary GIS data</li> </ul>
<b>3.5</b>		Advances in Public Health Geoinformatics	<ul style="list-style-type: none"> <li>In this interdisciplinary course the students are introduced to the application of GIS in public health management.</li> <li>The students are taught health data mining, spatial clusters of health events, spatial interpolation and basic statistics.</li> <li>At the end of the course, the students will be able to analyze data pertaining to GIS related public health</li> </ul>
<b>1.1</b>	MSc Medical Physcs- I semester	Basics of Radiation Physics	<ul style="list-style-type: none"> <li>This introductory course teaches the basics of radiation physics to the students.</li> <li>The topics covered include fundamentals of</li> </ul>

			<p>physics, electromagnetic radiation, ionizing radiations, particle accelerators, X-ray generators and radiation units.</p> <ul style="list-style-type: none"> <li>• At the end of the course, the students will have a strong foundation in physics that will help them in this program.</li> </ul>
<b>1.2</b>		Fundamentals of Biostatistics	<ul style="list-style-type: none"> <li>• This course covers the necessary aspects in biostatistics as needed for medical physics</li> <li>• The students learn about biometric data, probability, testing of hypothesis and analysis of categorical data</li> <li>• At the end of the course the student will be able to demonstrate the necessary skill sets to be able to interpret statistical data.</li> </ul>
<b>1.3</b>		Medical Electronics and Instrumentation	<ul style="list-style-type: none"> <li>• This introductory course is designed to familiarize the students with basics to electronics that are part of medical physics instruments.</li> <li>• The students are taught about semiconductor devices, circuit systems, ultrasound, lasers, radiation monitoring instruments, personnel monitoring</li> <li>• At the end of the course, the student will have gained the necessary knowledge to understand the electronics involved in instrumentations.</li> </ul>
<b>1.4</b>		Nuclear Physics	<ul style="list-style-type: none"> <li>• This course covers the</li> </ul>

			<p>principles of nuclear physics and its application in radiation therapy.</p> <ul style="list-style-type: none"> <li>• The topics covered include the basics of radioactivity, particle accelerators, X-ray generator, X-ray tubes and interaction of radiation with matter.</li> <li>• The student at the end of the course will have a thorough understanding on various aspects of radioactivity as applicable to radiation therapy for cancer.</li> </ul>
<b>1.5</b>		Solid State Physics	<ul style="list-style-type: none"> <li>• This course describes the crystal structure, thermal and dielectric properties of solids, magnetic properties of materials, superconductivity and optical properties.</li> <li>• Student at the end of this course will be able to demonstrate the grasp of knowledge in the necessary solid state physics topics.</li> </ul>
<b>2.1</b>	MSc Medical Physcs- I semester	Anatomy and Physiology	<ul style="list-style-type: none"> <li>• This interdisciplinary course teaches the basic anatomy and physiology of human body as relevant to radiation therapy.</li> <li>• The students are taught cell biology, physiology, radiographic anatomy, medical imaging and radiation oncology and ethics.</li> <li>• At the end of this course the students will be able to appreciate the anatomical and</li> </ul>



			physiological aspect of the human body and its role in radiation therapy,
<b>2.2</b>		Radiation Biology	<ul style="list-style-type: none"> <li>• This interdisciplinary course covers the role of radiation in altering the biology of cells and organs.</li> <li>• The students are taught about interaction of radiation with cells, biological effects of radiation, radiation carcinogenesis, quality assurance and safety in radiation delivery.</li> <li>• The students in the course will be able to interpret the changes to biological system when subjected to radiation treatment.</li> </ul>
<b>2.3</b>		Radiation Dosimetry and Standardization	<ul style="list-style-type: none"> <li>• This course covers the aspects involved in radiation dosimetry and standardization involved in the administration of radiation treatment</li> <li>• The topics covered include radiation quantities and units, radiation sources, dosimetry for X-ray, neutron, Co-60.</li> <li>• At the end of the course, the student will have an appreciation for all the standardization and measurement tools for radiation delivery.</li> </ul>
<b>2.4</b>		Radiation Detectors and Instrumentation	<ul style="list-style-type: none"> <li>• This course deals with the instruments and methods employed to detect radiation produced by radiation treatment instruments.</li> </ul>

