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## 1. ABOUT THE SCHOOL OF BIO SCIENCES AND TECHNOLOGY (SBST):

School of Bio Sciences and Technology (SBST) offer programs in various disciplines of Modern Biology such as M.Sc in Applied Microbiology, Biotechnology, Biomedical Genetics (Genetic Counseling specialization). The School houses excellent infrastructure and well trained faculty members (115 nos). Most of them have pursued Post-Doctoral Fellowship from laboratories in developed countries. The competencies of the faculty in research are endorsed by the quality of research papers and obtaining research projects. There has been a constant inclination in the research publication in the recent years. From 2012 – 2017 faculty have published 1549 research papers in peer reviewed journals with the cumulative impact factor of 2377.

SBST has been dedicated to expanding and sharing knowledge, inspiring innovation, and preserving cultural and scientific information for future generations. We at SBST impart futuristic technical education and instill high patterns of discipline through our dedicated staff, who set global standards, making our students technologically superior and ethically strong, leading them to improve the quality of life of the human race.

### 1.1. Major Funding Projects:

Faculty has received funding from various National & International agencies. A total of 53 projects have been completed with a sum of 10 crores and 9 crores project is currently in pipeline. Apart from manuscripts and projects, SBST also have developed 20 products that are filed for patenting. The Memoranda of Understanding with various international universities and biotechnological industries is the major strength of this Institution. They provide for an exchange of students and faculty and encourage joint research projects for the mutual benefit of research institutions.

Many of the students, who pursue their research projects in foreign universities, bring high quality to their work and esteem to India. With steady steps, we continue our march forward.

### 1.2. Placements:

Most of our students got placed in highly reputed Biotech companies like Biocon, Dr.Reddys, Anthem Biosciences, HUL, Intas Pharma, Novonordisk, Quntilas, Bhat Biotech, TUV SUD labs, Charoen Pokphand Foods (CPF), Panacea Biotech, Organica Biotech, Pfizer, Orchid, Microtherapeutics and many more. These components make SBST listed amongst the top schools of Modern Biology in India. Because of our industry based curriculum and strong network with industries, our students got placed in highly reputed and leading biotech companies with the CTC of 2.4 to 8.5 lakhs/ annum.

## 2. ABOUT THE SCHOOL OF ADVANCED SCIENCES (SAS):

School of Advanced Sciences (SAS) comprises of Physics, Chemistry and Mathematics departments. The school offers M.Sc. programmes in Physics, Data Science and Chemistry with an option with specialization in Analytical or Inorganic or Organic or General Chemistry or Pharmaceutical Chemistry.

The curriculum keeps abreast of the latest advancements in the respective domains and endeavor's to develop scientists of high quality. The primary goal is to prepare a new generation of young scientists for the technical and social needs of the 21st century. Syllabi are on par with IITs. The Departments are DST-FIST recognized. The Curriculum for Applied Learning (CAL) adopted presently is benchmarked with top ranking universities.

The Semester Abroad Program (SAP) offers students an international exposure so as to prepare effectively for professional employment or research degree in basic and applied sciences in addition to classroom and laboratory teaching, the students are engaged in experiential learning through research participation both in the laboratory and in the field. Adding to the traditional science subjects such as mathematics, statistics, physics and chemistry, interdisciplinary program such as pharmaceutical chemistry are offered to meet the needs of the modern society and health firms.

### 2.1. Major Funding Agencies:

Over the years, the School has been receiving research grants from various funding agencies such as DST, CSIR, DRDO, BRNS, IGCAR, AERB, NBHM, Naval Research Board (NRB), DBT-RGYI, UGC-DAE, Indian Space Research Organisation (ISRO), CII.

