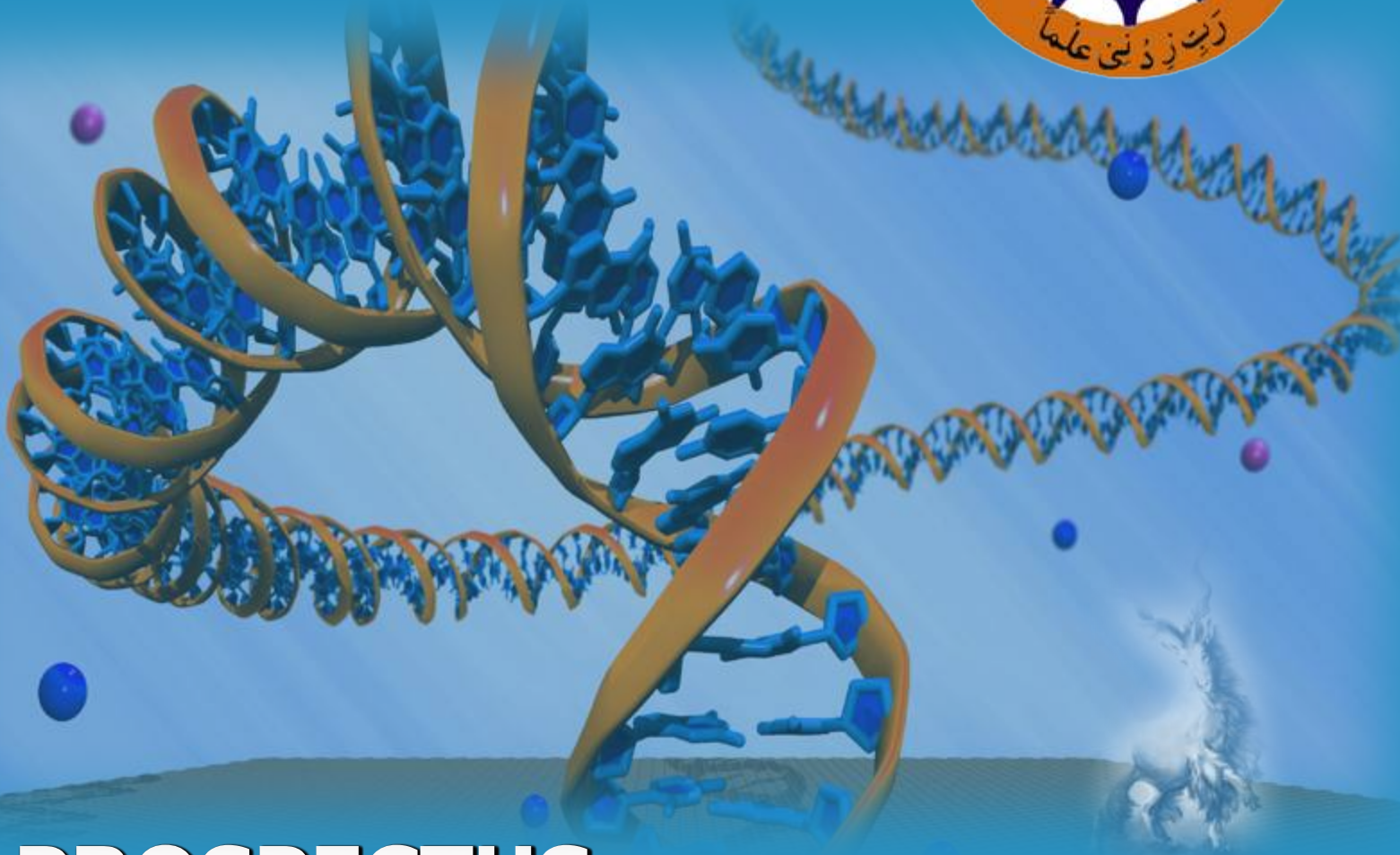


BUITEMS

Quality & Excellence in Education



PROSPECTUS

Faculty of Life Sciences & Informatics



Balochistan University of Information Technology
Engineering & Management Sciences

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Vice Chancellor's Message

Disciplines associated with Life Sciences are very important not only for economic well-being of nations and quality of life but also for the promotion of other scientific studies and disciplines like medicine, nutrition, agriculture and most of all for understanding the whole phenomenon of life on our planet; thus Research in Life Sciences is like a bridge between all sciences. It is a matter of great honor for BUIITEMS to have initiated the study programs in Biotechnology & Informatics for the first time in Pakistan, back in 2003.

The Faculty of Life Sciences and Informatics is keeping the importance of this field of study in view and has extended its teaching and research at all levels including BS, MS and PhD maintaining the world class standards. The Faculty has taken up the initiative to address the relevant regional issues and is conducting research on many disorders prevailing in humans, including genetic disorders and infectious diseases. The Faculty is also contributing in essential public services not available in the Province elsewhere by initiating development of modern facilities such as forensic DNA and molecular diagnostic laboratory. I am confident that the faculty will keep on guiding the young researchers and students to develop and match the contemporary advanced expertise in order to strengthen the initiatives which this institution has already under taken and excel for the generation of new knowledge reaching the frontline of scientific discovery.

The students choosing this branch of study will surely acquire the desired training and knowledge necessary to fulfill their objectives for successful careers in life.

Ahmed Farooq Bazai (SI)
Vice Chancellor



Dean's Message

Faculty of Life Sciences and Informatics was established in 2003 as a Center for Biotechnology and Informatics. Since its inception, the Faculty has gained significant national and international recognition and it is increasingly contributing to the global vision and mission of BUIITEMS by providing services to ensure quality and excellence in education. The Faculty is striving to achieve its academic goals in line with the legacy of



the University. I am confident that it will uphold the proud traditions of the University. The Faculty is advancing in teaching and research in the fields of agriculture, DNA technology, molecular diagnostics, genetic diseases, molecular medicine and many other areas of applied sciences crucial for the development and progress of the nation.

BUIITEMS is pioneer in introducing the degree of Biotechnology & Informatics in the country. The Biotechnology is considered to be the technology of 21st century on account of its vast applications in R&D globally. Biotechnology in modern industries is focusing on the use of enzymes, microbes and microbial products from common household cleaning to massive environmental disasters such as oil spills in seas. Faculty is also offering undergraduate and graduate courses in Microbiology which is multidisciplinary in scope and covers all aspects of life forms. We are also teaching Environmental Science, the field of science that studies the interactions of the physical, chemical, and biological components of the environment and the relationships and effects of these components on the organisms in the environment.

I am confident that the enlightened graduates of Faculty of Life Sciences will not only serve the nation, will also prove to be leading at the forefront of international scientific society. I truly believe that these ambassadors of BUIITEMS will take the ambition of the University to further heights of advancement.

Jamil Ahmad, Ph.D

Dean

Faculty of Life Sciences & Informatics



Faculty of Life Sciences & Informatics



VISION

Our vision is to conduct advanced teaching and quality research in life sciences for the profitable scientific developments of the society and to bridge the gap between academia and industry through applied research.

MISSION

Our mission is to develop human resource equipped with theoretical knowledge, technical skills and experience for understanding developments in the rapidly growing field of life sciences.

OBJECTIVES

Objectives of faculty of Life Sciences & Informatics are to:

- ↪ Study the unanimity of diversified life at chemical, molecular and cellular levels.
- ↪ Understand biological mechanisms contributing to diversity in structural and functional aspects of the organisms.
- ↪ Apply the technological procedures in agriculture, health, industry and environment.
- ↪ Apply the molecular biology / biotechnology tools for understanding, sorting and identifying the chemical and molecular information in living organisms.
- ↪ Equip the students with multi disciplinary skills for diverse careers.

Vision
Mission
& Values



LEARNING OUTCOMES

A student holding the degree in any discipline of Life Sciences will be able to:

- ↪ Understand the unity of molecular and cellular mechanisms in diversified life.
- ↪ Know the concept of the complex architecture of molecules, their expression and functional relationships.
- ↪ Understand and explore the role and inter-relationship of bio-molecules and living organisms.
- ↪ Grasp the concepts of bioinformatics in sorting out and manipulating macromolecules and understand basic and applied aspects of life.
- ↪ Apply Bioinformatics software and use of search engines effectively.

PROGRAMS OFFERED

Department of Biotechnology

1. Bachelor of Science in Biotechnology (BS)
2. Master of Science in Biotechnology (MS)
3. Doctor of Philosophy in Biotechnology (PhD)

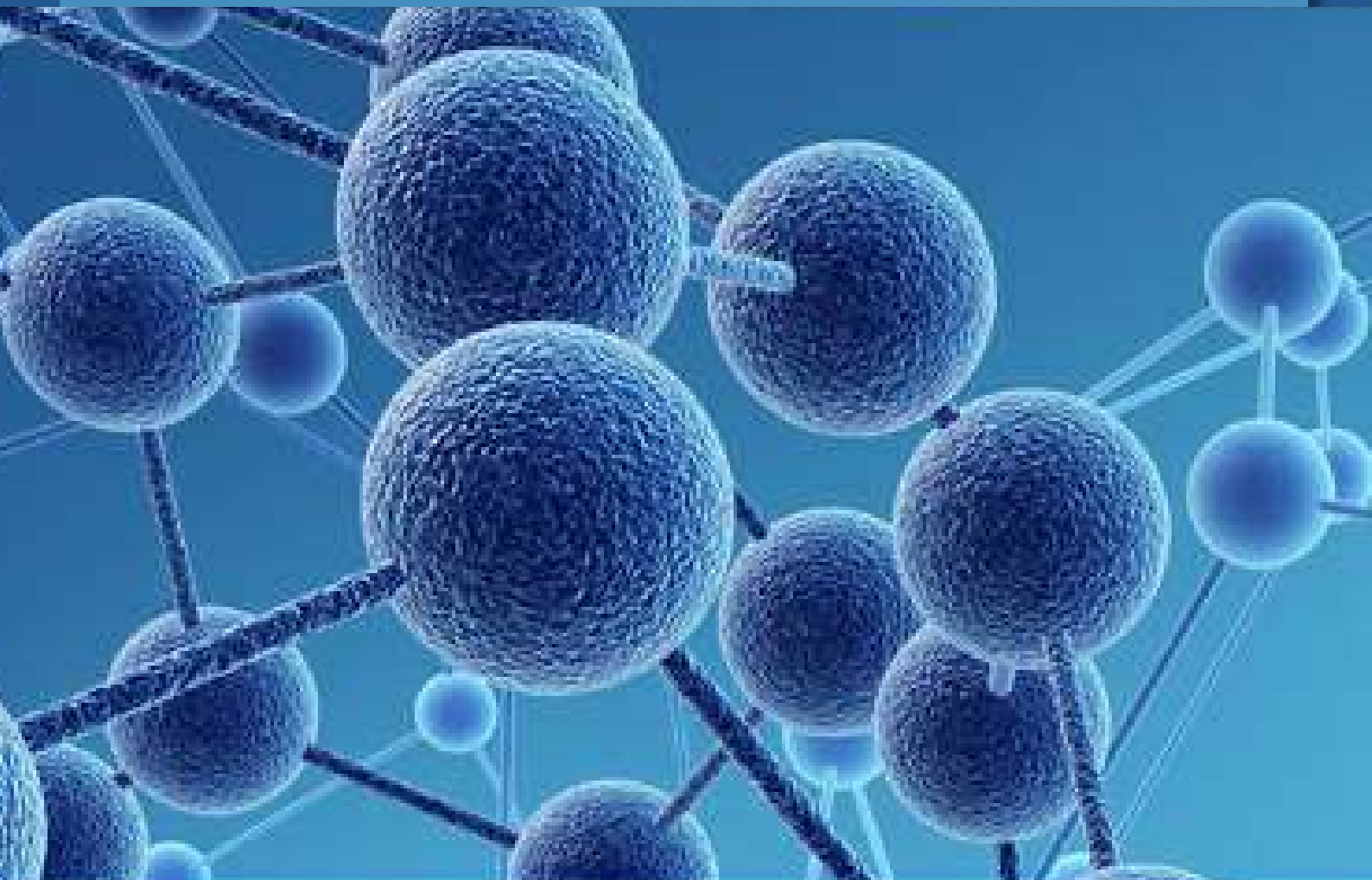
Department of Microbiology

1. Bachelor of Science in Microbiology (BS)
2. Master of Science in Microbiology (MS)
3. Doctor of Philosophy in Microbiology (PhD)

