

# INSTITUTE OF GENETIC ENGINEERING

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## Programme Specific Outcomes (PSOs): Biotechnology

**PSO1:** Postgraduate students will be able to demonstrate and apply their knowledge of cell biology, biochemistry, microbiology and molecular biology to solve the problems related to the field of biotechnology.

**PSO2:** Postgraduate students will be able to demonstrate and apply the principles of bioprocess engineering in the design, analysis, optimization and simulation of bioprocess operations.

**PSO3:** Students will be able to gain fundamental knowledge in animal and plant biotechnology and their applications.

**PSO4:** Students will be equipped to understand three fundamental aspects in biological phenomenon: a) what to seek; b) how to seek; c) why to seek?

**PSO5:** Student will be able to (a) Describe fundamental molecular principles of genetics; (b) Understand relationship between phenotype and genotype in human genetic traits; (c) Describe the basics of genetic mapping; (d) Understand how gene expression is regulated.

**PSO6:** Students will be able to (a) To elaborate concepts of biochemistry with easy to run experiments; (b) To familiarize with basic laboratory instruments and understand the principle of measurements using those instruments with experiments in biochemistry.

**PSO7** Students will be able to understand various facets of molecular procedures and basics of genomics, proteomics and metabolomics that could be employed in early diagnosis and prognosis of human diseases.

## Programme Specific Outcomes (PSOs): Genetics

- Comprehensive, detailed understanding of the chemical basis of heredity
- Comprehensive and detailed understanding of genetic methodology and how quantification of heritable traits in families and populations provides insight into cellular and molecular mechanisms.
- Understanding of how genetic concepts affect broad societal issues including health and disease, food and natural resources, environmental sustainability, etc.
- Understanding the role of genetic mechanisms in evolution.
- The knowledge required to to design, execute, and analyze the results of genetic experimentation in animal and plant model systems.

- The ability to recognize the experimental rationale of genetic studies as they are described in peer-reviewed research articles and grant proposals to federal and other funding agencies.
- The ability to evaluate conclusions that are based on genetic data.
- Insight into the mathematical, statistical, and computational basis of genetic analyses that use genome-scale data sets in systems biology settings.
- Understanding the role of genetic technologies in industries related to biotechnology, pharmaceuticals, energy, and other fields.
- Communication skills required in the discipline including oral presentations of research data, published research articles, grant proposals, and poster presentations at conferences.
- Teamwork and leadership skills including group analysis of data, working together in the research laboratory, joint compositions of written reports, substantive participation in research group meetings, etc.

### **Programme Specific Outcomes (PSOs): Microbiology**

- The course is emphasized on morphology, physiology and function of microorganisms in addition to several subjects including biochemistry, cell biology, immunology, virology, molecular biology and recombinant DNA technology.
- On successful completion of graduation, the students will gain insight of microbiology starting from history, basic laboratory techniques and fundamental knowledge about the microorganisms.
- They will acquire the skill in the use and care of basic microbiological equipment; performance of basic laboratory procedures in microbiology; proper collection and forwarding of microbiological and parasitological specimens to the laboratory.
- They will be well-informative about the integral role of microorganisms associated with specific disease, vital role of microorganisms in biotechnology, fermentation, medicine, and other industries important to human well being.
- The skill enhancement elective course is designed to provide students with an opportunity to gain hands on experience in state-of-the-art laboratory equipments that could enrich them to perform high throughput research on microorganisms and execute diagnostic procedures required in food, dairy and pharmaceutical industries.
- This course will also help them to comprehend and write effective project reports in multidisciplinary environment. It will also help to the development of sound attitudes in relation to the role of medical microbiology in clinical and community medicine.

