



BACHELOR OF SCIENCE

Course Guide

Programme Overview

The Bachelor of Science programme is a broad study programme that encapsulates a wide number of science based subjects that can be studied full-time in three years. The course aims to: provide students with opportunities to acquire knowledge, attitudes and skills in life sciences; introduce students to scientific method through a range of disciplines; provide graduates with advanced knowledge in one or more of the science disciplines; and to meet the needs of industry, business and government agencies.

Programme Name

Bachelor of Science

Programme Code

003

Course Code & Name

303 – B.Sc in Biotechnology, Chemistry, Microbiology

304 - B.Sc in Biotechnology, Chemistry, Botany

305 - B.Sc in Biotechnology, Chemistry, Genetics

Degree Awarded

Bachelor of Science

Duration of the Programme

3 years, 6 semesters

Total Credits

168

Eligibility

The minimum qualification required to apply is a pass in the 10+2 examination in Science (from PUC / ISC / CBSE or equivalent board with Physics, Chemistry and Biology as core subjects).

Medium of Instruction / Examination

English

Study Campus

School of Graduate Studies

J C Road, Bangalore – 560 027

Programme Timings

8.30 am – 4.00 pm (Mon – Fri) & 8.30 am – 2.30 pm (Sat)

Course Advisor

Ms. Anitha Abraham

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Programme Features

1. Students have a choice of graduating with a [Single degree](#) or a [Dual degree](#)
2. Students opting for [Dual degree programme](#) can enroll into [the 5th semester MSc programme](#)
3. Students benefit from [interdisciplinary design](#) of the curriculum

Examinations & Assessments

1. Internal tests
2. Assignments
3. Seminar presentation
4. Class tests
5. Preparatory theory and Practical examination
6. End term theory and Practical examination

Value Added Courses

The objective of Jain University is to provide integrated coaching to students that adds value to students' profile and can make them more employable. These value added courses are designed as per current industry standards. We offer two certificate courses. Each course spreads over two semesters and the students are evaluated at the end of each semester. Evaluation is based on internal assessment, seminars and reports.

1. Certificate programme in Plant Science & Technology – I & II semester

It is a certificate programme aiming at inculcating in the young minds, the importance of plants in an ecosystem & their role in maintaining an ecological balance. Deals with concept based learning with a focus on applied aspects of Plant Science. Topics covered include Phytochemistry, Phycology & its techniques, Tissue culture, Palynology, Paleobotany, Floriculture, Ayurveda, Herbal wealth, Taxonomy, Landscaping & Ecology.

2. Certificate programme in Bioinformatics – III & IV semester

It is an exciting field of science that incorporates varied skills to catalyze biological research. Topics covered include structural biology, sequence analysis, phylogenetics, proteomics (including structure prediction, drug designing and other applications) & genomics (including gene prediction, primer designing and other applications). The course equips students with important research & industrial skills thereby opening new avenues & opportunities to the students.

Course Overview

Biotechnology refers to the use of plants, animals and microorganisms to create new products or processes. Biotechnology plays an important role in helping industry, medicine and agriculture produce foods and medicines, manage disease and pests, and clean up the environment.

Chemistry has come a long way since the ancients used it for brewing, cosmetics, pottery, metallurgy and embalming, and since the alchemists tried to use chemistry to find the elixir of life or to change lead into gold.

Today Chemistry permeates every aspect of our world. Virtually everything from life itself to complete geological structure can be expressed in chemical terms, because Chemistry is the science of matter. A seemingly limitless variety of substances derived from elements and compounds and from atoms and molecules form the basic framework of nature and account for its ever changing patterns.

Microbiology is the science which is concerned with the study of micro-organisms including their distribution and role in the environment and their relationship to other living organisms including humans (in health and disease) and other animals. An understanding of the basic nature and molecular structure of the microbes has been a major factor in the advancement of molecular biology as a scientific discipline and in establishing microbial genetics as an advancing science.

Botany covers all aspects of the life of plants. It therefore includes their structure and development, physiology and biochemistry, health and disease, relationships with other organisms and the environment (ecology), as well as the traditional aspects of plant identification and classification.

Genetics combines the classical approaches of human & biomedical genetics and cytogenetics with the recently developed discipline of molecular genetics. Very much a practical science, it also has a complex and interesting theoretical foundation.

