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. Genetic Engineering students will be able to:

PO1: Apply their biotechnology knowledge to solve real world problems.

PO2: To identify and define important research questions and can plan and conduct research on their own.

PO3: Find innovative solutions for the public health, food security, climate change and pollution.

PO4: Analyze and interpret data by using statistical and bioinformatics tools.

PO5: Commit professional ethics and responsibilities and norms of IPR, biosafety, environmental awareness and IAEC practices.

PO6: Work in the area of regenerative medicine, tissue engineering, pharmacogenomics, functional genomics and proteomics, and agricultural biotechnology.

Programme Education Objectives (PEOs)

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

PEO1: Socially responsible biotechnologists who can cater the diversified research need of local and global perspectives.

PEO2: Knowledgeable teachers with academic excellence, and world class professionals who can serve government as well as corporate R&Ds in biotechnology and biopharma sectors.

PEO3: Entrepreneurs who are able to meet the local and global demands of products, procedures, technology and logistics.

PEO4: Ambassador of peace and concerned for society and environment.

PEO5: Professionally skilled having skill-set applicable to biotechnological research in the field of disease biology, Proteomics, Genomics, etc.

Programme Specific Objectives (PSOs)

PSO1: Students will gain and will be able to apply knowledge of Biotechnology comprised of science and engineering components to solve problems related to field of biotechnology.

PSO2: Students will be able to design, perform experiments, analyze and interpret data for investigating complex problems in the area of biotechnology.

PSO3: Graduates will be able to decide and apply appropriate tools and techniques in biotechnological manipulation in biological systems.

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

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

PSO6: Graduates will be able to undertake any responsibility as an individual and as a team in a multidisciplinary / cross cultural environment.

PSO7: Students will be having excellent oral and written communication skills.

Course Objectives (COs)

SEMESTER – I

BT GE 501: Biomolecules

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 GE 511: Cell & 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 GE 521: 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.

BT GE 531: Analytical Techniques

CO1: To enable the students to acquaint with basic principle, instrumentation, procedure, and applications of various classical as well as sophisticated biochemical techniques.
CO2: To develop competence in various chromatographic and electrophoresis techniques and apply them in isolating and characterizing different biological molecules.
CO3: To provide information on fundamental laws relating to photochemistry and applications of UV-visible, fluorescence and IR spectrophotometry in analytical determination and characterization of biomolecules.
CO4: To apply the principles of microscopy and radiochemistry to understand cell structure and metabolic functions.
CO5: To expose students to various separation techniques and their applications in isolation of different biological molecules.
CO6: To develop a range of generic skills that are relevant to wage employment, self-employment, and entrepreneurship.

BT GE 541: Computer Applications in Biology & Bio-statistics

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 techniques in structural biology for diagnostic therapeutic application.
CO6: To equip students for analytical and problem-solving skills to develop new algorithms and tools to address a range of biological questions.

SEMESTER – II

BT GE 502: Immunology

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 GE 512: Genetics

CO1: This course deals with the concepts of inheritance and its relation with generic defects and genetic counseling.
CO2: To provide a comprehensive notion about the dynamic nature of chromosome and its influence in regulating cellular functioning and organism as whole.
CO3: To develop a holistic concept about genome organization, various gene mapping strategies and the genetic elements present in genome.
CO4: To apply the knowledge of genetics in the prevention and cure of various diseases, improvements in the crops etc.

BT GE 532: 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 GE 542: Environmental Biotechnology

CO1: This course addresses the issues of environmental changes, pollution and talk about the biotechnological solutions.
CO2: To make students aware of the types and source of pollution.
CO3: To identify the toxic chemicals and their biochemical aspects in environment, their mode of entry and carcinogenicity.
CO4: To explain biogeochemical factor in environmental health.
CO5: To make students aware of uses and preparation of biopesticides, biofertilizers, etc.
CO6: Students will be able to find novel solutions for the climate change and pollution.