### 2.2. Placements:

Students get recruited through campus placements into various reputed companies like Biocon, Dr. Reddy's lab, Agilent Technologies, Advinus Therapeutics, Aurigene Discovery, Cognizant, Hospira, Shasun, Aurobindo, Dabur, ITC-Blore, Alkem, Orchid, Suven, AMRI, Torrent Pharma, Astra Zenica, Cipla, GVK Biosciences, Sai life Science, Anthem Bioscience, Sami labs, Chem Biotech and Piramal life sciences in addition to Teaching and Research in IITs, CSIR Labs and reputed Universities.

### 3. GENERAL DISCIPLINE

All applicants admitted to the Institute shall maintain good conduct, pay the requisite tuition fees and other charges by the due dates, attend their classes regularly and abide by the rules and regulations of the Institute.

If at any point of time, if the conduct and character of an applicant is not satisfactory or is of suspicious nature, the Management reserves the right, without assigning any reason, to make him /her vacate the hostel or expel him/her from the Institute.

#### 3.1. Measures For Prevention Of Ragging At The Institution Level :

- ◆ Ragging is totally prohibited in the institution and anyone found guilty of ragging and / or abetting ragging, whether actively or passively, or being a part of a conspiracy to promote ragging, is liable to be punished in accordance with the regulations as well as under the provisions of any penal law for the time being in force.
- ◆ Ragging Juniors in any form is forbidden. If anyone is found ragging his/her juniors, he/she can be rusticated from the Institute.
- ◆ It is mandatory that Applicants and parents who are attending interview has to sign an undertaking in ₹20 non-judicial stamp paper as per the information given in Annexure-I & II (as per UGC Regulations-2009, [www.ugc.ac.in](http://www.ugc.ac.in)).

### 4. HOSTEL ACCOMMODATION

Separate hostel accommodation is available for boys and girls.

- ◆ Hostel accommodation will be provided only to those Applicants whose residence is beyond 100 Kms radius from the Institute.
- ◆ For details regarding Establishment Charges, Mess, etc., please visit VIT website [www.vit.ac.in](http://www.vit.ac.in)

### 5. ADMISSION CANCELLATION PROCESS / REFUND OF FEES

- ◆ The refund will be made as per the norms of the UGC and Institute guide lines.

#### 5.1. Academic Cancellation: (Documents to be submitted in the Office of PG Admissions)

- ◆ Apply online in website: Fresher withdrawal
- ◆ Collect the No Dues Certificate Form from Office of PG Admissions.
- ◆ Original Provisional Admission Letter
- ◆ Migration / Transfer / College Leaving Certificate with Original. (if not submitted at the time of admission)

#### 5.2. Hostel Cancellation: (Documents to be submitted in the concerned Hostel Office)

- ◆ Write an application with Parent Signature.
- ◆ Collect the No Dues Certificate Form from concern Hostel Office.
- ◆ Hostel Admission Letter

## M.Sc - APPLIED MICROBIOLOGY

### Programme Educational Objectives

- ◇ Excel in professional career and/or higher education by acquiring a solid foundation in science, mathematics, and advanced communication engineering and technologies
- ◇ Develop and apply engineering solutions for solving contemporary, social and human issues with realistic constraints suitable for the present need through the use of modern tools.
- ◇ Exhibit professional and ethical standards, effective communication skills, teamwork spirit, multidisciplinary and transdisciplinary approach for successful careers and to be able to compete globally, function as leaders, as entrepreneurs, and manage information efficiently and to engage in lifelong learning.

### Programme Outcomes

- ◇ A clear understanding of the subject related concepts and contemporary issues
- ◇ An ability to be socially intelligent with good SIQ (Social Intelligence Quotient) and EQ (Emotional Quotient)
- ◇ Computational thinking (Ability to translate vast data into abstract concepts and to understand database reasoning)
- ◇ Virtual Collaborating ability
- ◇ Problem-solving ability- solving social issues and engineering problems
- ◇ A clear understanding of professional and ethical responsibility
- ◇ Cross-cultural competency exhibited by working in teams
- ◇ A good working knowledge of communicating in English
- ◇ Critical thinking and innovative skills
- ◇ Having a good digital footprint

### Programme Specific Outcomes

- ◇ Acquire expertise in the applications of microbial functioning at the advanced level.
- ◇ Equip students to make use of tools, technologies, and methods of microbiology and to apply the scientific methods
- ◇ Ability to independently carry out research and development work to solve the practical problems

## Scope of Employment

In Pharmaceutical companies, breweries, diagnostic and R & D labs, and the healthcare industry.