			<ul style="list-style-type: none"> <li>• The students learn about principles of radiation detection, dosimetry instruments, radiation protection instruments, scintillation detectors and TLD badges.</li> <li>• Through this course, the student will be able to demonstrate the various detectors and instruments used for the production and monitoring of radiation.</li> </ul>
<b>2.5</b>		Applied Medical Imaging	<ul style="list-style-type: none"> <li>• The objective of this course is to provide information on the various imaging modalities involved in cancer treatment.</li> <li>• The topics covered include X-ray diagnosis, filters, production of X-ray, radiographic films, image quality of radiology.</li> </ul>
<b>3.1</b>	MSc Medical Physcs- III semester	External Beam Photon Therapy	<ul style="list-style-type: none"> <li>• Students in this course will be taught beam generators, beam modifiers, treatment planning, electron and particulate beam therapy, radiation beam quality and dose.</li> <li>• The outcome of this course is to impart knowledge to students in the area of external photon beam radiotherapy.</li> </ul>
<b>3.2</b>		Brachytherapy: Physical and Clinical Aspects	<ul style="list-style-type: none"> <li>• The aim of this course is to introduce the students to all the working aspect of brachytherapy.</li> <li>• The students learn about various types of</li> </ul>

			<p>brachytherapy, the equipment, latest advances and treatment plans for its implementation.</p> <ul style="list-style-type: none"> <li>• The student at the end of this course will demonstrate all the aspects involved in administration of brachytherapy treatment.</li> </ul>
<b>3.3</b>		Physics of Nuclear Medicine	<ul style="list-style-type: none"> <li>• The course teaches the students the role of radionucleotides in cancer therapy.</li> <li>• The topics covered include nuclear medicine, radioisotopes, radionuclide imaging, biological basis of radiotherapy, internal radiation dosimetry.</li> <li>• The student at the end of this course will be able to interpret all the necessary aspects related to nuclear medicine.</li> </ul>
<b>3.4</b>		Radiation Protection, Safety and Standards	<ul style="list-style-type: none"> <li>• The objective of this paper is to familiarize the students on the various tools available for radiation protection, safety and standards.</li> <li>• The topics covered include principles of radiation monitoring, safety devices, managing radioactive waste and radiation emergencies.</li> <li>• At the end of the course the student will be familiar with all the necessary radiation safety and standards required for successful administration of</li> </ul>

			radiation treatment.
<b>3.5</b>		Recent Advances in Radiotherapy	<ul style="list-style-type: none"> <li>• This is an advanced course that covers the latest development in the field of radiotherapy.</li> <li>• The students are taught the latest techniques used in the clinics for the treatment of cancer.</li> </ul>
<b>1.1</b>	MSc Medical Statistics- I semester	Fundamentals of Mathematics	<ul style="list-style-type: none"> <li>• The purpose of this course is to introduce the students to basics in mathematics as relevant to geoinformatics program</li> <li>• The students learn trigonometry, elementary mathematics, matrices, numeral methods and vector algebra</li> <li>• At the end of the course, the student is well versed in the necessary mathematics components to understand the field of geoinformatics</li> </ul>
<b>1.2</b>		Basic Medical Statistics	<ul style="list-style-type: none"> <li>• This introductory course gives an overview of medical statistics.</li> <li>• The area covered include types of measurement, quantitative aspects of medical decisions, sample survey methods, significance and methods of rank order.</li> <li>• By the end of the course, the students are able to appreciate the importance of statistics in research and prepares them for a career in research</li> </ul>
<b>1.3</b>		Statistical Epidemiology	<ul style="list-style-type: none"> <li>• The main objective of this course is to impart training in the application of statistics in epidemiology</li> <li>• The topics covered</li> </ul>

			<p>include probability, tools of epidemiology, measures of disease-exposure association, principles of measurements, infectious disease epidemiology</p> <ul style="list-style-type: none"> <li>• At the end of the course, the student will have a greater appreciation on the role of statistics in understanding epidemiology.</li> </ul>
<b>1.4</b>		Population and Health Data Management	<ul style="list-style-type: none"> <li>• The course highlights the importance of statistics in population and health data management.</li> <li>• The students are taught demography and measures of population, vital statistics, life table, population growth models and development statistics.</li> <li>• At the end of the course, the students will be able to demonstrate knowledge in the use of statistics in interpreting population and health data.</li> </ul>
		Statistical computing using Excel and SPSS	<ul style="list-style-type: none"> <li>• Students in this course study a wide variety of statistical and graphical techniques, including linear and nonlinear modeling, classical statistical tests, time-series analysis, and classification and clustering.</li> <li>• The course will impart training to students who seek to acquire and refine their skills relating to data analysis and</li> </ul>