Department of Environmental Science

1. Bachelor of Science in Environmental Science (BS)
2. Master of Science in Environmental Science (MS)
3. Doctor of Philosophy in Environmental Science (PhD)

DEPARTMENT OF BIOTECHNOLOGY



DEPARTMENT OF BIOTECHNOLOGY

Introduction

Biotechnology is based on biology, especially when applied in agriculture, food and medicine. The term "biotechnology" refers to the use of biological systems, living organisms or their products to make or modify products or processes for the betterment of mankind, human health and the environment. Prehistoric biotechnologists did this as they used yeast cells to raise bread dough and to ferment alcoholic beverages, bacterial cells to make cheese and yogurt while they bred their strong, productive animals to make even stronger and more productive offspring. Modern Biotechnology is related with the use of genetically altered microorganisms such as E. coli or yeast for the production of substances like insulin or antibiotics. It is also related with transgenic animals and transgenic plants, such as Bt corn or Bt cotton. Biotechnology also corresponds with landmark breakthroughs in new medical therapies to treat diabetes, hepatitis B, hepatitis C, cancers, arthritis, haemophilia, bone fractures, multiple sclerosis, cardiovascular as well as molecular diagnostic devices. Traditional pharmaceutical drugs are small molecules that treat the symptoms of a disease or illness - one molecule directed at a single target. While on the other hand Biopharmaceuticals are large biological molecules which target the underlying mechanisms and pathways and drug responses.

Scope

Biotechnology may be as old as human civilization but modern biotechnology is less than three decades old. Traditional Biotechnology that led to the developmental processes for producing products like yogurt, vinegar, alcohol and cheese was entirely empirical and there was no understanding of the mechanisms that led to the product. In modern biotechnology, we use the in-depth understanding of molecular techniques that we have acquired in the last five decades. In case of an established product, the new biotechnological process is cheaper and better in many respects than the earlier processes. Today's biotechnology consists of many new areas; each area being characterized by the use of a different set of technologies like genetic engineering, gene therapy, immunotechnologies, tissue culture, stem cell techniques, enzyme engineering and technology, nutraceuticals, new drug-delivery systems, production of useful materials, DNA vaccines, biosensor, bioremediation, nanobiotechnology and so many others.

Degree Courses Offered

1. BS (Biotechnology)

Pre-requisite: Intermediate (Pre-medical/Pre-engineering or equivalent with 45% marks).

Scheme of Study for 4-year Bachelor of Science (BS) in Biotechnology

Semester 1

S. No.	Course Code	Course Title	Credit Hours
1	BIOL-102	Ecology, Biodiversity & Evolution – I	3(3-0)
2	BIOL-301	Cell Biology	3(2-1)
3	CHE-107	Organic Chemistry	3(2-1)
4	HUM-163	Functional English	3(3-0)
5	HUM-102	Pakistan Studies	2(2-0)
6	MATHa-114	Mathematics-I	3(3-0)
Total Credit Hours			17

Semester 2

S. No.	Course Code	Course Title	Credit Hours
1	HUM-268	Communication Skills	3(3-0)
2	HUM-101/ HUM-112	Islamic Studies / Ethics	2(2-0)
3	MATHa-104	Biomathematics	3(3-0)
4	CHE-108	Inorganic Chemistry	3(2-1)
5	BIOL-203	Ecology, Biodiversity & Evolution – II	3(2-1)
6	MICRBIOL-301	Microbiology	3(2-1)
Total Credit Hours			17

Semester 3

S. No.	Course Code	Course Title	Credit Hours
1	HUM-265	Technical writing and presentation skills	3(3-0)
2	CS-101	Introduction to Computer	3(2-1)
3	CHE-109	Physical Chemistry	3(3-0)
4	BIOCHEM-202	Biochemistry-I	3(2-1)
5	GENET-301	Genetics	3(2-1)
6	HUM-272	Sociology	3(3-0)
Total Credit Hours			18

Semester 4

S. No.	Course Code	Course Title	Credit Hours
1	PHY-206	Biological Physics	3(3-0)
2	STAT-303	Probability & Biostatistics	3(3-0)
3	CHE-301	Analytical Chemistry & Instrumentation	3(2-1)
4	BIOCHEM-404	Biochemistry-II	3(2-1)
5	MOLBIOL-301	Molecular Biology	3(2-1)
6	MKTG-205	Marketing	3(3-0)
Total Credit Hours			18

Semester 5

S. No.	Course Code	Course Title	Credit Hours
1	BIOTECH-103	Introduction to Biotechnology	3(3-0)
2	IMMUNOL-302	Immunology	3(2-1)
3	MOLBIOL-403	Methods in Molecular Biology	3(1-2)
4	BIOCHE-302	Principles of Biochemical Engineering	3(2-1)
5	BIOINFO-202	Introduction to Bioinformatics	3(2-1)
Total Credit Hours			15

Semester 6

S. No.	Course Code	Course Title	Credit Hours
1	BIOL-204	Genetic Resources & Conservation	3(3-0)
2	BIOTECH-320	Microbial Biotechnology	3(2-1)
3	BIOTECH-402	Plant Biotechnology	3(2-1)
4	BIOTECH-309	Dairy and Food Biotechnology	3(2-1)
5	METHOD-304	Research Methodology	3(3-0)
6	–	Elective-I	3
Total Credit Hours			18

Semester 7

S. No.	Course Code	Course Title	Credit Hours
1	BIOTECH-404	Genomics & Proteomics	3(2-1)
2	BIOTECH-310	Health Biotechnology	3(2-1)
3	THESIS-480	Research project/ Internship	*
4	BIOTECH- 407	Environmental Biotechnology	3(2-1)
5	BIOTECH-316	Seminar-I	1(1-0)
6	–	Elective-II	3
Total Credit Hours			13

Semester 8

S. No.	Course Code	Course Title	Credit Hours
1	BIOTECH-302	Industrial Biotechnology	3(2-1)
2	BIOTECH-311	Biosafety & Bioethics	2(1-1)
3	THESIS-480	Research project/ Internship	6(0-6)*
4	–	Elective-III	3
5	–	Elective-IV	3
6	BIOTECH-429	Seminar-II	1(1-0)
Total Credit Hours			18

*Credit hours included in semester 8

TOTAL CREDIT HOURS: 134

LIST OF ELECTIVES

S. No.	Course Code	Course Title	Credit Hours
1	BIOTECH-313	Animal Biotechnology	3(2-1)
2	BIOTECH-315	Marine Biotechnology	3(2-1)
3	BIOL-401	Radiobiology	3(3-0)
4	ENVIRON-403	Hospital Waste Management	3(2-1)
5	ENVIRON-404	Water and Waste-water Treatment	3(2-1)
6	BIOTECH-426	Nano Biotechnology	3(3-0)
7	BIOTECH-319	Fungal Biotechnology	3(2-1)
8	BIOTECH-317	Pharmaceutical Biotechnology	3(3-0)
9	BIOTECH-427	Biosensors	3(3-0))
10	BIOTECH-428	Biofuels and Bio refineries	3(3-0)
11	MOLBIOL-404	Molecular Diagnostics	3(2-1)
12	BIOTECH-201	Cell and Tissue Culture	3(2-1)
13	VIROL-301	Virology	3(3-0)
14	BIOTECH-314	Fermentation Biotechnology	3(2-1)

2. MS (Biotechnology)

Pre-requisite: BS Biotechnology or equivalent degree with CGPA \geq 2.0 or Minimum 16 years of education in life sciences discipline with 50% marks.

Scheme of Study for Master of Science (MS) in Biotechnology

Semester 1

S. No.	Course Code	Course Title	Credit Hours
1	BIOTECH- 602	Modern Biotechnology: Principles & Applications	3(3-0)
2	BIOTECH- 617	Developments in rDNA Technology	3(3-0)
3	MOLBIOL- 601	Advance Molecular Biology	3(3-0)
4	–	Elective (From the approved list)	3(3-0)
Total Credit Hours			12

Semester 2

S. No.	Course Code	Course Title	Credit Hours
1	BIOCHEM-604	Advance Biochemistry	3(3-0)
2	BIOCHEM-639	Research Methods in Biotechnology	3(3-0)
3	STAT-601	Biostatistics	3(3-0)
4	–	Elective (From the approved list)	3(3-0)
Total Credit Hours			12

Semester 3

S. No.	Course Code	Course Title	Credit Hours
1	THESIS-601	Research & Thesis (continued in the fourth semester)	In progress
Total Credit Hours			In progress

Semester 4

S. No.	Course Code	Course Title	Credit Hours
1	THESIS-601	Research & Thesis	6(0-6)
Total Credit Hours			6

TOTAL CREDIT HOURS: 30

Summary:

Course Work: 24 Credit Hours
Thesis: 06 Credit Hours

S. No.	Course Code	Course Title	Credit Hours
1	BIOTECH-502	Advances in Vaccine Research	3(3-0)
2	BIOTECH-503	Applications of Nanobiotechnology	3(3-0)
3	BIOTECH-504	Bioethics, Biosecurity, Biosafety	3(3-0)
4	BIOTECH-505	Biopharming in Plants, Principles and Techniques	3(3-0)
5	BIOTECH-506	Bioprocess Technology	3(3-0)
6	BIOTECH-507	Bioremediation and biodegradation	3(3-0)
7	BIOTECH-508	Biotechnology Law & Regulation	3(3-0)
8	BIOTECH-509	Biotechnology of Nonrenewable Resources	3(3-0)
9	BIOTECH-510	Medicinal Plant Biotechnology	3(3-0)
10	BIOTECH-511	Metabolic Engineering and Biofuels	3(3-0)
11	BIOTECH-512	Microbial Enzyme Technology	3(3-0)
12	BIOTECH-513	Molecular Basis of Plant Breeding	3(3-0)
13	BIOTECH-514	Molecular Systematics	3(3-0)
14	BIOTECH-515	Protein Engineering and Enzyme Technology	3(3-0)
15	BIOTECH-628	Advances in Agriculture Biotechnology	3(3-0)
16	BIOTECH-629	Advances in Animal Biotechnology	3(3-0)
17	BIOTECH-630	Advances in animal cell Culture	3(3-0)
18	BIOTECH-631	Advances in Environmental Biotechnology	3(3-0)
19	BIOTECH-632	Advances in Fermentation Technology	3(3-0)
20	BIOTECH-633	Advances in Fungal Biotechnology	3(3-0)
21	BIOTECH-634	Advances in Health Biotechnology	3(3-0)
22	BIOTECH-635	Advances in Industrial Biotechnology	3(3-0)
23	BIOTECH-636	Advances in Plant Biotechnology	3(3-0)
24	BIOTECH-637	Advances in Plant Tissue Culture	3(3-0)
25	BIOTECH-638	Advances in Proteomics	3(3-0)
26	BIOCHEM-503	Advances in Protein Chemistry	3(3-0)
27	BIOCHEM-504	Metabolic Pathways in Plants	3(3-0)
28	BIOINFO-602	Advances in Bioinformatics	3(3-0)
29	BIOL-501	Advances in Biosensor Technologies	3(3-0)
30	BIOL-502	Biological Safety and Risk Management	3(3-0)
31	BIOL-503	Cellular Signaling	3(3-0)
32	BIOL-504	Molecular Evolution	3(3-0)
33	GENET-501	Advances in Microbial Genetics	3(3-0)
34	GENET-601	Advances in Molecular Genetics	3(3-0)
35	GENOMICS-601	Advances in Genomics	3(3-0)
36	GENOMICS-602	Advances in Pharmacogenomics	3(3-0)
37	IMMUNOL-601	Advances in Immunology	3(3-0)
38	MICRBIOL-501	Advances in Microbiology	3(3-0)
39	MOLBIOL-604	Forensic Sciences	3(3-0)
40	MOLBIOL-605	Regulation of Gene Expression	3(3-0)
41	MOLBIOL-607	Advances in Cell and Molecular Biology	3(3-0)
42	MOLBIOL-608	Recent trends in Molecular Diagnostics	3(3-0)
43	MOLBIOL-609	Molecular Basis of Plant Development	3(3-0)
44	PHY-503	Biophysics	3(3-0)
45	STAT-501	Biostatistics & Laboratory Mathematics	3(3-0)