## Programme Core Courses

Microbial Diversity / Microbial Physiology and metabolism/Bacteriology/Virology/ Mycology / Parasitology / Fermentation Technology/ Environmental Microbiology / Molecular Microbial Genetics / Agricultural Microbiology / Immunology and Immunotechnology / Research Methodology and Biostatistics / Food Microbiology / Bioethics and IPR.

## Elective Courses

Bioinformatics / Fungal Biotechnology / Bioremediation / Medical Microbiology / Food Preservation Technology / Bio-Business and Entrepreneurship / Industrial Microbiology / Microbial Nanotechnology.

## Curriculum

### Semester I

Course Title	Credits
Microbial Diversity	4
Microbial Physiology and Metabolism	4
Food Microbiology	4
Systematic Bacteriology and Virology	4
Computer programming	4
Basic Techniques in Microbiology Lab	2
Food Microbial Techniques Lab	2

### Semester II

Course Title	Credits
Immunology and Immunotechnology	4
Environmental Microbiology	4
Applied Mycology and Parasitology	4
Agricultural Microbiology	4
Analytical Instrumentation	4
Immunology, Bacteriology, Mycology And Parasitology Lab	2
Environmental Microbiology Lab	2

**Semester III**

Course Title	Credits
Molecular Microbial Genetics	4
Fermentation Technology and Microbial Biotechnology	4
Research Methodology and Biostatistics	4
Bioethics and IPRs	4
Elective	3

**Semester IV**

Course Title	Credits
Project	20
Comprehensive Viva 2	2

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**M.Sc - BIOMEDICAL GENETICS****Programme Educational Objectives**

- ◆ Excel in professional career and/or higher education by acquiring a solid foundation in science, mathematics, and advanced communication engineering and technologies
- ◆ Develop and apply engineering solutions for solving contemporary, social and human issues with realistic constraints suitable for the present need through the use of modern tools.
- ◆ Exhibit professional and ethical standards, effective communication skills, teamwork spirit, multidisciplinary and transdisciplinary approach for successful careers and to be able to compete globally, function as leaders, as entrepreneurs, and manage information efficiently and to engage in lifelong learning

**Programme Specific Outcomes**

- ◆ Apply knowledge of genetic principles and understand how they contribute to etiology, clinical features, and disease expression.
- ◆ Exhibit the knowledge of ethical legal, and social issues about genetic counseling
- ◆ Ability to independently carry out research and development work to solve the practical problems

### Programme Outcomes

- ◆ A clear understanding of the subject related concepts and contemporary issues
- ◆ An ability to be socially intelligent with good SIQ (Social Intelligence Quotient) and EQ (Emotional Quotient)
- ◆ Computational thinking (Ability to translate vast data into abstract concepts and to understand database reasoning)
- ◆ Virtual Collaborating ability
- ◆ Problem-solving ability- solving social issues and engineering problems
- ◆ A clear understanding of professional and ethical responsibility
- ◆ Cross-cultural competency exhibited by working in teams
- ◆ A good working knowledge of communicating in English
- ◆ Critical thinking and innovative skills
- ◆ A good digital footprint

### Scope of Employment

In health care industries, Pharmaceutical companies, Diagnostics, R & D organizations and hospitals

### Programme Core Courses

Biochemistry/Cell and Molecular Biology/ Principles of Genetics/ Human Immunology/ Clinical Cytogenetics/ Human Molecular Genetics/ Human Biochemical Genetics/ Developmental Genetics /Human Anatomy and Physiology.