			manipulation.
<b>2.1</b>	MSc Medical Statistics- II semester	Basics of Clinical Trial	<ul style="list-style-type: none"> <li>• The students in this course are introduced to the basics in designing experiments for clinical trials, alternative trial designs, designing studies of medical tests, addressing ethical issues and classification of clinical trials.</li> <li>• The student after completion of the course will be well versed in all aspects involved in the design, implementation and execution of a successful clinical trial.</li> </ul>
<b>2.2</b>		Linear Regression and Robustness	<ul style="list-style-type: none"> <li>• In this course students study linear regression, multiple regression, logistic regression, non-linear regression and robust regression.</li> <li>• By the end of the course the students will be able to demonstrate the role of regression in the identification and characterization of relationships among multiple factors in medical data.</li> </ul>
<b>2.3</b>		Documentation and Research Methodology	<ul style="list-style-type: none"> <li>• The outline of the course is to introduce the students to research methodology, precision and accuracy, cohort studies and quality control.</li> <li>• At the end of the course the students will be able to apply their learning to design experiments meeting the international guidelines</li> </ul>

2.4		Time Series and Spatial Statistics	<ul style="list-style-type: none"> <li>• Students in this course study the components of time series, stationary processes and spectral analysis.</li> <li>• Students upon completion of this course will be able to apply this knowledge in better designing clinical trial experiments.</li> </ul>
2.5		Statistical Model Using `R`	<ul style="list-style-type: none"> <li>• Students in this course study a wide variety of statistical and graphical techniques, including linear and nonlinear modeling, classical statistical tests, time-series analysis, and classification and clustering.</li> <li>• The course will impart training to students who seek to acquire and refine their skills relating to data analysis and manipulation.</li> </ul>
3.1	MSc Medical Statistics- III semester	Generalized Linear Models	<ul style="list-style-type: none"> <li>• The student in this course is taught linear regression, logistic regression and Poisson regression.</li> <li>• Student at the end of this course will be able to demonstrate the use of GLM in the analysis of multicenter clinical trials data.</li> </ul>
3.2		Multivariate Analysis	<ul style="list-style-type: none"> <li>• Students in this course learn principle component analysis, clustering, applications in test on mean vectors and MANOVA.</li> <li>• Outcome of this course is that it prepares the students to apply these</li> </ul>

			methodologies to actual real world data.
<b>3.3</b>		Survival Data Analysis	<ul style="list-style-type: none"> <li>• The course on survival data analysis focuses on time to event data. They learn techniques for positive-valued random variables.</li> <li>• Understanding of this course will prepare the students in interpreting clinical trial data involving survival statistics.</li> </ul>
<b>3.4</b>		Advanced Epidemiology	<ul style="list-style-type: none"> <li>• The aim of the course is to provide in-depth expertise in epidemiologic methods across different topics like infectious and chronic disease and for diverse population.</li> <li>• Students after successful completion of this course will be able to identify potential ethical problems in research studies and evaluate alternative approaches.</li> </ul>
<b>3.5</b>		Data analysis Using MATLAB	<ul style="list-style-type: none"> <li>• This course explores the use of the MATLAB software in data analysis.</li> <li>• The students in this course are taught graphics, descriptive statistics, linear algebra and lineal methods, modeling.</li> <li>• Upon successful completion of this course, the students will be able to demonstrate their skills in applying the MATLAB software to address a variety of biomedical problems that involve large volumes of data.</li> </ul>



1.1	MSc Nanoscience and Technology - I semester	Fundamentals of Molecular Biology	<ul style="list-style-type: none"> <li>• It deals with understanding the molecular aspects of the biology.</li> <li>• It majorly emphasizes the concepts of central dogma of molecular biology spanning from DNA Replication till Protein Synthesis and Reverse transcription.</li> <li>• It also helps in understanding the concepts of cellular function.</li> </ul>
1.2		Fundamentals of Nanotechnology	<ul style="list-style-type: none"> <li>• This is an interdisciplinary and emerging area</li> <li>• The students are taught the basics of nanotechnology and their applications</li> <li>• 3. The course introduces the students to the new and novel applications to solve biomedical problems through nanotechnology</li> </ul>
1.3		Fundamentals of Biochemistry and Biomolecules	<ul style="list-style-type: none"> <li>• This paper trains students to appreciate the salient features of biomolecules in the organization of life.</li> <li>• It spans over the significance and methodology involved in characterizing major biomolecules.</li> <li>• It helps the students in understanding the classification, functions and application aspects of biomolecules.</li> </ul>
1.4		Biochemical Techniques	<ul style="list-style-type: none"> <li>• The units of this paper are crucial for implementation of research ideas at molecular level.</li> </ul>

