Program course offering (semester wise)

Scheme of Study for BS Program

Semester 1:

Category	Course Code	Courses	Credit Hours
Compulsory I	MTH-106	Mathematics-I	3(3,0)
Compulsory II	CHM-101	Introduction to Chemistry	3(2,1)
Compulsory III	CSC-101	Introduction to Information and Communication Technologies	3(2,1)
Compulsory IV	ENG-101	English-I (Reading & Writing Skills)	3(3,0)
Compulsory V	IST-/ETH-101	Islamic Studies or Ethics	2(2,0)
Foundation I	BIF-101	Basic Cell Biology	3(2,1)
	Total Cr. Hrs.		17

Semester 2:

Category	Course Code	Courses	Credit Hours
Compulsory VI	ENG-105	English-II (Composition Writing)	3(3,0)
Compulsory VII	GEN-101	Pakistan Studies	2(2,0)
General I	CSC-102	Programming Fundamentals	4(3,1)
Foundation II	BIF-102	Bioinformatics-I	3(2,1)
Foundation III	CHM-208	Introduction to Biochemistry	4(3,1)
	Total Cr. Hrs.		16

Semester 3:

Category	Course Code	Courses	Credit Hours
Compulsory VIII	KUM-201	Entrepreneurship	3(3,0)
Compulsory IX	MTH-101	Calculus-I	3(3,0)
General II	CSC-104	Object Oriented Programming	4(3,1)
Major I	BIF-203	Bioinformatics Computing-I	4(3,1)
Foundation IV	BIF-204	Molecular Biology	4(3,1)

		Total Cr. Hrs.	18

Semester 4:

Category	Course Code	Courses	Credit Hours
General III	SOC-101	Introduction to Sociology	3(3,0)
General IV	MTH-201	Discrete Mathematics	3(3,0)
General V	CSC-201	Data Structure and Algorithms	4(3,1)
Foundation V	BIF-205	Ethical and Legal Issues in Bioinformatics	2(2,0)
General VI	BIF-206	Bioinformatics Database Development	3(2,1)
Foundation VI	BIF-207	Essential of Genetics	3(2,1)
	Total Cr. Hrs.		18

Semester 5:

Category	Course Code	Courses	Credit Hours
Foundation VII	MTH-110	Linear Algebra and Differential Equation	3 (3,0)
Foundation VIII	BIF-308	Bioinformatics-II	3(2,1)
Foundation IX	BIF-309	Biochemistry-II	3(3,0)
Major II	BIF-310	Genomics	3(3,0)
Major III	BIF-311	Probability and Biostatistics	3(2,1)
Elective I	BIF-xxx	Elective I	3
	Total Cr. Hrs.		18

Semester 6:

Category	Course Code	Courses	Credit Hours
Foundation X	BBT-302	Recombinant DNA Technology	3(2,1)
Major IV	BIF-312	Bioinformatics Computing-II	3(2,1)
Major V	CSC-208	Artificial Intelligence	3(3,0)
Major VI	BIF-313	Modern Programming Languages	3(2,1)
Foundation XI	BIF-314	Scientific Writing	3(3,0)
Elective II	BIF-xxx	Elective II	3

		Total Cr. Hrs.	18

Semester 7:

Category	Course Code	Courses	Credit Hours
Major VII	BIF-415	Proteomics	3(3,0)
Major VIII	BIF-416	Bioinformatics Software Engineering	3(2,1)
Major IX	BIF-417	Systems Biology	3(3,0)
Major X	CSC-316	Fundamentals of Data Mining	3(2,1)
Major XI	CSC-322	Modeling and Simulation	3(2,1)
Major XII	BIF-418	Research Project part I/ Internship	3 (0,3)
	Total Cr. Hrs.		18

Semester 8:

Category	Course Code	Courses	Credit Hours
Elective III	BIF-xxx	Elective III	3
Elective IV	BIF-xxx	Elective IV	3
Major XIII	BIF-418	Research Project part II / Internship	3 (0,3)
	Total Cr. Hrs.		9
	Grand Total Cr. Hrs.		132

Foundation courses of Program

List the foundation courses of your programs

1. Basic Cell Biology
2. Bioinformatics I
3. Introduction to Biochemistry
4. Molecular Biology
5. Ethical and Legal Issues in Bioinformatics
6. Essential of Genetics
7. Linear Algebra and Differential Equation

8. Bioinformatics II
9. Biochemistry II
10. Recombinant DNA Technology
11. Scientific Writing

List of electives

Biological Sciences
Cancer genetics
Molecular oncology
Immunology
Environmental Biotechnology
Epigenetics and gene regulation
Microbial genomics and proteomics
Network Biology
Structural Bioinformatics
Microbial Forensics
Surveillance Epidemiology
Health Informatics

Computer Science
Linux of Biological Sciences
Data Science
Statistical Programming in R
Statistical methods in bioinformatics
Design and analysis of algorithms
Machine Learning
Drug Design / Cheminformatics
Computer Aided Drug Design
Pharmacoinformatics
Enzyme Kinetics
Immuno-Informatics
Pharmaceutical Chemistry
Pharmaceutical Biotechnology
Others
Nanotechnology
Biomaterials
Biophysics
Intellectual Property Rights
Digital Rights Management
Professional practices
Entrepreneurship

Specialization areas

Career Opportunities

Bioinformatics or computational biology is an interdisciplinary field of science that combines computer science, mathematics, engineering, and statistics to understand and interpret biological information. It is the application of computer technology to the management of biological data. Bioinformatics is an emerging scientific discipline with highly remunerative career options.

- Bioinformatics has become an important part of many areas of Biology. It plays an important role in Biomedical Research.
- The career prospect in Bioinformatics has been gradually increasing with the use of information technology in the area of Molecular Biology.
- Bioinformatics degree holder can work in all sectors of Pharmaceutical, Biomedical organizations, Biotechnology, scientific research institutes, hospital, industry and even NGOs.
- You can work in private & government hospitals and as a teacher in private and public colleges/universities.
- One can also find employment in manufacturing industries of various biomedical products.
- Students having a degree in Bioinformatics can be a part of the leading IT Companies.
- Other career opportunities include database design & maintenance, proteomics, pharmacology, sequence assembly & analysis, informatics developer, bio analytics, clinical pharmacologist, etc.
- Bioinformatics has applications in broad range of fields including microbial genome applications, molecular medicine, personalized medicine, gene therapy, drug development, evolutionary studies, Biotechnology, climate change studies, crop improvement, forensic analysis, improving nutritional quality and many others.

<u>Bioinformatics Lab</u>