### Elective Courses

Genetics of Human Infertility / Analytical Techniques for Genetics/ Genetic Counseling / Ethical , Legal and Social Issues in Genetic Counseling / Radiation Genetics / Cognitive and Behavioral Genetics / Forensic Science / Stem Cell Biology / Medical Biochemistry / Genetic Engineering / Cancer Genetics/ Environmental Genetics/ Introduction to Human Psychology.

### Students Outcomes

- ◆ Inculcate knowledge in mathematics, science, and engineering.
- ◆ Understand a scientific problem and conduct experiments, as well as to analyze and interpret data.
- ◆ Design experimental protocols, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health care and safety, manufacturability, and sustainability.
- ◆ Understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- ◆ Ability to conduct research, work in a team and contribute to the goals of the team.



## Curriculum

Course Title	Credits
University Core	29
Professional and Communication Skills/ Foreign Language	2
Statistics for Biologists	4
Computer Applications	3
Master's Thesis ( Related to Genetic Counseling)	20

## University Electives

Course Title	Credits
University Core	3

Programme Core	Credits
Biochemistry	4
Cell and Molecular Biology	3
Principles of Genetics	3
Human Immunology	3
Clinical Cytogenetics	4
Human Molecular Genetics	4
Human Biochemical Genetics	4
Developmental Genetics	3
Human Anatomy and Physiology	4

Programme Elective	Credits
Genetics of Human Infertility	3
Analytical Techniques for Genetics	3
Genetic Counseling	3
Ethical Legal and Social Issues in Genetic Counseling	4
Radiation Genetics	3
Cognitive and Behavioral Genetics	3
Forensic Science	3
Stem Cell Biology	3
Medical Biochemistry	3
Genetic Engineering	4
Cancer Genetics	3
Environmental Genetics	4
Introduction to Human Psychology	3

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## M.Sc - BIOTECHNOLOGY

### Programme Educational Objectives

- Excel in professional career and/or higher education by acquiring solid foundation in science, mathematics and advanced communication engineering and technologies
- Develop and apply engineering solutions for solving contemporary, social and human issues with realistic constraints suitable for the present need through the use of modern tools.
- Exhibit professional and ethical standards, effective communication skills, teamwork spirit, multidisciplinary and transdisciplinary approach for successful careers and to be able to compete globally, function as leaders, as entrepreneurs, and manage information efficiently and to engage in lifelong learning

### Programme Outcomes

- A clear understanding of the subject related concepts and of contemporary issues
- An ability to be socially intelligent with good SIQ (Social Intelligence Quotient) and EQ (Emotional Quotient)
- Computational thinking (Ability to translate vast data in to abstract concepts and to understand database reasoning)
- Virtual Collaborating ability
- Problem solving ability- solving social issues and engineering problems
- A clear understanding of professional and ethical responsibility
- Cross cultural competency exhibited by working in teams
- A good working knowledge of communicating in English
- Critical thinking and innovative skills
- A good digital footprint

### Programme Specific Outcomes

- Apply the principles of molecular biology methods with emphasis on the application of recombinant DNA technology to animals, plants and microbial organisms
- Manipulate living organisms and biological systems to produce products that advance healthcare, medicine, agriculture, food, pharmaceuticals and environmental control
- Ability to independently carry out research and development work to solve the practical problems

## Scope of Employment

Graduates will have a broad scope in the field of biotechnology. The opportunities are enormous in India and abroad. The field of biotechnology is expected to grow exponentially in the coming years offering opportunities in the field of research, engineering, industry, consultancy, and entrepreneurship.

## Programme Core Courses

Communicative English / Bio-statistics and Research Methodology / Computer Applications and Project in the Final semester. Programme Core Courses Advanced Biochemistry / Analytical Techniques in Biotechnology / Bioprocess technology/ Microbiology / Cell and Molecular Biology / Immunology / Agricultural Biotechnology/ Aquatic and Environmental Biotechnology / Genetic Engineering / Genomics and Proteomics/ Medical Biotechnology and Bio-informatics Programme.