3. PhD (Biotechnology)

Pre-requisite: MS Biotechnology or equivalent degree in Life Sciences discipline with CGPA \geq 3.0 or 70% marks

Scheme of Study for Doctor of Philosophy (PhD) in Biotechnology

Semester 1

S. No.	Course Code	Course Title	Credit Hours
1	BIOTECH-713 BIOTECH-701	Plant and Agriculture Biotechnology or Animal and Biomedical Biotechnology	3(3-0)
2	GENOMICS-701	Functional Genomics	3(3-0)
3	METHOD-701	Experimental Design & Analysis	3(3-0)
Total Credit Hours			9

Semester 2

S. No.	Course Code	Course Title	Credit Hours
1	BIOTECH-807	Research Specialization -I	3(3-0)
2	BIOTECH-808	Research Specialization -II	3(3-0)
3	BIOTECH-809	Research Specialization -III	3(3-0)
Total Credit Hours			9

TOTAL CREDIT HOURS: 18

Semester 3 - 6

S. No.	Course Code	Course Title
1	DSS-990	Research & Thesis

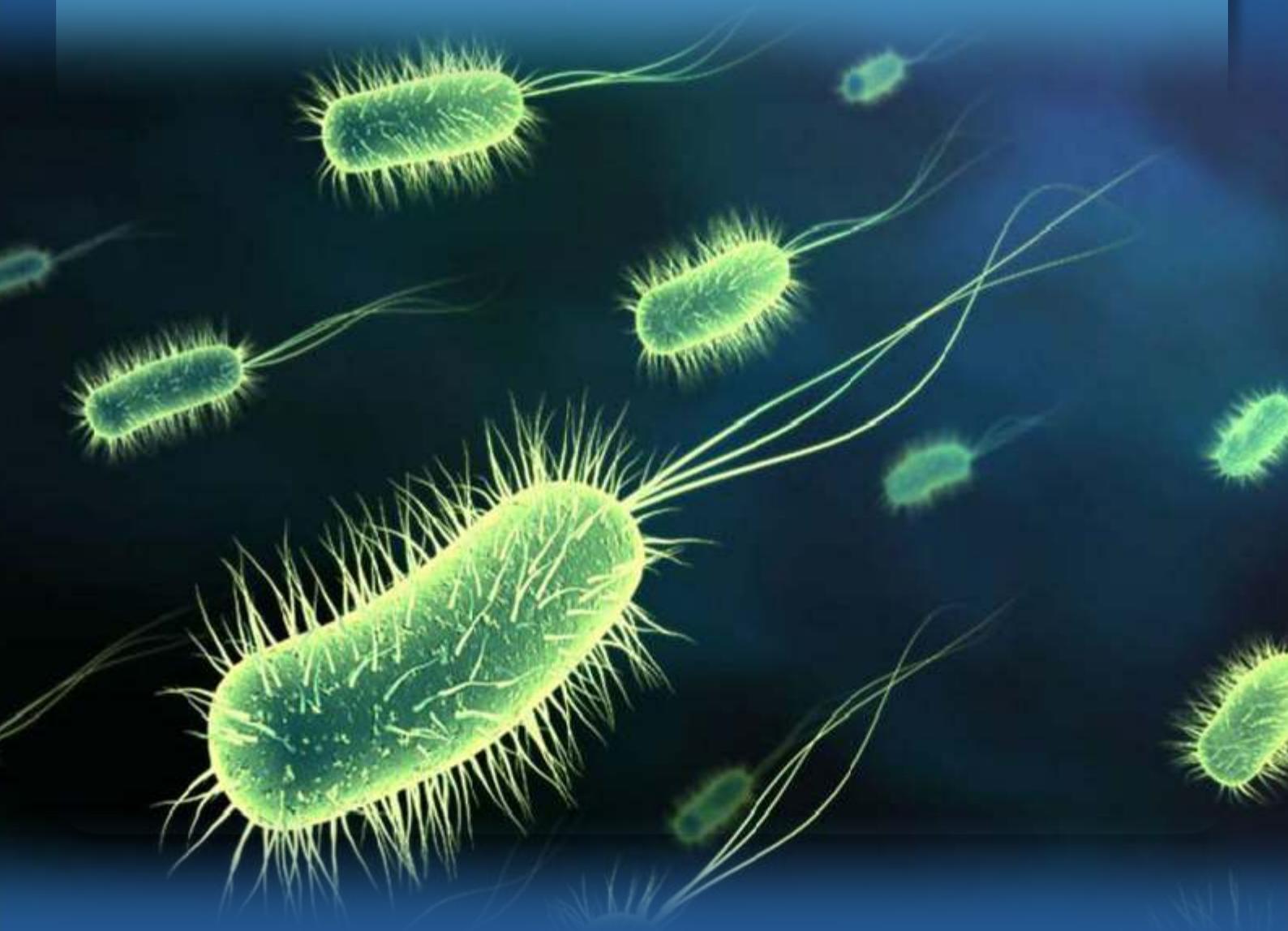
Summary:

Course Work:
Thesis:

18 Credit Hours
Student will have to carry out research work for a minimum period of two years

S. No.	Course Code	Course Title	Credit Hours
1	BIOINFO-702	Agriculture Bioinformatics	3(3-0)
2	EPIDEMO-701	Epidemiology	3(3-0)
3	BIOTECH-704	Biofuel and Biorefinery	3(3-0)
4	BIOL-701	Radiobiology	3(3-0)
5	BIOTECH-705	Biomaterial	3(3-0)
6	BIOINFO-801	Current Trends in Bioinformatics	3(3-0)
7	BIOTECH-706	Diagnostics	3(3-0)
8	BIOTECH-707	Fungal Biotechnology	3(3-0)
9	BIOTECH-708	Industrial Biotechnology	3(3-0)
10	BIOTECH-709	Marine Biotechnology	3(3-0)
11	BIOTECH-710	Pharmaceutical Biotechnology	3(3-0)
12	BIOINFO-802	Biomedical Informatics	3(3-0)
13	BIOTECH-711	Waste Management	3(3-0)
14	NUTR-802	Edible Oil Seed & Health Nutrition	3(3-0)
15	GENOMICS-801	Gene Microarray	3(3-0)
16	BIOTECH-712	Water and Waste Water Treatment	3(3-0)
17	BIOTECH-802	Nanobiotechnology	3(3-0)
18	BIOTECH-807	Bioremediation	3(3-0)
19	GENOMICS-702	Microarray Technology	3(3-0)
20	MICRBIOL-801	Microbial Genetics	3(3-0)
21	BIOTECH-808	Plant Biotechnology	3(3-0)
22	GENOMICS-703	Nutrigenomics	3(3-0)
23	BIOTECH-810	Contemporary Plant Biotechnology	3(3-0)
24	BIOTECH-811	Contemporary Animal Biotechnology	3(3-0)
25	BIOTECH-812	Contemporary Agriculture Biotechnology	3(3-0)
26	GENET-802	Protein Microarray	3(3-0)
27	BIOL-801	Biology of Oil Seeds & Nutrition	3(3-0)
28	BIOTECH-813	Contemporary Health Biotechnolog	3(3-0)
29	BIOTECH-814	Advance Research Reading-III	3(3-0)
30	BIOTECH-807	Research Specialization-I	3(3-0)
31	BIOTECH-808	Research Specialization-II	3(3-0)
32	GENET-803	Transcriptomics	3(3-0)
33	MOLBIOL-701	Transgenicity & Applications	3(3-0)
34	BIOTECH-809	Research Specialization-III	3(3-0)
35	ELE-731	Bioelectronics & Biosensor	3(3-0)
36	EPIDEOM-801	Molecular Epidemiology of Hepatitis	3(3-0)
37	GENET-804	Gene Expression and Replication of Hapatitis Virus	3(3-0)
38	GENET-805	Genetics Diversity of Hepatitis Virus	3(3-0)

DEPARTMENT OF MICROBIOLOGY



DEPARTMENT OF MICROBIOLOGY

Introduction

Microbiology is the systematic study of the structures, functions, uses and modes of existence of organisms which are too small to be seen with naked eyes *viz.*, bacteria, algae, protozoa, fungi and acellular agents like viruses and prions. These microorganisms are cosmopolitan in distribution and play vital role in their particular ecological niches due to their wide physiological activities. They are integral part of modern biotechnology, agricultural industries, environmental protection and production of medicines. On the contrary, they are important pathogens of plants and animals including humans, hence became the major focus of scientists for their diagnostics and control strategies.

Scope

The degree programs of Microbiology are designed to train the students in microbiological techniques and to give an insight in the applied areas of the subject and their relationship with other life sciences disciplines. Microbiology is essential for health sciences, agriculture, environment, marine sciences and rapidly growing biotechnology industry. This integration of microbiology is vital in all disciplines of life and is opening the doors for our graduates to different professional fields. They can work as scientists in research organizations, as clinical laboratory professionals, as microbiologists in food processing industries and as technologists in bio-medical equipment providing companies as well as academicians in public and private sector universities.

Degree Courses Offered

1. BS (Microbiology)

Pre-requisite: Intermediate (Pre-medical or equivalent with 45% marks).