			<ul style="list-style-type: none"> <li>• It trains the students in adopting various techniques in biological research.</li> <li>• This significantly enhances the employability of the candidates in Biotechnological, Pharmaceutical Industries and Analytical Laboratories and research institutes.</li> </ul>
<b>1.5</b>		Statistical Methods for Biology	<ul style="list-style-type: none"> <li>• It provides an introduction to selected important topics in biostatistical concepts and reasoning.</li> <li>• This course represents an introduction to the field of data and data types.</li> <li>• The students learn specific topics including tools for describing central tendency and variability in data; methods for performing inference on population means and proportions via sample data; statistical hypothesis testing and its application to group comparisons; issues of power and sample size in study designs; and random sample and other study types.</li> </ul>
<b>2.1</b>	MSc Nanoscience and Technology - II semester	Properties of Nanomaterials	<ul style="list-style-type: none"> <li>• This paper introduces the students to the properties of nanomaterials.</li> <li>• The students study the optical, magnetic, mechanical, electronic and surface properties of nanomaterials.</li> </ul>

			<ul style="list-style-type: none"> <li>At the end of the course, the student will be able to appreciate the unique properties at the nanoscale.</li> </ul>
<b>2.2</b>		Synthesis and surface modification of nanomaterials	<ul style="list-style-type: none"> <li>This paper covers the various synthesis methods and surface modification methods used for nanoparticles.</li> <li>The topics covered include physical method, chemical method, biological method, surface modification, targeting strategies.</li> <li>By the end of the course, the students will have an excellent grasp on all the concepts involved in synthesis of nanoparticles and their surface modification.</li> </ul>
<b>2.3</b>		Cell and tissue culture technology	<ul style="list-style-type: none"> <li>The paper emphasizes the up-to-date technological aspects of Cell and tissue culture.</li> <li>It also covers the various methods of gene transfer technology.</li> <li>The paper helps to train students in biotechnological training to work at industrial level.</li> </ul>
<b>2.4</b>		Nanobiology and Nanosystems	<ul style="list-style-type: none"> <li>This introductory course explains the interaction of nano materials with biology.</li> <li>By the end of the course, the students, demonstrate the ability to understand the interaction of nanomaterials, biological membrane, DNA, and microbial surfaces.</li> </ul>
<b>2.5</b>		Cancer Biology	<ul style="list-style-type: none"> <li>It is an elective paper which deals with</li> </ul>

			<p>fundamentals required for understanding the cancer at molecular level.</p> <ul style="list-style-type: none"> <li>• It helps the students to appreciate the phases of cell cycle and mechanisms involved in apoptosis.</li> <li>• It helps students to learn the updated therapeutics of cancer as well.</li> </ul>
<b>3.1</b>	MSc Nanoscience and Technology - III semester	Nanotechnology Product Development	<ul style="list-style-type: none"> <li>• This course discusses the strategies needed for successful commercialization of nanoscale products.</li> <li>• The students learn about business development, capital generation for business, IP rights, Patent aspects and economics of product development.</li> <li>• At the end of the course, the student will be able to demonstrate a command on all aspects involved in commercialization of nanotechnology-based product.</li> </ul>
<b>3.2</b>		Pharmacokinetics and drug metabolism	<ul style="list-style-type: none"> <li>• This is an interdisciplinary course that covers the aspects involved in understanding the pharmacokinetics and drug metabolism involving nano-based drug delivery system.</li> <li>• The students learn about various pharmacokinetics parameters through mathematical models, design protocol for BA/BE study and its interpretation, design in-vitro dissolution studies for various drugs.</li> <li>• At the end of the course, the students will have the necessary knowledge in the area in pharmacokinetics.</li> </ul>

