Vision

DAVV

Emerge as a premier higher learning institution by creating, advancing and disseminating knowledge with collective wisdom, through value imbued holistic education for peaceful, sustainable and humane society.

SBT

To achieve excellence in teaching and research to address some of the most challenging questions in advance biological sciences for the well-being of humankind, to inculcate entrepreneurial wisdom and values amongst learners.

Mission

DAVV

Educating and empowering the learners to realize their potential through righteous blending of knowledge, skills, and values for serving the society.

SBT

- To produce world class, knowledgeable professionals with excellent analytical mind, communication skills, team building spirit and ability to work in a cross cultural environment.
- To develop research aptitude in young students to improve their ability to think logistically and to solve the problems in every aspect of life.
- To inculcate professional ethics and social sensitivity among the students to serve the society.

The University strives to realize its vision and mission by:

- Facilitating learner centric multidisciplinary course curriculum, pedagogy and resources through technology enabled joyful and diverse learning environment.
- Achieving excellence for world class competencies in teaching, research and extension.
- Promoting multidisciplinary research and scholarship.
- Providing demand driven educational programmes for enhancing skills and employability.

- Emphasizing value guided competencies among learners for developing socially responsible professionals and leaders.
- Evolving educational processes to ensure balance between head, heart and hand for holistic personality development.
- Exploring global opportunities for stakeholders through international collaboration.
- Nurturing a culture of pride, ownership and belongingness for attracting and retaining human resources.
- Promoting autonomy with accountability through participatory, transparent and value-based governance.
- Adapting environment friendly and energy efficient best practices for sustainable development.
- Addressing issues and priorities for empowering local community with a global perspective.

SBT

- To generate skilled and intellectual human resource in Science and Technology and to develop a state of the art facilities to conduct experimentation to meet global standards.
- To provide specialized high quality education by integrating traditional and modern scientific techniques in teaching-learning processes.
- To explore new frontiers and improve quality, talent and skills of students through practical training in real world settings.
- To develop national and international academic collaborations to address local and global research problems.

Programme Objectives (POs)

M.Sc. Bioinformatics students will be able to:

PO1: Discover the cutting-edge and dynamic field of bioinformatics through a multidisciplinary approach.

PO2: Acquire solid subject knowledge and laboratory skills in the field of bioinformatics to work in both computer and experimental labs.

PO3: Possess all-round competence in IT technology, information gathering and synthesis.

PO4: Develop research aptitude, critical thinking, efficient oral and written communication skills, and teamwork spirit.

PO5: Address current biological problems with more innovative and sustainable solutions.

PO6: Gain understanding of professionalism, ethical principles, norms of IPR, environmental awareness and IAEC practices.

Programme Education Objectives (PEOs)

We believe that after completing M.Sc. Bioinformatics programme, our students will become:

PEO1: Skilled bioinformatics professionals who have life science background and who are simultaneously proficient in computational aspects.

PEO2: Professionals having knowledge of basic novel strategies implemented through machine learning and artificial intelligence, and understanding their applications in bioinformatics and allied domains.

PEO3: Graduates with extraordinary capacity to gain practical knowledge and a strong desire to pursue a successful career in academia, R&D institutes, and private sector.

PEO4: Graduates with extensive experience comparing and analyzing the best programming language, database and software to support and implement the most important biological challenges.

PEO5: Graduates with the ability to advance rigorous bioinformatics research and assist experimental scientists with biological hypothesis and mechanism development.

PEO6: Graduates who can meet the growing demand for highly qualified computer specialists to maintain, evaluate, and contribute worldwide to big data and biological resource management.

Programme Specific Objectives (PSOs)

PSO1: Students will gain ability to analyze the software for data studies and comparisons and to provide tools for modeling, visualizing, exploring and interpreting data.

PSO2: Students will be able to convert multitude of complex data into useful information and knowledge to answer questions relevant to biologists.

PSO3: Graduates will not only excel in programming languages but will also have knowledge of proteomics, genomics, cell and molecular biology, genetic engineering, biochemical pathways etc., relevant to the industrial application purposes.

PSO4: Graduates will be able to justify societal health, safety and legal issues and to understand their responsibilities in research practices.

PSO5: Graduates will be able to understand the need and impact of research solutions on environment and societal context keeping in view need for sustainable solution.

PSO6: Students will be having excellent oral and written communication skills.

PSO7: Students will have enhanced skills and attitude for becoming a better learner, thinker, professional and a human being.