Scheme of Study for 4-year Bachelor of Science (BS) in Microbiology

Semester 1

S. No.	Course Code	Course Title	Credit Hours
1	HUM-163	Functional English	3(3-0)
2	HUM-102	Pakistan Studies	2(2-0)
3	MATHA-114	Mathematics- I (Algebra)	3(3-0)
4	BIOCHEM-202	Biochemistry-I	3(2-1)
5	PHYSIOL-101	Human Physiology-I	3(2-1)
6	MICRBIOL-102	Fundamentals of Microbiology-I	4(3-1)
Total Credit Hours			18

Semester 2

S. No.	Course Code	Course Title	Credit Hours
1	HUM-268	Communication Skills	3(3-0)
2	HUM-101/112	Islamic Studies / Ethics	2(2-0)
3	MATHa-115	Mathematics-II (Calculus)	2(3-0)
4	BIOCHEM-404	Biochemistry-II	3(2-1)
5	PHYSIOL-202	Human Physiology-II	3(2-1)
6	MICRBIOL-203	Fundamentals of Microbiology-II	4(3-1)
		Total Credit Hours	18

Semester 3

S. No.	Course Code	Course Title	Credit Hours
1	CS-101	Introduction to Computer	3(2-1)
2	HUM-265	Technical Writing and Presentation Skills	3(3-1)
3	GENET-301	Genetics	3(2-1)
4	ECOLOGY-202	Ecology and Ecosystem	3(2-1)
5	MICRBIOL-308	Microbial Taxonomy	3(2-1)
6	BIOTECH-203	Fundamentals of Biotechnology	3(2-1)
		Total Credit Hours	18

Semester 4

S. No.	Course Code	Course Title	Credit Hours
1	BIOL-205	Biodiversity of Animals	3(2-1)
2	ENVIRON-303	Current Environmental Issues	3(2-0)
3	VIROL-201	General Virology	3(2-1)
4	BIOL-301	Cell Biology	3(2-1)
5	MYCOL-201	Mycology	3(2-1)
		Total Credit Hours	15

Semester 5

S. No.	Course Code	Course Title	Credit Hours
1	BIOSAFE-302	Biosafety and Risk Management	3(3-0)
2	IMMUNOL-302	Immunology	3(2-1)
3	MICRBIOL-310	Microbial Anatomy & Physiology	3(2-1)
4	EPIDEMO-301	Epidemiology	3(2-1)
5	MOLBIOL-301	Molecular Biology	3(2-1)
		Total Credit Hours	15

Semester 6

S. No.	Course Code	Course Title	Credit Hours
1	METHOD-302	Research Methodology	3(3-0)
2	MICRBIOL-402	Soil Microbiology	4(3-1)
3	MICRBIOL-309	Food Microbiology	3(2-1)
4	MICRBIOL-307	Fresh Water Microbiology	3(2-1)
5	BACTRIOL-401	Clinical Bacteriology	4(3-1)
		Total Credit Hours	17

Semester 7

S. No.	Course Code	Course Title	Credit Hours
1	MICRBIOL-406	Molecular Mechanism of Antimicrobial Drugs	4(3-1)
2	MICRBIOL-304	Marine Microbiology	3(2-1)
3	BIOCHEM-430	Genetics Engineering	4(3-1)
4	MICRBIOL-404	Medical Microbiology	3(2-1)
5	IMMUNOL-400	Applied Immunology	3(2-1)
Total Credit Hours			17

Semester 8

S. No.	Course Code	Course Title	Credit Hours
1	GENET-402	Bacterial Genetics	4(3-1)
2	THESIS-401	Research Project/ Internship	6(0-6)
3	STAT-401	Biostatistics	3(2-1)
4	BIOL-402	Plant Pathology	3(2-1)
Total Credit Hours			16

TOTAL CREDIT HOURS: 134**Summary of Courses**

	Compulsory		General		Foundation		Major		Elective		Total	
	Courses	Credits	Courses	Credits	Courses	Credits	Courses	Credits	Courses	Credits	Courses	Credits
Semester I	3	8	2	6	1	4	0	0	0	0	6	18
Semester II	3	8	2	6	1	4	0	0	0	0	6	18
Semester III	2	6	2	6	2	6	0	0	0	0	6	18
Semester IV	0	0	2	6	3	9	0	0	0	0	5	15
Semester V	0	0	0	0	2	6	3	9	0	0	5	15
Semester VI	0	0	0	0	1	3	4	14	0	0	5	17
Semester VII	0	0	0	0	0	0	3	11	2	6	5	17
Semester VIII	0	0	0	0	0	0	2	10	2	6	4	16
Total	8	22	8	24	10	32	12	44	4	12	42	134

Total Courses: 42**Total Credit Hours: 134**

S. No.	Course Code	Course Title	Credit Hours
1	IMMUNOL-400	Applied Immunology	3(2-1)
2	MICRBIOL-404	Veterinary Microbiology	3(2-1)
3	MICRBIOL-404	DNA Damage, Repair and Carcinogenesis	3(2-1)
4	MICRBIOL-404	Industrial Microbiology	3(2-1)
5	STAT-401	Biostatistics	3(2-1)
6	MICRBIOL-404	Medical Microbiology	3(2-1)
7	BIOL-402	Plant Pathology	3(2-1)

2. MS (Microbiology)

Pre-requisite: BS Microbiology or equivalent degree with CGPA ≥ 2.0 or Minimum 16 years of education in Life Sciences discipline with 50% marks.

Scheme of Study for Master of Science (MS) in Microbiology

Semester 1

S. No.	Course Code	Course Title	Credit Hours
1	BIOTECH-640	Genomics and Proteomics	3(3-0)
2	METHOD-502	Instrumentation and Bioanalytical Techniques	3(3-0)
3	–	Elective-I	3(3-0)
4	–	Elective-II	3(3-0)
Total Credit Hours			12

Semester 2

S. No.	Course Code	Course Title	Credit Hours
1	BIOL-505	Cell Biology and Systematics	3(3-0)
2	METHOD-503	Research Methodology	3(3-0)
3	–	Elective-III	3(3-0)
4	–	Elective-IV	3(3-0)
Total Credit Hours			12

Semester 3

S. No.	Course Code	Course Title	Credit Hours
1	THESIS-601	Research & Thesis (continued in the fourth semester)	In progress
Total Credit Hours			In progress

Semester 4

S. No.	Course Code	Course Title	Credit Hours
1	THESIS-601	Research & Thesis	6(0-6)
Total Credit Hours			6

TOTAL CREDIT HOURS: 30

Summary:

Course Work:	24 Credit Hours
Thesis:	06 Credit Hours

S. No.	Course Code	Course Title	Credit Hours
1	MICROBIOL-602	Advance Bacteriology	3(3-0)
2	MICROBIOL-603	Advance Mycology	3(3-0)
3	MICROBIOL-604	Advance Parasitology	3(3-0)
4	MICROBIOL-605	Advance Virology	3(3-0)
5	MICROBIOL-502	Microbial Metabolic Regulation	3(3-0)
6	MICROBIOL-606	Advance Molecular Microbiology	3(3-0)
7	MICROBIOL-607	Advance Microbial Physiology	3(3-0)
8	MICROBIOL-608	Advance Plant Pathology	3(3-0)
9	MICROBIOL-609	Advance Veterinary Microbiology	3(3-0)
10	MICROBIOL-503	Control of Plant Microbial Diseases	3(3-0)
11	MICROBIOL-504	Current development in Plant Diseases Diagnosis	3(3-0)
12	MICROBIOL-505	Pathogens of Aquatic Animals	3(3-0)
13	MICROBIOL-506	Pathogens of Plant Diseases	3(3-0)
14	MICROBIOL-507	Plant viral Diseases	3(3-0)
15	MICROBIOL-610	Advance Immunology	3(3-0)
16	MICROBIOL-611	Advance Medical Mycology	3(3-0)
17	MICROBIOL-508	Clinical Molecular Diagnostics	3(3-0)
18	MICROBIOL-509	Molecular Mechanism of Anti-microbial drugs	3(3-0)
19	MICROBIOL-510	Epidemiology: Analytical & expedited Approaches	3(3-0)
20	MICROBIOL-511	Molecular Pathogenesis	3(3-0)
21	MICROBIOL-512	Vaccinology	3(3-0)
22	MICROBIOL-513	Microbial Pollution and Waste management	3(3-0)
23	MICROBIOL-514	Microbiology of Soil and Bioremediation	3(3-0)
24	MICROBIOL-515	Public Health Microbiology	3(3-0)
25	MICROBIOL-516	Current Advances in Food Preservation and Packaging	3(3-0)
26	MICROBIOL-517	Food Borne Diseases	3(3-0)
27	MICROBIOL-612	Advance Dairy Microbiology	3(3-0)
28	MICROBIOL-613	Bioreactors & Biosensors	3(3-0)
29	MICROBIOL-518	Fermentations and its industrial applications	3(3-0)
30	MICROBIOL-519	Industrial Microbiology	3(3-0)
31	MICROBIOL-520	Pharmaceutical Microbiology	3(3-0)
32	MICROBIOL-521	Innovations in Microbial Fermentation Technology	3(3-0)
33	MICROBIOL-522	Microbial Enzyme Technology	3(3-0)
34	MICROBIOL-523	Microbial Strain development for Industry	3(3-0)
35	MICROBIOL-614	Microbial Genomics and Bioinformatics	3(3-0)
36	MICROBIOL-615	Microbial Transcriptomics and Bioinformatics	3(3-0)
37	MICROBIOL-616	Microbial Proteomics and Bioinformatics	3(3-0)
38	MICROBIOL-617	Microbial Phylogenomics	3(3-0)
39	MICROBIOL-618	Computer Aided Drug Designing	3(3-0)
40	MICROBIOL-524	Microbial Systems Biology	3(3-0)
41	MICROBIOL-619	Microbial Patho-Informatics	3(3-0)

3. PhD (Microbiology)

Pre-requisite: MS Microbiology with CGPA \geq 3.0 or 70% marks

Scheme of Study for Doctor of Philosophy (PhD) in Microbiology

Semester 1

S. No.	Course Code	Course Title	Credit Hours
1	–	Elective-I	3(3-0)
2	–	Elective-II	3(3-0)
3	–	Elective-III	3(3-0)
Total Credit Hours			9

Semester 2

S. No.	Course Code	Course Title	Credit Hours
1	–	Elective-IV	3(3-0)
2	–	Elective-V	3(3-0)
3	–	Elective-VI	3(3-0)
Total Credit Hours			9

TOTAL CREDIT HOURS: 18

Semester 3 - 6

S. No.	Course Code	Course Title
1	DSS-990	Research & Thesis

Summary:

Course Work:
Thesis:

18 Credit Hours
Student will have to carry out research work for a minimum period of two years

S. No.	Course Code	Course Title	Credit Hours
1	BACTERIOL-801	Recent Trends in Plant Bacteriology	3(3-0)
2	BACTERIOL-802	Advance Clinical Bacteriology	3(3-0)
3	BIOCHEM-702	Biology and Biochemistry of Viruses	3(3-0)
4	BIOETH-701	Ethical Issues in Scientific Research	3(3-0)
5	BIOINFO-803	Advance Microbial Patho-informatics	3(3-0)
6	BIOSTAT-701	Applied Biostatistics	3(3-0)
7	CLINDIAG-701	Recent Trends Clinical Microbial Diagnostics	3(3-0)
8	EPIDEMO-702	Molecular Epidemiology of Microbes	3(3-0)
9	EPIDEMO-703	Advance Epidemiology and Public Health	3(3-0)
10	GENET-805	Heterologous Gene Expression Systems	3(3-0)
11	GENET-804	Signal Transduction	3(3-0)
12	GENOMICS-802	Comparative Microbial Genomics	3(3-0)
13	MICROBIOL-701	Environmental Microbiology and Ecology	3(3-0)
14	MICROBIOL-702	Microbiology, Immunology and Immunotherapeutics	3(3-0)
15	MICROBIOL-703	Anaerobic Microbiology and Biotechnology	3(3-0)
16	MICROBIOL-704	Energy Transformation in Microorganisms	3(3-0)
17	MICROBIOL-705	Microbial Metabolism and Energetics	3(3-0)
18	MICROBIOL-706	Microbial Metabolic Engineering	3(3-0)
19	MICROBIOL-707	Current Trends in Microbiology	3(3-0)
20	MICROBIOL-708	Experimental Microbiology	3(3-0)
21	MICROBIOL-709	Global Public and Health Microbiology	3(3-0)
22	MICROBIOL-710	Microbiological Control of Plant Diseases and Weeds	3(3-0)
23	MICROBIOL-802	Microbial Evolution, Genomics and Metagenomics	3(3-0)
24	MICROBIOL-803	Cellular and Molecular Microbiology	3(3-0)
25	MICROBIOL-804	Microbiology of Human Pathogens	3(3-0)
26	MICROBIOL-703	Modern Methods in Molecular Biology	3(3-0)
27	MICROBIOL-704	Molecular Cell Biology	3(3-0)
28	MOLSYS-801	Advance Microbial Molecular Systematics	3(3-0)
29	MYCOL-801	Recent Trends in Plant Mycology	3(3-0)
30	MYCOL-802	Advance Clinical Mycology	3(3-0)
31	PATHLOGY-701	Problems in Plant Pathology	3(3-0)
32	PATHLOGY-702	Microbial Plant Disease Forecasting	3(3-0)
33	PATHLOGY-703	Host-Pathogen Interactions	3(3-0)
34	PATHLOGY-704	Human Quarantine and Diseases	3(3-0)
35	PATHLOGY-705	Plant Quarantine and Diseases	3(3-0)
36	PHARGENO-801	Advance Computer Aided Drug Designing	3(3-0)
37	RES-703	Advance Techniques in Microbiology and Cell Science	3(3-0)
38	RES-704	High Impact Research Writing Skills	3(3-0)
39	BIOL-802	Advance Microbial Systems Biology	3(3-0)
40	VIROL-801	Recent Trends in Plant Virology	3(3-0)
41	VIROL-802	Advance Clinical Virology	3(3-0)