BT GE 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 GE 562: Protein Engineering

CO1: To develop the understanding of the protein structure, sequence and their molecular evolution to apply the gathered knowledge in the field of biology.
CO2: Students will obtain competence in analyzing and predicting how the 3D structure of a protein is related to its specific function; and to evaluate how specific proteins should be produced, purified, analyzed, and utilized for vaccine and drug development.
CO3: To make students understand various aspects of detecting, analyzing and managing Genetically Modified Organisms (GMOs) and their derived products in agriculture and food systems.
CO4: Case studies will enable students to understand the applications of theoretical concepts, information gathering and analysis, and develop group work and problem solving abilities.

BT GE 572: Cancer Genetics

CO1: It intensely focuses on the molecular mechanisms of the development and progression of various cancers.
CO2: Overview of cancer biology and clinical oncology, breast cancer syndromes, management of high risk patients, cancer risk assessment models and tools.
CO3: It also provides knowledge to apply for cancer prevention and development of novel treatment modalities.

BT GE 582a: Seminar/ Research Skill Development

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 GE 611: Bioprocess Technology

CO1: Knowledge of industrial applications of biotechnology and tactics to convert lab scale to industry scale production of commercially important products.
CO2: To understand the bioprocess engineering, basic techniques, methods, functions and industrial products.
CO3: To know the different microorganisms and their products (enzymes, polymers, metabolites, etc.) that are used in the biotech industry.

BT GE 621: Agriculture Biotechnology

CO1: This course provides understanding of the tools and techniques of biotechnology to develop genetically engineered or genetically modified plants for agronomic purposes.
CO2: Become familiar with sterile techniques, media preparation, DNA extraction methods, gene isolation and nucleotide sequence analysis.
CO3: Acquaint with principles, technical requirement, scientific and commercial applications in plant biotechnology.
CO4: Support methodologies in plant tissue/cell culture to plant improvement, as well as DNA handling with PCR-based detection diagnostic tools.

CO5: Become motivated to set goals towards pursuing higher level positions, such as lab manager and key scientist in plant biotechnological research institutes and industries.

BT GE 631: Microbial & Enzyme Technology: Industrial Applications

CO1: It develops skills among students so that they can grow different type of microbes for the production of various commercially important products.
CO2: To show the main microbial processes, methods, cultivation, preservation, metabolism and synthesis activity.
CO3: To explain about the microorganisms.
CO4: This course also provides the approaches to convert lab scale production to the industrial scale by using microbes.

BT GE 641: Biosafety, Bioethics and IPR

CO1: Gain Knowledge of working principles in a laboratory taking all safety measures, handling of live cultures, disposal of infectious waste, care of the equipment requiring safety audit.
CO2: Get an insight into biosafety and IPR guidelines.
CO3: Analyse and manage the risks involved with GMOs.
CO4: Understand the International Agreements and Regulations with respect to biosafety.
CO5: Understand guidelines to protect biological inventions.
CO6: Understand the process of filing a patent.
CO7: This course is to develop professional ethics and social responsibilities among students of biotechnology.

BT GE 651: Animal Tissue Culture

CO1: Students will gain a basic working knowledge of concepts and techniques necessary for animal tissue culture.
CO2: It will give students an overview of the latest developments in animal cell culture and various technical applications including cell line and stem cells.
CO3: Students will learn about the concept of new gene transfer in animal cell culture techniques and associated medical implications.
CO4: Students will have strengthened biomedical research from basic research to the modern drug discovery.

BT GE 661: 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, and drug efficacy & safety concerns.

CO3: It has high employability components in clinical trials and pharmaceutical industries.

BT GE 671: Stem Cell Biology

CO1: This course will provide the detailed knowledge of stem cell formation, techniques and tools of stem cell development and differentiation.
CO2: It also skill students to apply this knowledge in the development of regenerative medicines, umbilical cord banking etc.
CO3: It has high employability component.

BT GE 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.

Training of writing SOP/Application for Jobs/Ph.D.

CO1: Students will learn to write SOPs to effectively communicate their career goals and to prove their motivation for joining a specific program.
CO2: It will enable students to apply properly for various biotechnological jobs.
CO3: Students will develop the skills to explore the research areas of their interest and join the relevant Ph.D. program.

SEMESTER – IV

BT GE 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.