Course Objectives (COs)

SEMESTER – I

BT BI 501: Basic Mathematics

CO1: To have detailed understanding to formulate problems in the language of sets and carry out set operations.
CO2: To apply the knowledge of vector analysis and limits and continuity in analyzing large data sets.
CO3: To apply the knowledge of probability in prediction problems.
CO4: To utilize differentiation and integration in the field of bioinformatics.

BT BI 511: Computer fundamentals and Biostatistics

CO1: To make students able to interpret and utilize bioinformatics data, information resources, and make efficient use of the software from large databases.
CO2: To develop understanding about the common statistical terminology and techniques and their applications in biology.
CO3: To develop understanding of the principal numeric and graphical techniques to demonstrate and summarize biological data.

CO4: To prepare students to utilize and understand biological databases to gather, store, retrieve, manage, analyze and integrate biological data to understand the concept of genomic sequences and evolution.
CO5: To familiarize the students with theory and mathematical calculation used in online/offline tools or technique in structural biology for diagnostic therapeutic applications.
CO6: To equip students for analytical and problem-solving skills to develop new algorithms and tools to address a range of biological questions.

BT BI 521: Bio-molecules

CO1: To provide the insights of the macromolecules involved in the structure and function of a cell.
CO2: To apply the knowledge of metabolic pathways in production of commercially important products.
CO3: To apply the knowledge of metabolic pathways to solve physiological and molecular aspects.

BT BI 531: Cell and Developmental Biology

CO1: To have detailed understanding of various processes including cell division, signal transduction pathways and regulation of overall structure and function of the cells.
CO2: To know about the developmental processes at molecular level in model organisms.
CO3: To apply the knowledge in knockout and knocking in of the genes and understanding of the polygenic diseases.

BT BI 541: Programming in C/C++

CO1: To train the students in writing programs in C- language and introducing them to the ideas of object-oriented language through C++.
CO2: To provide the students the ability to construct and conceptualize flow and logic for the execution of a computational task.
CO3: To develop expertise in writing codes using the structured programming approach of C & C++ programming language.
CO4: To develop and implement programs to analyze biological data.

BT BI 551: Molecular Biology

CO1: To enable students to comprehend the structure and function of nucleotides and the basics of genome organization.
CO2: To provide detailed understanding of the DNA replication, transcription, translation, protein folding and sorting as well as their regulation, respectively.

CO3: To develop understanding that how errors in the above mentioned processes can cause several problems in living systems and how we can develop some tactics to reverse them.
CO4: To inculcate understanding of the mechanism of RNA editing to regulate gene expression and how the genes are mapped in the genome.
CO5: To apply the knowledge of molecular biology in various fields of plant and animal sciences.

SEMESTER – II

BT BI 502: Biological Databases and Data Analysis (Bioinformatics-I)

CO1: To provide an overview of the most widely used bioinformatics databases and their applications.
CO2: To give an overview of methods of sequence analysis and their applications in the field of bioinformatics.
CO3: To prepare students to integrate biological data to understand the concept of genomic sequence comparison and genomic evolutionary analyses.
CO4: To equip students for analytical and problem-solving skills to develop new algorithms and tools to address a range of biological questions.

BT BI 512: Recombinant DNA Technology

CO1: This is advance course to develop understanding of tools, tactics and designs through which engineered organisms can be developed for human welfare.
CO2: This paper deals with the structural and informational molecules and their role in information transfer.
CO3: Students will learn of the basics of nucleic acid structure and function, mechanisms and molecules governing processes of replication and the advancement in the field will be discussed
CO4: To give an account on how and what processes are involved in decoding information from DNA to RNA or proteins in both prokaryotes and eukaryotes.

BT BI 522: Design and Analysis of algorithms

CO1: To comprehend the concept of an algorithm that will be applied through various methods and to be aware of the asymptotic performance of algorithms.
CO2: To understand the mathematical aspects and analysis of algorithms using different kinds of data structures.

CO3: To provide a description of how sorting and searching algorithms work and their in depth analysis.
CO4: Students will learn different algorithmic technique along with algorithm design methods.

BT BI 532: Internet & Web Based Programming (CGI PERL & HTML)

CO1: To introduce the fundamentals of internet and Perl programming language to the students.
CO2: To familiarize with Hyper Text Markup Language (HTML) and Perl modules.
CO3: To write scripts for manipulating and processing genomics and proteomics data.
CO4: Students will be able to use a Perl module toolkit for a range of bioinformatics applications.