DEPARTMENT OF ENVIRONMENTAL SCIENCE



Department of Environmental Science

Introduction

Environmental science is interdisciplinary area of subject involving different fields of studies. In Environmental Science, Biologists, Ecologists, Geologists, Chemists, Physicists, Engineers, Mathematicians, Computer Scientists and Biomedical experts synchronously work to investigate environmental issues, their underlying causes and their health implications on humans and biota. This unique juxtaposition of several sciences in one department fosters cooperation and exchange among traditional disciplines that share similar methodological and philosophical problems. An environmental scientist also have understanding of economics, sociology and political science to effectively understand the complex interaction of humans with the environment to develop policies and to communicate with the government for sustainable development and natural resource management. Department of Environmental Science at BUIITEMS is committed to excellence in teaching, research and service to the community and policy makers.

Scope

There is significant demand for environmental scientists to monitor environmental quality, interpret the impact of human actions on ecosystems, sustainable use of natural resources and develop strategies for restoring damaged and deteriorating ecosystems. This interdisciplinary science opens great many opportunities for our graduates in diverse fields of industry, academia, natural resource management, disaster management and public health.

Degree Courses Offered

1. BS (Environmental Science)

Pre-requisite: Intermediate (Pre-medical/Pre-engineering or equivalent with 45% marks or DAE in Civil, Petroleum & Gas, Chemical).

Scheme of Study for 4-year Bachelor of Science (BS) in Environmental Science

Semester 1

S. No.	Course Code	Course Title	Credit Hours
1	ENVIRON-101	Introduction to Environmental Science	3(3-0)
2	BIOL-202	Fundamentals of Biology-I	3(2-1)
3	CHE-106	Basic Chemistry	3(2-1)
4	MATHa-114	Mathematics-I (Algebra)	3(3-0)
5	HUM-163	Functional English	3(3-0)
6	HUM-102	Pakistan Studies	2(2-0)
Total Credit Hours			17

Semester 2

S. No.	Course Code	Course Title	Credit Hours
1	GEOE-101	Introduction to Earth Science	3(2-1)
2	BIOL-304	Fundamentals of Biology-II	3(2-1)
3	MATHa-115	Mathematics-II (Calculus)	3(3-0)
4	HUM-272	Sociology	3(3-0)
5	HUM-268	Communication Skills	3(3-0)
6	HUM-101/ HUM-112	Islamic Studies / Ethics	2(2-0)
Total Credit Hours			17

Semester 3

S. No.	Course Code	Course Title	Credit Hours
1	CS-101	Introduction to Computer	3(2-1)
2	CHE-203	Environmental Chemistry	3(2-1)
3	PHY-431	Environmental Physics	3(2-1)
4	ECON-204	Introduction to Economics	3(3-0)
5	HUM-264	Technical Writing and Presentation skills	3(3-0)
6	MATHa-201	Introduction to Statistics	3(3-0)
Total Credit Hours			18

Semester 4

S. No.	Course Code	Course Titles	Credit Hours
1	BIOTECH-203	Fundamentals of Ecology	3(3-0)
2	MICRBIOL-306	Environmental Microbiology	3(2-1)
3	ENVIRON-201	Environmental Pollution	3(3-0)
4	ARCH-142	Climatology	3(3-0)
5	HUM-138	Psychology	3(3-0)
6	TOXICOL-201	Environmental Toxicology	3(2-1)
Total Credit Hours			18

Semester 5

S. No.	Course Code	Course Title	Credit Hours
1	BIOTECH-310	Applied Ecology	3(2-1)
2	—	Elective I	3
3	ENVIRON-301	Environmental Profile of Pakistan	3(3-0)
4	ECON-401	Environmental Economics	3(3-0)
5	ENVIRON-321	Analytical Techniques in Environmental Science	3(1-2)
6	—	Elective II	3
Total Credit Hours			18

Semester 6

S. No.	Course Code	Course Title	Credit Hours
1	IT-316	GIS & Remote Sensing	4(2-2)
2	ENVIRON-421	Environmental Policy and Law	3(3-0)
3	BIOL-304	Biodiversity & Conservation	3(3-0)
4	ENVIRON-441	Environmental Monitoring	3(2-1)
5	—	Elective III	3
Total Credit Hours			16

Semester 7

S. No.	Course Code	Course Title	Credit Hours
1	ENVIRON-302	Climate Change	3(3-0)
2	ENVIRON-443	Environmental Impact Assessment	3(3-0)
3	ENVIRON-341	Natural Resource Management	3(3-0)
4	RES-201	Research Methods in Environmental Science	3(3-0)
5	ENVIRON-401	Pollution Control Technologies	3(3-0)
Total Credit Hours			15

Semester 8

S. No.	Course Code	Course Title	Credit Hours
1	ENVIRON-444	Environmental Management Systems	3(3-0)
2	ENVIRON-402	Public Health and Environment	3(3-0)
3	—	Elective IV	3
4	ENVIRON-495	Research Project / Internship	6(0-6)
Total Credit Hours			15

TOTAL CREDIT HOURS : 134

Summary of Courses

	Compulsory		General		Foundation		Major		Elective		Total	
	Courses	Credits	Courses	Credits	Courses	Credits	Courses	Credits	Courses	Credits	Courses	Credits
Semester I	3	8	2	6	1	3	0	0	0	0	6	17
Semester II	3	8	2	6	1	3	0	0	0	0	6	17
Semester III	2	6	2	6	2	6	0	0	0	0	6	18
Semester IV	0	0	1	3	4	12	1	3	0	0	6	18
Semester V	0	0	0	0	2	6	2	6	2	6	6	18
Semester VI	0	0	0	0	0	0	4	13	1	3	5	16
Semester VII	0	0	0	0	1	3	4	12	0	0	5	15
Semester VIII	0	0	0	0	0	0	3	12	1	3	4	15
Total	8	22	8	24	10	32	12	44	4	12	42	134

Total Courses: 42

Total Credit Hours: 134

LIST OF ELECTIVES

S. No.	Course Code	Course Title	Credit Hours
1	ENVIRON-446	Water Resources Management	3(2-1)
2	ENVIRON-342	Urban Environmental Management	3(3-0)
3	ENVIRON-304	Hydrology	3(3-0)
4	ENVIRON-305	Occupational Health and Safety	3(2-1)
5	ENVIRON-405	Solid Waste Management	3(3-0)
6	ENVIRON-343	Ecotourism	3(3-0)
7	ENVIRON-306	Air and Noise Pollution	3(3-0)
8	ENVIRON-406	Soil and Environment	3(3-0)
9	ENVIRON-447	Disaster Risk Management	3(3-0)
10	ENVIRON-461	Pollutant Movement in Soil	3(3-0)
11	ENVIRON-448	Energy and Environment	3(3-0)
12	ENVIRON-407	Agro-ecology	3(3-0)
13	ENVIRON-449	Coastal Environmental Management	3(3-0)
14	BIOTECH-432	Environmental Biotechnology	3(3-0)
15	ENVIRON-408	Project Management	3(3-0)
16	ENVIRON-409	Environmental Impact Analysis	3(3-0)

2. MS (Environmental Science)

Pre-requisite: BS Environmental Science or equivalent degree with CGPA ≥ 2.0 or Minimum 16 years of education in a Life Sciences discipline with 50% marks.

Scheme of Study for Master of Science (MS) in Environmental Science

Semester 1

S. No.	Course Code	Course Title	Credit Hours
1	ENVIRON-685	Research Methods in Environmental Science	3(3-0)
2	ENVIRON-619	Global Warming and Climate Change	3(3-0)
3	ENVIRON-503	Occupational Health and Safety	3(3-0)
4	–	Elective-I	3(3-0)
Total Credit Hours			12

Semester 2

S. No.	Course Code	Course Title	Credit Hours
1	ENVIRON-541	Solid and Hazardous Waste Management	3(3-0)
2	ENVIRON-618	Environmental Impact Assessment and Strategic Environmental Assessment	3(3-0)
3	–	Elective-II	3(3-0)
4	–	Elective-III	3(3-0)
Total Credit Hours			12

Semester 3

S. No.	Course Code	Course Title	Credit Hours
1	THESIS-601	Research & Thesis (continued in the fourth semester)	In progress
Total Credit Hours			In progress

Semester 4

S. No.	Course Code	Course Title	Credit Hours
1	THESIS-601	Research & Thesis	6(0-6)
Total Credit Hours			6

TOTAL CREDIT HOURS: 30

Summary:

Course Work:	24 Credit Hours
Thesis:	06 Credit Hours

S. No.	Course Code	Course Title	Credit Hours
1	BIOL-505	Biological Conservation	3(3-0)
2	BIOL-506	Wildlife and Forest Conservation	3(3-0)
3	BIOTECH-516	Environmental Biotechnology	3(3-0)
4	CHE-551	Environmental Chemistry	3(3-0)
5	CHE-601	Polymers and the Environment	3(3-0)
6	CHE-641	Advanced Chromatography Techniques –I	3(3-0)
7	ECOLOGY-501	Freshwater Ecology / Limnology	3(3-0)
8	ECOLOGY-502	Restoration Ecology	3(3-0)
9	ECOLOGY-503	Urban Ecology	3(3-0)
10	ENVIRON-504	Principles and Applications of Bioremediation	3(3-0)
11	ENVIRON-542	Wetland Management	3(3-0)
12	ENVIRON-543	Sustainable Urban Planning and Management	3(3-0)
13	ENVIRON-641	Laboratory Management Practices	3(3-0)
14	ENVIRON-642	Marine Pollution Management	3(3-0)
15	ENVIRON-643	Energy and Environment	3(3-0)
16	ENVIRON-686	Treatment and Management of Wastewater	3(3-0)
17	ENVIRON-687	Disaster Risk Management	3(3-0)
18	ENVIRON-688	Environmental Education	3(3-0)
19	ENVIRON-689	Gender and Environment	3(3-0)
20	ENVIRON-690	Environmental Policy and Law	3(3-0)
21	ENVIRON-691	Environmental Risk Assessment and Management	3(3-0)
22	ENVIRON-692	Environmental Geology	3(3-0)
23	HUM-501	Advance Environmental Sociology	3(3-0)
24	IT-601	GIS and Remote Sensing	3(3-0)