### **Course Objective and Learning Outcome of**

**B. Sc Biotechnology**

**B. Sc Genetics**

**B. Sc Microbiology**

**B. Sc Genetics**

<b>Course Name</b>	<b>Course Code</b>	<b>Course Objective</b>	<b>Learning Outcome</b>
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Biochemistry and metabolism	CBT-101, CGN-101, CMc-101, CMB-101	To acquaint students with Concepts of Biochemistry and metabolism	To impart basic knowledge about the structure, function and metabolism of carbohydrate, lipid, amino acid, protein and nucleic acid
Cell biology	CBT-102, CGN-102, CMc-102, CMB-102	To acquaint students with basic Concepts of cell structure and function	To impart basic knowledge about the basic components of prokaryotic and eukaryotic cells, cell cycle and cell death
General Microbiology	CBT-201, CMB-201	To acquaint students with basics of microbiology	To impart basic knowledge about the classification and growth and maintenance of microorganisms as well as the basic concept of sterilization.
Principle of Transmission genetics	CGN-201	To acquaint students with Basic Concepts of genetics and inheritance	To impart basic knowledge about inheritance, Mendelian and Non-Mendelian, Chromosomal variation in Number and structure, mapping and pedigree analysis
Chemistry-I	CBT-202, CGN-202, CMB-202	To acquaint students with basics of chemistry	To impart basic knowledge about atomic structure, chemical bonding organic, inorganic and other related concepts.
Plant and mammalian physiology	CBT-203	To acquaint students with Concepts of basic physiology of plant and mammalian systems.	To impart knowledge about the basic physiological mechanisms of both plants and mammalian systems as well as overview of growth and development.
Population and evolutionary biology	CGN-203	To acquaint students with Basic Concepts of population and Evolutionary genetics	To impart basic knowledge about Allele frequencies, polymorphism, Genetic Equilibrium, Application of Hardy –Weinberg theory and theories of evolution

Genetics	CBT-301	To acquaint students with Basic Concepts of Pro- and Eukaryotic Genetics	To impart basic knowledge about Prokaryotic Genomes, Mechanism of genetic exchange, Transcriptional regulation in prokaryotes, , Genome Organization Fine structure of the Gene, Uniques genetic features of plant, genes controlling flower development in plants, genome organization and Function, Cis-acting elements and Trans-acting factors, Chromosomal variation in Number & Structure, Human Cyto-Genetics
Pro- and Eukaryotic Genetics	CGN-301, CMB-301	To acquaint students with Basic Concepts of Pro- and Eukaryotic Genetics	To impart basic knowledge about Prokaryotic Genomes, Mechanism of genetic exchange, Transcriptional regulation in prokaryotes, , Genome Organization Fine structure of the Gene, Uniques genetic features of plant, genes controlling flower development in plants, genome organization and Function, Cis-acting elements and Trans-acting factors, Chromosomal variation in Number & Structure, Human Cyto-Genetics
Chemistry-II	CBT-302, CGN-302, CMB-302	To acquaint students with basics knowledges of chemistry	To impart basic knowledge about the chemical analysis, interhalogen and Organometallic Compounds and thermodynamics.
Molecular Biology	CBT-303, CGN-303, CMc-303, CMB-303	To acquaint students with the concepts of molecular biology	To impart basic knowledge about DNA structure, replication, Transcription and DNA damage and repair as well as regulation and gene expression
Immunology	CBT-401, CGN-401, CMc-401, CMB-401	To acquaint students with basic concepts of immunology	To impart basic knowledge and history of the concepts of immunity, immunological techniques and different aspects.

Bioanalytical Tools	CBT-402, CGN-402, CMc-402, CMB-402	To acquaint students with different essential bio-analytical tools	To impart basic knowledge about the bio-analytical tools and principles of centrifugation , microscopy, spectroscopy , chromatography and other different tools.
Bioprocess Technology	CBT-501	To acquaint students with basics of Bioprocess Technology	To impart the knowledge about the range and basic principle components of fermentation and bio-processing technology, designs of bioprocess vessels and different essential factors.
Model Organisms in Human Genome Project	CGN-501, CMB-501	To acquaint students with different model organisms and basics of Human genome project	To impart basic knowledge about basic knowledge about genome and model organisms as well as their relation with human genome project and related technologies
Recombinant DNA Technology	CBT-502, CGN-502, CMB-502, CMc-501	To acquaint students with basics of Recombinant DNA Technology	To impart the knowledge about different molecular tools and application , mutagenesis, genetic engineering in animals and plants.
Genomics, Proteomics and Bioinformatics	CBT-601, CGN-601, CMB-601, CMc-601	To acquaint students with the concepts of Genomics, Proteomics and bioinformatics	To impart the knowledge about genomics, managing and distributing genome data, introduction to proteomics and Bioinformatics, Data Generation , Data Retrieval, Sequence Alignment and Pattern recognition
IPR, Biosafety and ethical issues	CBT-602, CGN-602, CMB-602	To acquaint students with the concepts of Intellectual property rights, Biosafety and ethical issues	To introduce basic concepts of ethics and safety that are essential for various branches of science involving technical procedures and protection of intellectual property and related rights.