## Elective Courses

Biophysics / Bioengineering / Nanotechnology / Cancer Biology / Nutraceuticals / Enzyme Engineering / Systems Biology / Signal Transduction and Stem Cell Biology / Bio-ethics and Bio-safety and Bio-business.

## Curriculum

### Semester I

Course Title	Credits
Biomacromolecules	4
Molecular Biology and Recombinant DNA Technology	4
Microbiology	4
Analytical Instrumentation	4
Computer Programming	4
Biochemistry and Microbiology Lab	2
Molecular Biology and r DNA Technology Lab	2

### Semester II

Course Title	Credits
Bioprocess Technology and Biocatalysis	4
Immunotechnology	4
Enzyme Technology	4
Plant Genetic Engineering	4
Environmental Biotechnology	4
Immunology and Enzyme Technology Lab	2
Environmental Biotechnology Lab	2

**Semester III**

Course Title	Credits
Pharmaceutical Biotechnology	4
Aquatic Biotechnology	4
Biostatistics and Research Methodology	4
Bioethics and IPRs	3
Bioethics and IPRs	4
Elective	3
Bioprocess and Pharmaceutical Biotechnology Lab	2
Tissue Culture Lab	2

**Semester IV**

Course Title	Credits
Project	20
Comprehensive Viva 2	2

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## M.Sc - BUSINESS STATISTICS

### Overview:

**Business statistics** is the science of good decision making in the face of uncertainty and is used in many disciplines such as econometrics, auditing and production and operations, including services improvement and marketing research.

**Statistics** open doors in engineering, business, finance, computing, data sciences, health sciences, environmental sciences and public policy.

**Statistics** make it possible to analyse real-world business problems with actual data so that you can determine if a marketing strategy is really working.

The **science of statistics** uses regression analysis, hypothesis testing, sampling distributions, and more to ensure accurate data analysis.

**Business Statistics** refers to the application of statistical tools and techniques to business and managerial problems for the purpose of decision making.

**Business Statistics** involves the application of statistical tools in the area of marketing, production, finance, research and development, manpower planning etc. to extract relevant information for the purpose of decision making.

Business managers use **statistical tools and techniques** to explore almost all areas or business operations of public and private enterprises.

**Business Statistics** helps a business to :

- ◆ Deal with uncertainties by forecasting seasonal, cyclic and general economic fluctuations
- ◆ Helps in Sound Decision making by providing accurate estimates about costs, demand, prices, sales etc.
- ◆ Helps in business planning on the basis of sound predictions and assumptions
- ◆ Helps in measuring variations in performance of products, employees, business units etc.
- ◆ It allows comparison of two or more products, business units, sales teams etc.
- ◆ Helps in identifying relationship between various variables and their effect on each other like effect of advertisement on sales
- ◆ Helps in validating generalizations and theoretical concepts formulated by managers

### Programme Objectives

- ◆ Modern facilities to provide ambience and support for curricular and extra-curricular activities for the overall development of students.
- ◆ Dedicated, qualified faculty to ensure high standard of teaching, learning and evaluation processes.
- ◆ Periodic review and revision of curricula based on feedback from the industry and academia with quick response to ensure the relevance of the programmes to the changing needs of industry.
- ◆ Semester system with proper planning to utilize the resources effectively.
- ◆ Industry based project work as part of the curricula to get recognition and reward to the students in the form of job offer or support for further studies and research.

- ◆ Industry based project work as part of the curricula to get recognition and reward to the students in the form of job offer or support for further studies and research.
- ◆ The Industry Interaction Program has been initiated to keep the students abreast of the latest trends in the industry/research organizations through industrial visits and guest lectures.
- ◆ Every student will have to complete a research project, preferably industry oriented.