Course Curriculum

Biotechnology

Semester 1: Cell Biology and Biostatistics

Semester 2: Biochemistry and Biophysics

Semester 3: Microbiology

Semester 4: Molecular Biology

Semester 5: Recombinant DNA Technology, Immunology and Animal Biotechnology

Semester 6: Plant and Agricultural Biotechnology & Bioprocess Engineering

Chemistry

Semester 1: Solutions & Binary liquid mixtures, Colligative properties, Quantum mechanics and atomic structure, Periodic table, Phase rule, classification and nomenclature of organic compounds, Basics of organic reactions, Aliphatic & allicyclic compounds.

Semester 2: Thermodynamics, Chemical equilibrium, Chemical bonding, Structure & Bonding in Non metallic compounds, Aromatic Hydrocarbons, Halogen derivatives of organic compounds, Organometallic compounds

Semester 3: Gaseous state, Liquid state, Chemical Kinetics, Silicates & their applications, Alcohols & ethers, phenols, Carboxylic acid & derivatives, Organic & Inorganic polymers, Transition and inner transition elements,

Semester 4: Nuclear & Radiochemistry, Environmental and Green Chemistry, Solid state, surface Chemistry, Nanoscience, Metallurgy, Carbonyl compounds, Amines, active methylene compounds

Semester 5: Stereochemistry, Heterocyclic compounds, Natural products, Organic spectroscopy, Industrial and Pharmaceutical chemistry, Electrochemistry, Ionic equilibrium, Physical spectroscopy, Photochemistry, Physical properties and chemical constitution

Semester 6: Coordination chemistry and organometallics, Coordination compounds in Biological, Industrial materials, Analytical chemistry, Introduction to Biochemistry. Carbohydrates, Lipids, aminoacids and proteins, Nucleic acids, Enzymes, Metabolism, Biological oxidation, Molecular biology, Vitamins and hormones

Microbiology

Semester 1: Fundamentals of Microbiology

Semester 2: Virology, Microbial Growth and Control of Microbes

Semester 3: Physiology, Bioinstrumentation, Biostatistics

Semester 4: Molecular Biology and Genetic Engineering

Semester 5: Agricultural and Environmental Microbiology, Immunology and Medical microbiology

Semester 6: Food and Dairy Microbiology, Industrial Microbiology & Microbial Technology.

Genetics

Semester 1: Fundamentals of genetics and biometry

Semester 2: Cell biology

Semester 3: Cytogenetics

Semester 4: Molecular genetics

Semester 5: Genetic engineering, Behavioral, Ecological and Developmental genetics

Semester 6: Human and Biomedical genetics, Advanced and Applied genetics

Botany

Semester 1: Microbiology & Phycology

Semester 2: Mycology, Lichens, Plant physiology and Bryophytes

Semester 3: Pteridophytes, Gymnosperms, Paleobotany and Plant anatomy

Semester 4: Embryology and applied botany

Semester 5: Economic Botany, Environmental Biology, Ethnobotany, Plant physiology

Semester 6: Bioenergetics, Molecular biology and Plant biotechnology, Cell biology, Genetics, Plant breeding and Biostatistics

Career Opportunities

Biotechnology graduates can work in:

- Agricultural, environmental, chemical, food processing, pharmaceutical and waste management industries
- Beverage and food production
- Biotechnology, medical and agricultural industries
- Government and research establishments
- In a range of public and private diagnostic, therapeutic and research laboratories covering microbiology, hematology, bioremediation, immunology, forensic science, crop development, pest control, animal production, veterinary services, molecular biology and protein engineering
- Medical and veterinary science service industries
- Intellectual Property
- Suppliers to the Biotechnology Industry

Chemistry graduates can work in:

Wine, pharmaceutical, paint, mining, petrochemical, petroleum and automotive industries, and research and analytical laboratories

Botany graduates can work as:

Biological technician, environment consultants, plant explorers, ecologists, conservationists, Park ranger/Forester, Nursery manager, Taxonomist, Horticulturist, Genetics, Plant biochemist, Molecular biologist, Plant pathologist, Environmental consultant, and Farming consultant. Options are not only confined to India, numerous opportunities are also available in abroad as well.

Genetics graduates can work in:

- Medical and agricultural industries
- Research institutes, hospitals, universities
- Biotechnology and scientific supply companies

Microbiology graduates can work as:

Bacteriologists, Environmental Microbiologists, Food Microbiologists, Industrial Microbiologists, Medical Microbiologists, Mycologists, Protozoologists, Biochemist, Biotechnologist, Biomedical Scientist, Cell Biologists, Geneticists, Immunologists, Parasitologists, and Virologists. They can even choose a career as science writer, who writes articles for common people and professional microbiologists. Career as a teacher in the field of microbiology is also a lucrative option.