3.3		Nano drug delivery systems	<ul style="list-style-type: none"> <li>• This course covers all the aspects in the design of various drug delivery platforms for nano-based therapeutics.</li> <li>• The areas covered include oral, ocular, transdermal and mucoadhesive-based nano-drug delivery systems.</li> <li>• By the end of the course, the student will demonstrate the ability to design novel drug delivery system based on the application.</li> </ul>
3.4		Biomedical Applications of nanomaterials	<ul style="list-style-type: none"> <li>• The objective of this course is to provide the students with an insight into the various application of nanomaterials in the biomedical area.</li> <li>• The students learn about tissue engineering, in vitro diagnostics, in vivo imaging, localized drug delivery system and triggered drug release system.</li> <li>• The student at the end of the course will be able to demonstrate an appreciation on the use of nanomaterials for biomedical applications.</li> </ul>
3.5		Environmental Nanoscience	<ul style="list-style-type: none"> <li>• This course describes both the advantages and disadvantages of nano products to the environment.</li> <li>• By the end of the course, the students have an appreciation for the benefits of nanotechnology in improving the environment.</li> </ul>
1.1	MSc Nutrition and	Fundamentals of Food	<ul style="list-style-type: none"> <li>• The course imbibes an</li> </ul>

	Dietetics - I semester	Science	<p>understanding of the changes that occur in the components during food preparation whether natural or induced by handling procedures.</p> <ul style="list-style-type: none"> <li>• The students are made to understand the various Physical and chemical reactions occur during food preparation with the medium of cooking.</li> <li>• At the end, the students understand the nutritive value of different foods and methods of preserving them during cooking.</li> </ul>
<b>1.2</b>		Nutritional Biochemistry	<ul style="list-style-type: none"> <li>• The paper provides the structural and functional role of cell organelles and cell membrane at the biological level</li> <li>• Students will be exposed classification, biochemical and physical properties of macro nutrients, enzymes and nucleic acids.</li> <li>• It helps students to understand structural configuration of macro nutrients, enzymes and nucleic acids.</li> </ul>
<b>1.3</b>		Human Physiology	<ul style="list-style-type: none"> <li>• The paper covers the working of internal organ and system.</li> <li>• The students will be exposed to anatomy of different organs</li> <li>• Paper helps the students to understand the physiological functions of the biological systems</li> </ul>
<b>1.4</b>		Biochemical Techniques	<ul style="list-style-type: none"> <li>• The units of this paper are crucial for implementation of research ideas at molecular level.</li> <li>• It trains the students in adopting various</li> </ul>

			<p>techniques in biological research.</p> <ul style="list-style-type: none"> <li>• This significantly enhances the employability of the candidates in Biotechnological, Pharmaceutical Industries and Analytical Laboratories and research institutes.</li> </ul>
<b>1.5</b>		Statistical Methods for Biology	<ul style="list-style-type: none"> <li>• It provides an introduction to selected important topics in biostatistical concepts and reasoning.</li> <li>• This course represents an introduction to the field of data and data types.</li> <li>• The students learn specific topics including tools for describing central tendency and variability in data; methods for performing inference on population means and proportions via sample data; statistical hypothesis testing and its application to group comparisons; issues of power and sample size in study designs; and random sample and other study types.</li> </ul>
<b>2.1</b>	MSc Nutrition and Dietetics - II semester	Advanced Nutrition - 1	<ul style="list-style-type: none"> <li>• The students will understand the basic concepts of RDA for Indian population.</li> <li>• The paper helps to understand the Bioavailability, metabolism, functions, deficiency and toxicity of micro and macro</li> </ul>

			<p>minerals.</p> <ul style="list-style-type: none"> <li>The students will be exposed to different methods and techniques used for estimating the minerals in food and biological samples.</li> </ul>
<b>2.2</b>		Community Nutrition	<ul style="list-style-type: none"> <li>In the present scenario, society needs the awareness regarding their diet and also, people are becoming more nutrition conscious.</li> <li>Students will understand how the common man is gradually switching towards nutrition scientists and dietitians for scientifically proved information on Nutrition and Diet.</li> </ul>
<b>2.3</b>		Human Nutrition	<ul style="list-style-type: none"> <li>The paper helps students to understand the significance of various nutrients</li> <li>The paper covers the metabolism of all macronutrients</li> <li>Students will understand the effect of hypo and hyper effects of the nutrients</li> </ul>
<b>2.4</b>		Diet Therapy - 1	<ul style="list-style-type: none"> <li>The paper provides the knowledge regarding health benefits beyond the nutrient contribution when</li> <li>They are eaten on a regular basis in adequate amounts.</li> <li>By the end, The students understand that functional foods have positive effect on a person's health, physical performance or state of mind</li> </ul>
<b>2.5</b>		Nutraceuticals and Functional Foods	<ul style="list-style-type: none"> <li>Paper helps in understanding the role of</li> </ul>