### Uniqueness of Programme

- ◆ A Unique program, blending traditional M. Sc. with practical application skill set building .
- ◆ Extensive course work in line with the requirements of Industry, thus adding value to the degree.
- ◆ Development of skills to use statistical and computational techniques as research/data analysis tools like SAS, SPSS, R, Python .
- ◆ In built opportunity to improve soft skills as well as scientific writing.
- ◆ Grading system at par with international standards.
- ◆ A system of continuous evaluation through seminars, quizzes and practical.
- ◆ Guest faculty drawn from a pool of experts from Industry/academia thereby ensuring a balanced and continuous interaction with the industry.
- ◆ Innovative teaching methods involving continuous interaction amongst faculty and students, using a blend of traditional and modern techniques, as well as live projects for better understanding .
- ◆ Blending theory with practical using top end statistical tools (MS Excel, Studio, ,Python, SPSS, Base SAS, SAS Predictive Modeling)
- ◆ Focuses on the holistic development of the student to help enhance knowledge and skillsets for an edge in employability after completion of the course.

### Programme Specific Outcomes

- ◆ have the **versatility** to work effectively in a broad range of analytic, scientific, government, financial, health, technical and other positions.
- ◆ have a **broad background** in Mathematics and Statistics, an appreciation of how its various sub-disciplines are related, the ability to use techniques from different areas, and an **in-depth knowledge** about topics chosen from those offered through the department.

- ◆ be mathematically, statistically and numerically **literate**. In particular, graduates will:
- ◆ recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines;
- ◆ be familiar with a variety of examples where mathematics or statistics helps accurately explain abstract or physical phenomena;
- ◆ recognize and appreciate the connections between theory and applications;
- ◆ be able to independently read mathematical and statistical literature of various types, including survey articles, scholarly books, and online sources; and
- ◆ be life-long learners who are able to independently expand their mathematical or statistical expertise when needed.

### Non-Subject-Specific-Outcomes:

- ◆ **Logic and Critical Thinking.** Graduates will:
  - ◆ have a facility with abstract reasoning, including the ability to abstract from concrete situations and make ideas precise by formulating them mathematically or statistically;
  - ◆ be able to analyze, test, and interpret technical arguments, and form independent judgements. This includes their own arguments and those of others, in both academic and non-academic contexts.
- ◆ **Problem solving.** Graduates will be able to:
  - ◆ use their mathematical and statistical training to help guide possible lines of inquiry;
  - ◆ solve complex problems by identifying feasible divisions into simpler sub-problems;
  - ◆ gather and organize relevant qualitative and quantitative information such as related problems, examples and counterexamples;
  - ◆ sharpen and/or focus mathematical or statistical questions as a problem solving strategy;
  - ◆ identify suitable existing methods of analysis, if any, and assess their strengths and weaknesses in the context of the problem being considered;
  - ◆ construct abstract models using appropriate mathematical and statistical tools;
  - ◆ use computers and software as exploratory, visualization, modelling and computational tools;
  - ◆ engage their creativity in the quest for novel or elegant solutions;
  - ◆ document problem solving steps and reliably certify the validity of their methods and results (self-check); and interpret and critically evaluate their qualitative and quantitative results in the context of the original problem, and make recommendations.
- ◆ **Communication.** Graduates will be able to:
  - ◆ work effectively in a multi-disciplinary environment;
  - ◆ accept comments and feedback, and learn from them;
  - ◆ explain fundamental mathematical or statistical concepts to non-experts;
  - ◆ justify choices made during problem solving and interpretation of results;
  - ◆ present the results and assessment of a problem solving strategy; and
  - ◆ clearly communicate logical arguments both orally and in writing to a range of audiences.

### Scope of Employment

- ◆ Research Centres
- ◆ Manufacturing Sector
- ◆ Pharmaceutical Companies
- ◆ Educational Institutes
- ◆ Scientific Research Organisations
- ◆ Public Sector Research Organisations
- ◆ Market Research Companies
- ◆ Banking Sector
- ◆ Insurance Companies

## Careers and opportunities

When you graduate, you'll have the skills and knowledge needed for a successful career in software industry or business or management roles.