3. PhD (Environmental Science)

Pre-requisite: MS Environmental Science or equivalent degree with CGPA \geq 3.0 or 70% marks

Scheme of Study for Doctor of Philosophy (PhD) in Environmental Science (For students having their terminal degree in Environmental Science)

Semester 1

S. No.	Course Code	Course Title	Credit Hours
1	–	Elective-I	3(3-0)
2	–	Elective-II	3(3-0)
3	–	Elective-III	3(3-0)
Total Credit Hours			9

Semester 2

S. No.	Course Code	Course Title	Credit Hours
1	–	Elective-IV	3(3-0)
2	–	Elective-V	3(3-0)
3	–	Elective-VI	3(3-0)
Total Credit Hours			9

TOTAL CREDIT HOURS: 18

(For students having their terminal degree in Basic, Natural and Applied Sciences)

Semester 1

S. No.	Course Code	Course Title	Credit Hours
1	ENVIRON-706	Environmental Issues-I	3(3-0)
2	–	Elective-II	3(3-0)
3	–	Elective-III	3(3-0)
Total Credit Hours			9

Semester 2

S. No.	Course Code	Course Title	Credit Hours
1	ENVIRON-805	Environmental Issues-II	3(3-0)
2	–	Elective-V	3(3-0)
3	–	Elective-VI	3(3-0)
Total Credit Hours			9

TOTAL CREDIT HOURS: 18

Semester 3 - 6

S. No.	Course Code	Course Title
1	DSS-990	Research & Thesis

Summary:

Course Work:
Thesis:

18 Credit Hours
Student will have to carry out research work for a minimum period of two years

LIST OF ELECTIVES

S. No.	Course Code	Course Title	Credit Hours
1	ENVIRON-741	Coastal Environment and Management	3(3-0)
2	ENVIRON-742	Health, Safety and Environmental Management	3(3-0)
3	ENVIRON-743	Sustainable Development	3(3-0)
4	ENVIRON-841	Project Development and Management	3(3-0)
5	BIOL-702	Conservation of Natural Resources	3(3-0)
6	CHE-841	Advanced Chromatography Techniques –II	3(3-0)
7	CHE-842	Environmental Application of Nanomaterials	3(3-0)
8	ECOLOGY-701	Industrial Ecology	3(3-0)
9	ECOLOGY-801	Advances in Plant Ecology	3(3-0)
10	ECON-801	Green Economy	3(3-0)
11	ENVIRON-704	Alternative Energy Sources	3(3-0)
12	ENVIRON-705	Cleaner Production Technologies	3(3-0)
14	ENVIRON-707	Population Dynamics and Environment	3(3-0)
15	ENVIRON-708	Special Topic in Environment Science	3(3-0)
16	ENVIRON-709	Sustainable Agriculture	3(3-0)
17	ENVIRON-803	Agrochemicals in the Environment	3(3-0)
18	ENVIRON-804	Carbon Sequestration and Environment	3(3-0)
20	ENVIRON-806	Global Environmental Politics	3(3-0)
21	ENVIRON-807	Quality Assurance and Quality Control	3(3-0)
22	ENVIRON-808	Remediation Strategies for Contaminated Environment	3(3-0)
23	EPIDEMO-801	Advance Epidemiology	3(3-0)
24	MICRBIOL-802	Applied Environmental Microbiology	3(3-0)



FACULTY PROFILES



*Faculty of
Life Sciences
& Informatics*

FACULTY PROFILE

Professor Dr. Jamil Ahmad

Dean

Faculty of Life Sciences and Informatics

Professor Jamil Ahmad did his PhD from University of the Punjab, Lahore. He leads Human Genetics research group working on different common and rare genetic disorders.

His research group is investigating causative genes and mutations responsible for hereditary disorders like cataracts, mental retardation and epilepsy. So far, the group has published 30 research articles in international journals of high repute including BMC Medical Genetics, Molecular Biology Reports, American Journal of Human Genetics, Clinical Genetics, Human Genetics and European Journal of Medical Genetics.



Professor Dr. Mohammad Saeed

Faculty Coordinator

Faculty of Life Sciences and Informatics

Professor Mohammad Saeed did his Masters' in Botany from University of Balochistan in 1987 and PhD from Department of Botany, University of Athens, Republic of Greece in 2000, on eco-physiology of seed germination of Pinus species of Pakistan. He investigated the effect of light and temperature regimes and the role of phytochrome in seed germination of Pines. Techniques to break seed dormancy, seed viability testing and seed storage requirements have also been within the scope of his studies. He has also explored unconventional plant propagation methods i.e. tissue culture on P. Gerardiana.



His areas of interests are seed germination of ecologically and economically important indigenous plants of Balochistan especially Juniper and other native conifers. He has more than 20 publications in journals of national and international repute. He has worked as a principal investigator of HEC and PSF funded projects for the development of the protocols for the propagation and regeneration of conifers of Balochistan.

Dr. Naseebullah Kakar

Chairperson

Department of Biotechnology

Dr. Naseebullah Kakar joined faculty of Life Sciences and Informatics, BUIITEMS in 2005. He did his MS in Biotechnology & Informatics from BUIITEMS and PhD in Molecular Medicine from "International graduate school for molecular medicine Ulm (IgradU)", Ulm University, Germany. His area of research interest is molecular medicine/ disease genomics. He works on human genetic diseases with the aims: to understand the molecular biology of monogenic diseases, and to improve the lives of patients affected by these diseases.



He has identified many novel mutations including novel disease causing genes using laboratory techniques such as next-generation sequencing and CRISPR/ Cas9 Genome editing. Dr. Kakar is author of several research papers published in peer reviewed international journals.

Dr. Agha Mohammad Raza

Chairperson

Department of Microbiology

Dr. Agha Mohammad Raza did his MS from Department of Biotechnology, BUIITEMS and bachelor's degree in dental surgery from Bolan Medical College, Quetta. He served as dental surgeon and demonstrator for more than four years in Civil Hospital, Quetta. He joined BUIITEMS as Assistant Professor of Microbiology in 2006.



He has participated in national and international conferences & seminars and presented his research work. His MS research work was on "oral health condition in relation to nutritional profile and biochemical assessments of various ethnic groups".

Dr. Muhammad Luqman

Chairperson

Department of Environmental Science

Dr. Muhammad Luqman did his PhD from GC University, Lahore in Environmental Science. Earlier he did master in Botany from University of the Punjab and M.Phil from Centre of Excellence in Marine Biology, University of Karachi. During his PhD, he worked on characterization of environmental risk factors contributing to lung cancer development in Pakistan.



His areas of research include environmental impacts on human health (Environmental epidemiology, Occupational health), water pollution (both marine and freshwater) and impacts of environmental pollution & climate change on the biodiversity of phytoplanktons.

Professor Dr. M. A. K. Malghani

Professor M. A. K. Malghani got his PhD from University of Aston, UK in field of metabolism studies and has more than fifty research publications in the relevant fields. He has vast experience of teaching and research spread over more than forty years of service as university teacher and researcher. During these years, he supervised research scholars leading to PhD, MPhil and MS degrees.



He established Centre of Biotechnology & Informatics in September 2003, immediately after joining BUIITEMS. His experience in the practice of Sciences, like Biochemistry, Molecular Biology and Biotechnology is a source of knowledge for both students and teachers of the Faculty. He also has experience of university administration.

Professor Dr. Muhammad Naeem Shahwani*Administrator Chiltan Campus / Director ORIC*

Professor Muhammad Naeem Shahwani did his PhD in 2011 from University of Glasgow, Scotland, UK. His PhD research is focused on the development of drought, salinity and thermal stress tolerant crop plants. He compared a large number of elite lines with local plant species of Balochistan on physiological and molecular level of particular local varieties of barley crop plants, growing successfully in dry arid lands of Balochistan conferring significant tolerance against stresses compared to elite European lines. His research is at a stage where he is planning to characterize these land races on molecular level and utilize their built-in diversity for abiotic stress tolerance into high yielding elite lines. His work in these lines is an effort to answer questions arising due to climatic changes and ever increasing fear of food scarcity in under developed World. His research interests are on leaf photosynthesis and its components like, light harvesting complexes (LHC), electron transport chain (ETC) and metabolite pool analysis under salt and thermal stress conditions in cereal crops, genomic and proteomic studies of plants under abiotic stress conditions. He also has research experience in basic seed production through plant tissue culture and hybrid seed development through conventional breeding methods. He has a professional membership with Society of Experimental Biology, UK. He has many national and international publications. He has developed collaboration between, BUIITEMS, University of Glasgow and The Max Planck Institute of Molecular Plant Physiology, Am Muehlenberg, Germany.

**Professor Dr. Nazeer Ahmed***Professor / Dean Graduate Studies Office*

Professor Nazeer Ahmed joined BUIITEMS as lecturer in 2004. He did his PhD from university of Wuerzburg, Germany in 2010. The main theme of his research work was to explore the early signaling events involved in plant microbe interaction, particularly plant interaction with the mutualistic bacteria. These mutualistic bacteria are well known for their positive effects on plants growth through different mechanisms involved in particular phytohormones production and nitrogen fixation. Furthermore, Dr. Nazeer Ahmed, with the help of in-silico studies, is focusing, among others, on comparative genomics of plant growth promoting bacteria. Besides, he is also involved in developing DNA based biodiversity inventories of Juniper ecosystem in Balochistan. He is HEC recognized supervisor and convener of National Curriculum Revision Committee of Higher Education Commission of Pakistan on Bioinformatics.

**Dr. Abrar Hussain Khan***Associate Professor*

Dr. Abrar H Khan is affiliated with BUIITEMS since 2004. He is among the pioneer faculty members of the Department of Biotechnology. Before joining BUIITEMS, he has worked in HEJ, University of Karachi (2000-2002) and Department of Biological Sciences, Agha Khan University (2002-2004). His area of interest is clinical chemistry, molecular virology and hepatocellular carcinoma. The specific area of research is CMV, Dengue virus, HEV, HBV, HDV and HCV. So far Dr. Abrar has been able to publish 60 research articles with an impact factor above 100. He is also academic editor of Journal of Medicine.



Dr Abdul Wali Tareen*Associate Professor*

Dr. Abdul Wali Tareen is Associate Professor in department of Biotechnology. He obtained his PhD in 2008 from Quaid-i-Azam University Islamabad. Dr Wali has two years of Post-doctoral research experience from Max Plank Institute for Molecular Genetics, Berlin and Institute of Human Genetics, University of Bonn, Germany. He is involved in mapping and identification of genes responsible for human genetic disorders. Much of his research work focuses on skin disorders including Alopecia and Ectodermal Dysplasia which also extends to skeletal dysplasia. These studies led to the discovery of a number of causative mutations and chromosomal loci for important genetic disorders and have been documented in several articles published in high impact journals including Nature Genetics.

**Dr. Shahjahan Shabbir Ahmed***Associate Professor*

Dr. Shahjahan Shabbir Ahmed Rana joined BUIITEMS in 2012 after serving Lasbela University of Agriculture, water and Marine Sciences (LUAWMS) and Agriculture department for more than seven years. He joined BUIITEMS as Assistant Professor and was later on appointed as Associate Professor in the faculty of life sciences and Informatics. After Masters in Horticulture with distinction, he did PhD in Life Sciences from Northwest A&F University, Shaanxi, Yangling, China in June, 2012. During Ph.D. his research was on molecular and physiological aspects of plant gene cloning and expression of polygalacturonase. He was able to decipher the gene cloning and expression in many model and Solanaceous crops. He has published research articles in journals having impact factor.