### Program Outcomes of B. Sc Medical Lab Technology

**PO1- Medical Laboratory Knowledge:** Apply the knowledge of clinical haematology, pathology, histopathology, clinical biochemistry, clinical enzymology, clinical immunology, clinical microbiology, clinical endocrinology & toxicology, diagnostic molecular biology and other medical lab technology specialisations to the solution of complex disease diagnosis.

**PO2- Design/Development of Solutions:** Identify, formulate, review and research design solutions for complex medical diagnostic problems and design medical experimental components or processes to meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal and environmental considerations.

**PO3- Medical Laboratory Professional and Society:** Create, select and apply techniques, resources and modern medical laboratory tools and techniques to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Medical Laboratory Technology practice.

**PO4- Individual and teamwork:** Apply ethical principles and commit to professional ethics, responsibilities, and norms of the medical laboratory technologist practice as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.

**PO5- Communication:** Communicate effectively on complex medical laboratory technologist activities with the medical laboratory technologist community and with society, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO6- Lifelong Learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broad context of technological change.

### **Program Outcomes (PO) Mapping of Medical Laboratory Technology**

<b>PO#</b>	<b>Program Outcome</b>	<b>Mapped courses</b>
1	Medical Laboratory Knowledge	BML 101, BML 102, BML 201, BML 202, BML 301, BML 302, BML 303, BML 354, BML 401, BML 402, BML 501, BML 502, BML 543, BML 601, BML 602
2	Design/Development of Solutions	BML 455, BML 543, BML 544, BML 643, BML 644
3	Medical Laboratory Professional and Society	BML 265, BML 403, BML 455
4	Individual and Team Work	BML 403, BML 455, BML 543, BML 544, BML 643, BML 644
5	Communication	BML 164, BML 403, BML 644
6	Life-Long Learning	BML 455, BML 643, BML 644

### **Program Outcomes of BBA in Hospital Management**

1) Apply the principles and practices of management into managing the hospitals

- 2) Apply analytical and critical thinking abilities for problem solving in hospitals
- 3) Conform business affairs with respect to social economic legal and ethical issues
- 4) Communicate with effectiveness and empathy.

### Program Outcomes of BCA

PO1	Understand the fundamental concepts of computers, software hardware and peripheral devices and evolution of computer technologies.
PO2	Familiarized with business environment and information technology and its applications in different domains.
PO3	Gain knowledge to identify, explain and apply functional programming and object-oriented programming techniques and use of databases to develop computer programs.
PO4	Analyze, design, implement and evaluate computerized solutions to real life problems, using appropriate computing methods including web applications.
PO5	Understand the front end and backend of software applications.
PO6	Gain expertise in at least one emerging technology.
PO7	Acquire knowledge about computer networks, network devices and their configuration protocols, security concepts at various level etc.
PO8	Apply techniques of software validation and reliability analysis to the development of computer programs.
PO9	Acquire technical, communication and management skills to convey or present information, applications, instructions, policies, procedures, decisions, documentations etc. verbally as well as in writing.
PO10	Recognize the various issues related to society, environment, health and vivid cultures and understand the responsibilities to contribute in providing the solutions.
PO11	Acquire technical skills to lead a productive life in the society as a professional or as an entrepreneur

### Program Outcomes of BBA

**PO1** Upon completion of the BBA program, the individual must demonstrate maturity, professionalism and team working skills.

**PO2** Upon completion of the BBA program the students will have general idea of operations in business.

**PO3** Upon completion of the BBA program, the individual will have specialized skills to deal with area specific issues of concern.

**PO4** Upon completion of the BBA program, the individual will be able to apply technological knowhow for business advancements.

**PO5** Upon completion of the BBA program, the individual will be capable of analyzing, investigating and solving critical business issues.

### **Program Educational Objectives of BBA**

- To develop students professionally to handle business issues.
- To develop students to be a better team worker.
- To bridge the gap between theoretical and practical knowledge of the students by adopting innovative teaching pedagogy.
- To develop socially, ethically responsible business leaders.
- To sharpen soft and hard skills among the students.
- To promote entrepreneurial skills among students.

### **Program Outcomes of Bachelor of Optometry**

**PO 1** Optometry Knowledge and Skill

**PO 2** Planning and problem solving abilities

**PO 3** Communication

**PO 4** Research Abilities

**PO 5** Professionalism and Ethics

**PO 6** Leadership

**PO 7** Societal responsibilities

**PO8** Environment and Sustainability's

**PO9** Lifelong Learner