What jobs can you do with a Business Statistics degree?

Career opportunities include:

- ◆ Business Analyst
- ◆ Financial Analyst
- ◆ Market Research analysts
- ◆ Investment Analyst
- ◆ Actuarial Analyst
- ◆ Data analyst
- ◆ Statistician
- ◆ Business development and consultancy
- ◆ E-marketing
- ◆ Publicity
- ◆ Financial and risk analysis
- ◆ Market researcher
- ◆ Project management
- ◆ Research Scientist
- ◆ Survey Researchers
- ◆ SAS Programmer

Alternatively, you may choose to start your own business, or enter further academic study. Whatever you decide to do, you'll get advice and support from our Placements and Training office.

### Evaluation Criteria:

The students will be required to have a minimum attendance of 75%. The students will be evaluated through term-end exams and through continuous internal assessment.

Internal assessment will be on the basis of continuous assessment tests, Quiz, and Assignments based on Theory. Practical work will be evaluated each week during the course of the regular practical's. Seminars will be evaluated periodically. The grade will be awarded at the end of the year on the basis of Cumulative Grade Point Average.

The rigorous course work is spread over 4 semesters, including an Industry Project.

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## M.Sc - CHEMISTRY

### Programme Educational Objectives

- \* To divulge students in the frontier areas of chemistry
- \* To enhance the employability skills of the students and prepare them for placement in R&D centres, top-ranked academic institutes and industries
- \* To expose students in the research - based learning
- \* To encourage students to be a part of active research groups and motivate to conduct independent research.

### Scope of Employment

- \* In R&D centres, Universities of advanced learning, Research Centre of Excellence, Industries, Multi-national companies
- \* In QC / QA Departments of Chemical and Pharmaceutical industries
- \* Process and Production Department of Chemical and Pharmaceutical industries
- \* Advanced computations utilizing Bio-informatics and Chem-informatics

### Programme Content

- \* Mathematics
- \* Scientific English
- \* Foreign Language
- \* Soft Skill
- \* SET Conference (we have to expand this as Science and Engineering Technology)
- \* Research Methodology
- \* Master's Thesis

### Programme Core

- \* General chemistry
- \* Inorganic chemistry
- \* Analytical chemistry
- \* Organic chemistry
- \* Physical chemistry

### Core Lab Courses

- \* Inorganic chemistry
- \* Analytical chemistry
- \* Organic chemistry
- \* Physical chemistry
- \* General chemistry

### Programme Electives

- \* NMR, EPR and Mass spectrometry
- \* Bioorganic Chemistry
- \* Chemistry of Natural Products
- \* Green Chemistry
- \* Polymer Chemistry
- \* Intellectual Property Rights
- \* Drug Design, Biophysical Chemistry
- \* Organometallics and Industrial Applications
- \* Nanomaterials
- \* Computational Chemistry
- \* Quantum Chemistry
- \* Group Theory
- \* Molecular Spectroscopy

### **Inorganic Chemistry Specialization**

- \* Advanced Inorganic Chemistry
- \* Materials Chemistry
- \* Nanomaterials & Characterization Techniques
- \* Inorganic Photochemistry

### **Organic Chemistry Specialization**

- \* Advanced Organic Chemistry
- \* Chemistry of Heterocyclic Compounds
- \* Organic Synthesis & Methodologies
- \* Photochemistry and Pericyclic Reactions

### **General Chemistry**

- \* Advanced Inorganic Chemistry
- \* Advanced Organic Chemistry
- \* Advanced Physical Chemistry
- \* Analytical Quality Control and Quality Assurance
- \* Organic Synthesis and Methodologies
- \* Materials Chemistry
- \* Medicinal Chemistry

### **Analytical Chemistry Lab Course**

- \* Analytical/Physical Chemistry Practical-I
- \* Analytical/Physical Chemistry Practical-I
- \* Analytical Chemistry Practical -III