			<p>nutrients in maintaining the health.</p> <ul style="list-style-type: none"> <li>• The student will be able to understand the functional role of phytochemicals as nutraceutical.</li> <li>• The paper will help students to understand the nutraceuticals and functional foods role in preventing non communicable diseases.</li> </ul>
<b>3.1</b>	MSc Nutrition and Dietetics - III semester	Life cycle Nutrition	<ul style="list-style-type: none"> <li>• The paper covers the importance of nutrients throughout the life cycle</li> <li>• Helps in understanding the nutrient recommendation during different stages of life</li> <li>• Helps understand the requirement of nutrients in special condition like pregnancy and lactation</li> </ul>
<b>3.2</b>		Medical Nutrition and Management	<ul style="list-style-type: none"> <li>• The paper covers the nutritional requirements during the diseases condition</li> <li>• Students will be exposed to diet counseling</li> <li>• Students will be taught menu/diet planning</li> </ul>
<b>3.3</b>		Diet Therapy - 2	<ul style="list-style-type: none"> <li>• The paper covers dietary counseling in non-communicable disease condition</li> <li>• Students will be exposed to diet counseling of communicable disease</li> <li>• Students will be taught menu/diet planning in communicable disease</li> </ul>
<b>3.4</b>		Advanced Nutrition - 2	<ul style="list-style-type: none"> <li>• The students will be exposed to dietary guidelines for Indians and</li> </ul>

			<p>basal metabolic rate</p> <ul style="list-style-type: none"> <li>• The paper helps to understand the Bioavailability, metabolism, functions, deficiency and toxicity of vitamins</li> <li>• The students will be exposed to different methods and techniques used for estimating the vitamins in food and biological samples</li> </ul>
<b>3.5</b>		Food Safety and Food Service Management	<ul style="list-style-type: none"> <li>• The students will be exposed to the food laws</li> <li>• The students will be kitchen planning and management</li> <li>• The students will be exposed to the food safety and management of food waste</li> </ul>
<b>1.1</b>	MSc Molecular Biology- I semester	Fundamentals of Molecular Biology	<ul style="list-style-type: none"> <li>• It deals with understanding the molecular aspects of the biology.</li> <li>• It majorly emphasizes the concepts of central dogma of molecular biology spanning from DNA Replication till Protein Synthesis and Reverse transcription.</li> <li>• It also helps in understanding the concepts of cellular function.</li> </ul>
<b>1.2</b>		Fundamentals of Nanotechnology	<ul style="list-style-type: none"> <li>• This is an interdisciplinary and emerging area</li> <li>• The students are taught the basics of nanotechnology and their applications</li> <li>• 3. The course introduces the students to</li> </ul>

			the new and novel applications to solve biomedical problems through nanotechnology
<b>1.3</b>		Fundamentals of Biochemistry and Biomolecules	<ul style="list-style-type: none"> <li>• This paper trains students to appreciate the salient features of biomolecules in the organization of life.</li> <li>• It spans over the significance and methodology involved in characterizing major biomolecules.</li> <li>• It helps the students in understanding the classification, functions and application aspects of biomolecules.</li> </ul>
<b>1.4</b>		Biochemical Techniques	<ul style="list-style-type: none"> <li>• The units of this paper are crucial for implementation of research ideas at molecular level.</li> <li>• It trains the students in adopting various techniques in biological research.</li> <li>• This significantly enhances the employability of the candidates in Biotechnological, Pharmaceutical Industries and Analytical Laboratories and research institutes.</li> </ul>
<b>1.5</b>		Statistical Methods for Biology	<ul style="list-style-type: none"> <li>• It provides an introduction to selected important topics in biostatistical concepts and reasoning.</li> <li>• This course represents an introduction to the field of data and data types.</li> </ul>