**Dr. Rozeena Shaikh***Assistant Professor*

Dr. Rozeena Shaikh is Assistant Professor in the Department of Biotechnology, Faculty of Life Sciences and Informatics since 2014. She did her PhD in Biotechnology from Dr. A. Q. Khan Institute of Biotechnology and Genetic Engineering, University of Karachi. Her PhD research work was on genetic mutation/ polymorphism in ACE and AGT genes in diabetes, hypertension and nephropathy. She served at Molecular Biology (Genetics) Laboratory, Liaquat University of Medical and Health Sciences, Jamshoro from 2007-2009 and then joined Dr. A. Q. Khan Institute of Biotechnology and Genetic Engineering (KIBGE) from 2009-2014. She has expertise in Molecular based diagnosis of several infectious diseases as well as molecular genetic studies of inherited diseases. She has published research papers in various International Journals.

**Dr. Saif ur Rehman***Assistant Professor*

Dr. Saifur Rehman did B. Pharmacy from University of Balochistan, Quetta and PhD in Pharmacology from University of Karachi. He is working on the cardiovascular research area, natural product modulating effect of calcium ion channels (voltage-dependent and receptor-operated calcium channels) in regulation of smooth muscle tone of blood vessel, atria and trachea. He is author and co-author of nine research articles in national and international journals.



Dr. Shakeela Daud*Assistant Professor*

Shakeela Daud is Assistant Professor in the Department of Biotechnology. She did her masters' in Biology from University of Arid Agriculture, Rawalpindi and M.Phil in Molecular Biology from University of the Punjab, Lahore. During M.Phil, she worked on "Optimization and Validation of the PCR conditions of three hypervariable regions (HV1, HV11 and HV111) of human mitochondrial DNA". She has worked in Molecular Diagnostic Laboratory of (CAMB) Ministry of Science & Technology and used many molecular techniques such as DNA and RNA isolation, DNA estimation, HCV Qualitative, Quantitative and Genotyping. She also worked in Forensic DNA typing laboratory and grasped the techniques of "Forensic Serology & DNA Analysis" and performed DNA cases including rape, murder and paternity. She is author & co-author of 15 research articles in international journals including Molecular vision, Forensic Science International, Human Genetics, and Clinical Genetics etc.

**Dr. Samiullah Khan***Assistant Professor*

Samiullah Khan did his M.Sc Botany from University of Arid Agriculture, Rawalpindi in 2002. After serving different organizations, he joined BUIITEMS in 2006 under Faculty Development Program of HEC and obtained the degree of Master of Research (M.Res.) in Plant Sciences from University of Glasgow, UK. In M.Res. he has done projects in the fields of Molecular Biology and Gene Expression. He is currently doing his PhD from University Technology Malaysia (UTM), Malaysia, in identification of QTLs for saline-alkaline tolerance at germination stage in indica rice. His research interests are, quantitative genetics, quantitative trait loci, plant physiology, plant stress and molecular breeding.

**Dr. Nusrat Jahan***Assistant Professor*

Nusrat Jahan did her M.Sc (Botany) from University of Balochistan and MS in Biotechnology & Informatics from BUIITEMS. Her teaching and research interest is in the natural products, pest management and biochemical activities of medicinal plants of Balochistan.

She was co-investigator in HEC sponsored project team on micro propagation and cultivation of economically important plants of Balochistan.

**Asma Yousafzai***Assistant Professor*

Asma Yousafzai is Assistant Professor in the Department of Biotechnology, Faculty of Life Sciences & Informatics. She did her Master's in Biochemistry with distinction from University of Balochistan. She did her MS in Biotechnology & Informatics with merit in "Optimization of Protocols in order to enhance the Micropropagation of Ornamental Juniper for Biological Activities". Currently, she is working on "Genetic Studies of Thalassemia Patients of Balochistan Origin". She is member of the Student Affairs Office promoting co-curricular activities and positive learning. In addition, she has



conducted many workshops and trainings for University faculty members as a resource person at various trainings in Professional Competency Enhancement Program for Teachers (PCEPT) under the Project of NAHE (Phase II) organized by Higher Education Commission, Islamabad.

Samia Parveen

Assistant Professor

Samia Parveen is Assistant Professor in the Department of Microbiology. She has done her Masters' in Clinical Microbiology (Gold Medal) from Shah Abdul Latif University Khairpur Mir's. She did her MS in Biotechnology & Informatics from BUIITEMS. Her field of research interest is Environmental Microbiology. She has research publications in wheat seed Mycoflora and antibacterial activities.



Imrana Niaz Sultan

Assistant Professor

Imrana Niaz is Assistant Professor in the Department of Biotechnology. She did her MS in Biotechnology & Informatics from BUIITEMS. She has taught subjects like introduction to biochemistry & biotechnology, principles of biochemistry, toxicology, food and nutrition biotechnology, integrated pest management, and genetics. She also teaches courses in physiology, biosafety & biosecurity and food and dairy microbiology in the department of microbiology, BUIITEMS. She worked as a master trainer of Higher Education Commission (HEC) and National Testing Services (NTS) Pakistan. She conducted many workshops and trainings for University teachers.



Imran Ali Sani

Assistant Professor

Imran Ali Sani is Assistant Professor in the Department of Biotechnology. He did his M.Sc (Hons) Entomology from University of Agriculture Faisalabad with research focused on biodiversity, systematics and taxonomy. Before joining BUIITEMS he worked as agriculture officer and as additional assistant director (olive development and production) in Agriculture Research Institute. In 2009, he joined Balochistan Agriculture College Quetta as a lecturer where he taught several courses of graduate and Post graduate level. He supervised Master's students for their research work. He served as Controller of Examination and Deputy Registrar in BAC Quetta.



Umair Afzal Khan

Assistant Professor

Umair Afzal Khan graduated from Bahauddin Zakariya University, Multan, acquiring B.Sc (Hons) degree in Agriculture with Plant Breeding and Genetics as major subject. He joined BUIITEMS in 2006 under "HEC Faculty Development Programme" and obtained the degree of Master of Research (M.Res) in Plant Science from University of Glasgow, United Kingdom. At Glasgow, he did two projects in the areas of gene expression and root architecture in *Arabidopsis thaliana*. His research interests include tissue culture and ageing in plants. Currently he is completing his PhD at University of Perth, Australia under Endeavour Award Scholarship.



Sanaulah Tareen*Assistant Professor*

Sanaulah Tareen did his MSc in Microbiology from Quaid-e-Azam University Islamabad and earned his M.Phil degree from the same university in 2012 with distinction. He joined BUIITEMS as a faculty member in the Department of Microbiology in 2012. He has worked on Microbial diversity of glaciers and has a research publication in international journal to his credit. He is the member of American Society for Microbiology (ASN) under global outreach program.

**Ashiq Khan Nasar***Assistant Professor*

Ashiq Khan Nasar did his MSc from Quaid-e-Azam University, Islamabad in 2010 and M.Phil in Microbiology from the same University. He worked for about one year as a "Microbiologist" in National TB control program Islamabad, where he took various trainings regarding bacterial culturing especially growth of Mycobacterium tuberculosis (MTB) on different solid as well as liquid media (MAGIT). He attended different trainings on florescent microscopy using ora-mine dye, DST, LPA, PCR and an advance technique like Gene Xpert for the detection of MTB. He joined Department of Microbiology as lecturer in January 2013. His research interests are molecular study of Bacillus species and its applications in daily life.

**Shumaila Siddique***Assistant Professor*

Shumaila Siddique did her Bachelors in Biotechnology and Informatics in 2009 with her research topic as oral health status. She joined BUIITEMS in 2012 as a lecturer and later on she was appointed as Assistant Professor in 2016. She taught courses that include Genetics, Introduction to Biotechnology, Bio-Informatics and Bio-Analytical Techniques. She has supervised and conducted the research work of Undergraduate students of BS (Biotechnology & Informatics). Her research interest is in Molecular Genetics.

**Khadija Kakar***Assistant Professor*

Khadija Kakar did her BS in Biotechnology and Informatics from Balochistan University of Information Technology Engineering and Management Sciences, Quetta and her MS (Gold Medal) in Biotechnology and Informatics with research work on 'Identification of Genes involved in Autosomal Recessive Primary Microcephaly from the same institution. She taught the courses like Proteomics, Epidemiology and Principles of Biochemical engineering. Her area of interest is human molecular genetics, chromosomal mutation analysis, molecular medicine and functional analysis of protien.



Mahrukh Naudhani*Assistant Professor*

Mahrukh Naudhani is Assistant Professor in the Department of Microbiology. She joined BUIITEMS in January 2013. Her graduation is in Biotechnology and Informatics from Balochistan University of Information Technology Engineering and Management Sciences, Quetta. She got her M.Phil degree in Molecular Biology from Centre of Excellence in Molecular biology, University of the Punjab. Her research work is on HCV and Malaria. Her area of interest is infectious diseases.

**Sobia Faisal***Assistant Professor*

Sobia Faisal did her Master's degree in Botany from Quaid-e-Azam University in 2007. She did her MS in Environmental Sciences in 2013 from Islamic International University, Islamabad. Her research work was on the assessment of industrial effluents of oil & Ghee Mills in Faisalabad for compliance with NEQ'S. She worked on water quality assessment in PCRWR for one year.

**Muhammad Waseem Khan***Lecturer*

Muhammad Waseem Khan is Lecturer in the Department of Biotechnology. He did his M.Phil in Bioethics & Research from Aga Khan University Karachi in 2011. He worked as Chief Research Officer (Dec 2011 – July 2012) with Agha Khan University Hospital, Karachi, Pakistan. He has also worked with (UNFAO) United Nations Food & Agriculture Organization as ME & Research Officer (Oct 2010 – July 2011). Muhammad Waseem Khan is a member of Bioethics Assembly of Pakistan.

**Naveed Iqbal Khan***Lecturer*

Naveed Iqbal Durrani did his MS in Biotechnology & Informatics in March 2013. He joined BUIITEMS as lecturer in 2012. Being provincial Coordinator of NAYS and an OIC member of COMSTECH Pakistan, he has delivered lectures in various national and international conferences. His research interests include development of bioinformatics tools for analyzing gene, finding mutation, ORF and protein structure prediction.

**Faiz Muhammad***Lecturer*

Faiz Muhammad is Lecturer in the Department of Microbiology. He did his M.Sc in Microbiology from University of Karachi in 2007. His area of research is diagnosis of avian mycoplasmas by serology, PCR and their control by Live Vaccine.

He is the member of American Society for Microbiology (ASM) and Pakistan Society of Microbiology (PSM).



Sania Ashraf*Lecturer*

Sania Ashraf is Lecturer in Department of Microbiology since 2012. She did BS in Biotechnology and Informatics from BUIITEMS and MS in Biotechnology and informatics from the same institute. Her research interests are Medical biotechnology, Medical mycology, Clinical diagnostics, Microbial culture production and Bio Safety & Security. With all these, she had been playing her vital role in co-curricular activities as being the best athlete and sports women during her studies in the same institute, owing many gold medals in different sports and other competitions.

**Kashaf Zafar***Lecturer*

Kashaf Zafar is lecturer in department of Biotechnology since 2015. She did MS in Biotechnology from Government College University, Faisalabad in 2013 with distinction. Her research work was on microbial production of Lysine through fermentation. She obtained BS degree in Bioinformatics from the same institute in 2011. She has completed her BS research Project from Punjab Institute of Nuclear Medicine cancer hospital, Faisalabad. Before joining BUIITEMS she was working as Research Associate in department of Bioinformatics & Biotechnology, Government College University, Faisalabad.