### Organic Chemistry Lab Course

- \* Organic Chemistry Practical -I
- \* Organic Chemistry Practical - II
- \* Organic Chemistry Practical III

### General Chemistry Lab Course

- \* Analytical/Physical Chemistry Practical-I
- \* Analytical/Physical Chemistry Practical- II
- \* Inorganic Chemistry Practical –I (Synthesis and Characterization)
- \* Inorganic Chemistry Practical – II(Synthesis and Characterization)
- \* General Organic Practical

### Inorganic Chemistry Lab Course

- \* Inorganic Chemistry Practical -I (Synthesis of Inorganic Materials)
- \* Inorganic Chemistry Practical - II (Synthesis of Inorganic Materials)
- \* Inorganic Chemistry Practical III (Characterisation and properties measurements of Inorganic Materials)

### Pharmaceutical Chemistry - Theory

- \* Pharmaceutical Quality control and Quality assurance
- \* Pharmacognosy and phytochemistry
- \* Medicinal Chemistry

### Pharmaceutical Lab Course

- \* Medicinal Chemistry practical
- \* Pharmacognosy & Phytochemistry practical

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## M.Sc - DATA SCIENCE

### Programme Educational Objectives

- To become a skilled data scientist in industry, academia, or government.
- To use specialist software tools for data storage, analysis and visualization.
- To develop original ideas and solve complex problems based on advanced knowledge of the principles and methodologies of data science.
- To integrate knowledge and handle complexity in the area of computer science and information engineering.

### Scope of Employment

- Data Analyst
- Business Analyst
- Data Visualisation Engineer
- Internal Data Science Consultant
- New roles in all sectors that are experiencing digital transformation

### Programme Content (University Core)

- Matrix Theory and Linear Algebra
- English for Science and Technology
- Foreign Language
- Soft Skill
- SET Conference
- Research Methodology
- Master's Thesis

## Programme Core

- Probability Theory and Distributions
- Sampling Techniques
- Statistical Inference
- Regression Analysis and Predictive Models
- Multivariate Data Analysis
- Time series analysis and Forecasting

## University Elective

- Big- Data Analytics
- **Database Systems:** Design and Implementation
- **Algorithms:** Design and Implementation
- Machine Learning
- Data Mining and Business Intelligence

## Programme Elective

- Python Programming for Data Science
- Programming for Data Science using R
- Programming for Data Science using SPSS
- Programming for Data Science using SAS
- Programming for Data Science using MATLAB
- Programming for Data Science using MINITAB
- Design and Analysis of Experiments
- Optimization Techniques
- Statistical Quality Control
- Stochastic Process and Applications
- Reliability Theory and Survival Analysis
- Queuing Theory and Network Analysis
- Bio-Statistics
- Actuarial Statistics
- Artificial Intelligence
- Spatial Data Analytics
- Exploratory Data Analysis and Visualization

- Actuarial Statistics
- Artificial Intelligence
- Spatial Data Analytics
- Exploratory Data Analysis and Visualization
- Fuzzy Statistics

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## M.Sc - PHYSICS

### Programme Educational Objectives

To provide the highest level of knowledge at Masters level and encourage to apply it to solve the real-world societal problems through innovations.

### Scope of Employment

- Academia and Industries
- Opportunity to pursue higher education (Ph.D.) in India and abroad
- Teaching

### Programme Content

- Applied Statistical Methods
- Research Methodology
- Scientific English
- Soft Skills
- SET Projects ( Science and Engineering Technology)
- Master's Thesis

### Programme Elective

- Introduction to Solid State Physics
- Nuclear and Particle Physics
- Atomic and Molecular Physics
- Basic Electronics
- Advanced Solid state Theory
- Nanomaterials and its applications
- Optoelectronics
- Laser and Fiber Optics
- Bio Physics
- Microwave Physics and Device Technology
- Plasma Physics and Technology.

### Lab Courses

- General Physics Lab-I
- General Physics Lab-II
- Optoelectronics Lab

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