BT BI 542: Immunoinformatics

CO1: To provide knowledge of the mechanisms of immunity and the role of various immune cells in normal maintenance of immunity and alterations that cause different disorders.
CO2: To be able to distinguish various cell types involved in immune responses and associated functions.
CO3: To provide students with knowledge on how the immune system works building on their previous knowledge from biochemistry, genetics, cell biology and microbiology.
CO4: To be able to provide an overview of the interaction between the immune system and pathogens.
CO5: To provide a detailed account of vaccines and their development for various applications.

BT BI 552: Genomics & Proteomics

CO1: To provide details of various high throughput technologies used for gene expression, genome sequencing, genome editing, and protein isolation, purification and characterization strategies.
CO2: To describe the development of Omics technologies, with emphasis on genomics and proteomics.
CO3: Be able to describe advanced genomics and proteomics technologies and the ways in which their data are stored.
CO4: Be able to describe the different types of genome variation and their relationship to human diseases.
CO5: Be able to discuss how biological systems information relating to genes, proteins and cellular structures can be used to model living cells, and even to create new synthetic cells.
CO6: It is completely application based subject in the domain of drug development, crop development, development of diagnostic and prognostic markers; marker assisted breeding, crop development etc.

BT BI 582a: Seminars

CO1: It develops logistic thinking, creative art and articulation which are the basic components to become a good scientist.
CO2: This session enhance scientific skills in all the above mentioned domains through preparation and delivery of presentations and by writing SOPs and research projects.

SEMESTER – III

BT BI 601: Machine Learning Techniques & CADD (Bioinformatics II)

CO1: To provide the basic knowledge of machine learning and how it functions.
CO2: Students will be able to manage the enormous heterogeneous biological data sets with the use of various machine learning techniques and algorithms.
CO3: To become familiar with theoretical ideas in computer-aided drug design and molecular docking.
CO4: To apply the use of several bioinformatics tools in computational drug discovery methodologies.

BT BI 611: Structural Biology and Bioinformatics (Bioinformatics III)

CO1: To recognize the significance of structural studies in the field of bioinformatics.
CO2: To understand about the forces that determines the structure of biological macromolecules.
CO3: To understand the concept of potential energy surface and its types.
CO4: To be able to understand the computational methods of RNA structure analysis and its applications in functional genomics and evolutionary biology.

BT BI 621: Database management System

CO1: To understand database concepts and data manipulation queries.
CO2: Students will be able to write database queries to analyze the data.
CO3: To recognize the significance and components of database management systems.
CO4: To develop the concept of transaction management and database system architectures.

BT BI 631: Java Programming

CO1: To understand and implement the concept of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.

CO2: To be able to write Java programs to utilize the java applet code and graphics programming and their applications in the field of bioinformatics.
CO3: To create software tools and distributed packages for different kinds of sequence analysis and manipulation.
CO4: To illustrate the concepts of errors, file handling using multithreaded programming to solve specified problems.

BT BI 651: Pharmacogenomics

CO1: This course will provide the techniques and strategies to reduce the drug attrition rate from clinical trials.
CO2: Also focuses on pharmacokinetics, dynamics, drug efficacy & safety concerns.
CO3: It has high employability components in clinical trials and pharmaceutical industries.

BT BI 661: Microscopic Techniques For Image Processing

CO1: To impart knowledge on instrumentation and sample handling methods for various microscopic techniques.
CO2: Students will be theoretically proficient in using a variety of microscopic imaging techniques for varying biological samples.
CO3: Students will understand the workflow of image processing and image analysis by computer.
CO4: To understand the basics of confocal microscopy, sample preparation, confocal optics, and resolution.

BT BI 681a: Seminar

CO1: It develops logistic thinking, creative art and articulation which are the basic components to become a good scientist.
CO2: This session enhance scientific skills in all the above mentioned domains through preparation and delivery of presentations and by writing SOPs and research projects.

SEMESTER – IV

BT BI 602: Project Work

CO1: To teach students how to organize concepts, materials and objectives for their dissertation, to start building their communication abilities, and to get ready to present their research topic.

CO2: To help students become acclimated to the research settings and comprehend how projects are carried out in a laboratory.
CO3: Students will gain experience in planning projects, conducting independent research, and writing research papers and reviews.
CO4: Additionally, it will teach students the craft of analysis and thesis writing and allow them to learn about the practical side of research.