			<ul style="list-style-type: none"> <li>The students learn specific topics including tools for describing central tendency and variability in data; methods for performing inference on population means and proportions via sample data; statistical hypothesis testing and its application to group comparisons; issues of power and sample size in study designs; and random sample and other study types.</li> </ul>
<b>2.1</b>	MSc Molecular Biology- II semester	Cell and tissue culture technology	<ul style="list-style-type: none"> <li>The paper emphasizes the up-to-date technological aspects of Cell and tissue culture.</li> <li>It also covers the various methods of gene transfer technology.</li> <li>The paper helps to train students in biotechnological training to work at industrial level.</li> </ul>
<b>2.2</b>		Genetics	<ul style="list-style-type: none"> <li>The paper helps in highlighting the scope and significance of genetics by imbibing the principles of hereditary genetic transmission and interactions of gene with environment.</li> <li>It also helps students to learn the molecular aspects of genetics disorders and mutations.</li> <li>It helps the students to appreciate the concepts of gene and relationship between genotype and phenotype.</li> </ul>
<b>2.3</b>		Human Physiology and	<ul style="list-style-type: none"> <li>This course teaches the</li> </ul>

		Anatomy	<p>basic anatomy and physiology of human body.</p> <ul style="list-style-type: none"> <li>• The students are taught the functioning aspects of the human body at molecular level.</li> <li>• At the end of this course the students will be able to appreciate the anatomical and physiological aspects of the human body.</li> </ul>
<b>2.4</b>		Immunology	<ul style="list-style-type: none"> <li>• This course provides you with knowledge and understanding of immunology and the way it is applied in diagnostic and therapeutic techniques and research.</li> <li>• It trains the students with essentiality of molecules, cells, tissues, and organs involved in the defense mechanism.</li> <li>• It's a paper which accomplishes the learning of techniques involved in understanding the immunological aspects of physiology and biological samples.</li> </ul>
<b>2.5</b>		Cancer Biology	<ul style="list-style-type: none"> <li>• It is an elective paper which deals with fundamentals required for understanding the cancer at molecular level.</li> <li>• It helps the students to appreciate the phases of cell cycle and mechanisms involved in apoptosis.</li> <li>• It helps students to learn the updated therapeutics of cancer as well.</li> </ul>
<b>3.1</b>	MSc Molecular	Molecular Cell Signaling	<ul style="list-style-type: none"> <li>• This paper introduces the</li> </ul>

	Biology- III semester		<p>concept of cell signaling at molecular level.</p> <ul style="list-style-type: none"> <li>• The students learn about signaling in microbes, animal system, and their pathways</li> <li>• By the end of the course, the student has a better appreciation for the role of cell signaling in diagnostics and therapeutic applications.</li> </ul>
<b>3.2</b>		Genetic Engineering	<ul style="list-style-type: none"> <li>• This course is an amalgamation of principles of engineering with genetics.</li> <li>• The students learn techniques in separation, gene construction, and gene therapy.</li> <li>• By the end of the course, the student would be able to demonstrate the role of genetic engineering in gene therapy and its applications in agriculture and medicine.</li> </ul>
<b>3.3</b>		Vaccine Development	<ul style="list-style-type: none"> <li>• This course enables the students to understand the importance of vaccine development in disease control.</li> <li>• The students learn the basics of vaccinology, molecular immunology, antigen delivery system, adjuvants and regulatory aspects in vaccine production.</li> <li>• The outcome of the course is to inculcate the importance of molecular biology in understanding vaccines and their development.</li> </ul>
<b>3.4</b>		Applied Microbiology	<ul style="list-style-type: none"> <li>• This fundamental paper</li> </ul>

			<p>discusses the importance of applications of microorganisms</p> <ul style="list-style-type: none"> <li>• The course throws light on types of microorganisms in cosmetic products</li> <li>• At the end of the course, the student has understanding on the concept of culturing microbes, sterilization techniques and estimating the number of microbes in a given sample of cosmetic product.</li> </ul>
<b>3.5</b>		Proteomics	<ul style="list-style-type: none"> <li>• This paper introduces to the basic biology of proteins and the new advanced science called as proteomics which aims to look into entire set of proteins in the milieu.</li> <li>• The paper will cover details of the two major aspects of proteomics i.e., Gel-based proteomics and Mass spectrometry-based proteomics.</li> <li>• The techniques involved at large in major contribution in transition from protein chemistry to proteomics are learnt.</li> </ul>