**Nida Tabassum***Lecturer*

Nida Tabassum Khan is Lecturer in Department of Biotechnology since 2015. She did BS in Biotechnology & Informatics from BUIITEMS in 2012. She conducted her Bachelor's research in the area of clinical pathology from Saiban family hospital. Her teaching interests include Genetics, Microbiology and Nanobiotechnology.

**Sara Naudhani***Lecturer*

Sara Naudhani is Lecturer in Department of Biotechnology since 2015. She did Bachelor's in Biotechnology and Informatics in 2010 from BUIITEMS and did her MS in Biotechnology and Informatics in 2014 from the same institute with research work on epilepsy causing gene (CLN8) by DNA sequencing. Her expertises are in molecular techniques like DNA extraction, DNA estimation, gel electrophoresis and PCR. She served as a Research Associate in molecular genetics laboratory of BUIITEMS through HEC funded research project.

**Abida Dost Muhammad***Lecturer*

Abida Dost Muhammad did her Bachelor's degree in Chemistry from Sardar Bahadur Khan Women's University in 2010. She did her MS in Environmental Management & Policy (Gold Medal) from BUIITEMS in 2013. Her MS research was based on "Assessment of physical and chemical water quality parameters of Ziarat town". Her research interests are in Environmental Sustainability as a problem for human society, Mitigation and Adaptation Strategies for Climate Change, exploration of water quality parameters, detection of heavy metals in drinking water and study on bioremediation of water contamination.



Ghazala Muhammad Ali*Lecturer*

Ghazala Mohammad Ali is Lecturer in Department of Biotechnology since 2015. She did her BS in Biotechnology & Informatics from BUIITEMS in 2009 and her MS in Biotechnology and Informatics from same institute. Her core areas of research interest are plant molecular genetics, plant pathology and phytoremediation. Her MS research was on detection of resistant genes in different wheat varieties grown in Balochistan.

**Arooj Khan***Lecturer*

Arooj Khan is Lecturer in the Department of Biotechnology since 2015. She did her BS in Biotechnology & Informatics from BUIITEMS in 2013. Her areas of research interest are DNA bar-coding of Junipers species and environmental friendly plants species, water quality test and mushrooms cultivation. Previously, she worked as Monitoring and Evolution Officer (Nov - 2012 – Sep 2015) with Water, Environment & Sanitation Society (WESS) Balochistan, Pakistan.

**Nadia Shahid***Lecturer*

Nadia Shahid did her BSc (hons) in Environmental Sciences from University of the Punjab and MS in Environmental Sciences from the same University. During MS, she worked on occupational health injuries, health and safety related issues of small and medium scale surgical industries. During the study, she also worked on field projects of disaster management, EIA, IEE and occupational health and safety. She participated in different trainings and workshops on solid waste disposal and waste water treatment.



The core research areas of her interests are Solid Waste Management (SWM), Occupational Health and Safety (OH&S), Air Pollution and Social & Environmental Impact Assessment (SEIA).

Nisar Ahmed*Lecturer*

Nisar Ahmed is Lecturer in the Department of Biotechnology since 2016. He did his BS in Biotechnology and Informatics with distinction (Gold Medal) from BUIITEMS in 2013 and MS in Biotechnology and Informatics (Gold Medal) from the same University in 2015. During his MS, he worked on Sequence analysis of gene EPM2A in patients of Epilepsy. He worked as Research Associate for one year in Higher Education Commission funded project, Genetic and molecular studies for identification of genes responsible for recessive mental retardation in Pakistani population.



Lilas Batool*Lecturer*

Lilas Batool is Lecturer in the Department of Biotechnology since 2016. Ms. Lilas Batool did her Masters of Science (MS) in Biotechnology and Informatics from BUIITEMS. During her MS, she worked on sequencing analysis of candidate gene involved in Dowling Degos disease. She did her Bachelors of Science (BS) in Biotechnology and Informatics from BUIITEMS. Her area of research interest is Human Molecular Genetics.

**Akram Ali***Lecturer*

Akram Ali is Lecture in the Department of Biotechnology since 2016. He did his BS and MS in Biotechnology and Informatics from BUIITEMS. He worked on the “genetic characterization of Makrani population based on the human mitochondrial DNA sequence”. He worked on genetic characterization of Makrani population based on the human mitochondrial DNA sequence. He is co-author of research article published in journal “Legal Medicine”.

**Syeda Hafsa Ali***Lecturer*

Syeda Hafsa Ali is lecturer in the Department of Microbiology since 2016. During her BS in Microbiology, she got USEFP scholarship at Augustana University, Sioux Falls, South Dakota, USA. She did her MS in Plant Biotechnology from Atta-ur-Rahman School of Applied Biosciences (ASAB), NUST in 2015 and she was awarded with President’s Gold Medal. She worked as Research Officer under Pak-US Science & Technology Cooperation Program Phase-VI project, Genome-Wide MicroRNAs and Single Gamete Based Genetic Profiling of Sweet Sorghum Varieties for Biofuel Production at University of Balochistan.

**Muneeza Arbab***Lecturer*

Muneeza Arbab is Lecturer in the Department of Biotechnology since 2016. She did her Masters of Science (MS) in Molecular Genetics from COMSATS Institute of Information technology, Islamabad. During MS, she worked on Analysis of TNF- α for Keratoconus in Pakistani Population. She did her Bachelors of Science (BS) with badge of honor in Biotechnology and Informatics from BUIITEMS. Her research interest is in Molecular Biology and Human Molecular Genetics.

**Javeria Ayub***Lecturer*

Javeria Ayub is Lecturer in the Department of Microbiology since 2016. She did her MS in Biotechnology from BUIITEMS. During her MS, she worked on robust detection of Glaucoma using medical image processing techniques.

She did her BS with distinction (Gold Medal) in Microbiology from the same institute. Her research interests are Applied Microbiology, Mycology and Nanotechnology.



RESEARCH LABORATORIES





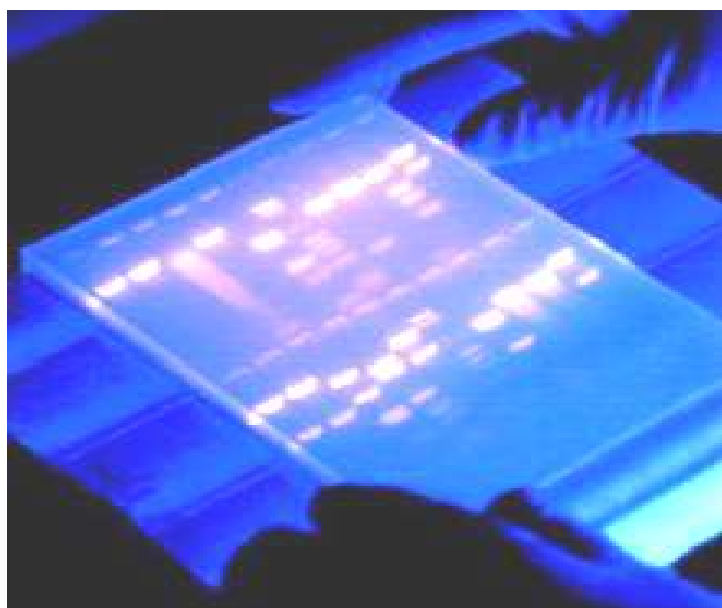
RESEARCH LABORATORIES

Plant Tissue Culture Laboratory

Plant tissue culture involves growing plants in an artificial medium under sterile conditions in a jar, flask or test tube. Plant tissue culturing techniques are essential for academic research, as well as many applied aspects of plant sciences. Practically any plant transformation experiment relies on tissue culture. Although there are various methods of gene transformation reported over the last two decades but *Agrobacterium* mediated transformation has proven to be the best among the scientific community and it purely relies on the availability of tissue culture lab. Plant tissue culture techniques are also central to innovative areas of applied plant science including plant biotechnology. In BUIITEMS we have well equipped tissue culture laboratory where we demonstrate new ways of propagating native as well as exotic plants. The laboratory also demonstrates embryogenesis and organogenesis which are the techniques whereby plants and organs are regenerated from cells. The techniques learnt by the students and researchers have potential to become an integral part of plant breeding programs.



Human Molecular Genetics Laboratory



The Human Molecular Genetics Laboratory (HMG) at BUIITEMS, established in 2005, conducts research leading to the understanding of underlying molecular mechanisms in various inherited disorders. HMG laboratory has facilities for advanced research in molecular genetics, molecular biology and is equipped with thermal cycler, gel documentation units, spectrophotometer, microcentrifuges, electrophoresis equipment and ABI genetic analyzer. The research of HMG Group mainly focuses on the identification and characterization of heritable mutations that result in both rare and common genetic disorders prevailing in Balochistan. The research investigators have earned

different national and international research grants for the genetic mapping of rare diseases and characterization of their downstream consequences to the study of common heritable disorders using different genomic and bioinformatic approaches. Identification of such gene mutations and variants can further lead to devising molecular diagnostics for rapid screening and early intervention. The group has published several research articles in international journals of high repute.

Plant Stress Physiology Laboratory

In plant stress physiology lab an active research group is engaged in the task of characterizing landraces of different staple crops i.e. wheat, barley, sorghum and maize etc. Under this topic, group is attempting to explore the physiological and ultimately molecular basis of abiotic (drought, salinity and thermal) stress tolerance of uncharacterized germplasm, enabling them to survive and reproduce from centuries in the harsher conditions of Balochistan. Along with this the team is focusing on the effects of environmental stress on plant membranes by using physiological, biochemical and molecular / genetic approaches to determine how environmental stress factors affect plant membranes. Long term aim of this team is to evolve abiotic stress tolerant crop varieties having better ability to grow and produce staple food on marginal (not suitable for cultivation) lands of Balochistan in particular and Pakistan in general.



Plant Molecular Genetics Laboratory



DNA barcoding is emerging as an aid to traditional taxonomic studies, among others, to document the existing biodiversity. In wake of the importance of Juniper ecosystem, the research workers in this laboratory are dedicated to Plant Molecular Genetics. This group is engaged in Polymerase Chain Reaction (PCR) based DNA barcoding for developing biodiversity inventories of the Juniper associated flora/medicinal plants in Balochistan. The studies are being undertaken in

three different Juniper forests located in Quetta, Ziarat and Kalat districts. We are also planning to extend such studies to insects and cattle. Besides, a section of the group is focusing on extending the post-harvest life of perishable agricultural commodities particularly fruits like Cherry etc. using RNA interference strategy. The group is attempting to knock out genes responsible for cellulose and pectin degradation. Decreased vacuolar processing enzymes (VPE) activity due to suppression by RNAi strategy accompanied with decreased enzyme activity of acid invertase reported to prolong shelf life of various climacteric and non-climacteric fruits. The group, in addition, is also undertaking comparative genome studies of plant growth promoting bacteria. The group has won a national research project on DNA Barcoding of Juniper ecosystem flora from Pakistan Agricultural Research Council.

Yeast and Fungal Biotechnology Laboratory

This lab is dedicated for the Biotechnological applications of filamentous and yeasts (unicellular) fungi. Using DNA finger printing (barcoding) some of the research students are involved in the identification of human pathogenic fungi such as *Candida* species and dermatophytes etc. from clinical specimens. On the other hand a group of student is involved in isolation of yeasts from fresh fruits such as kinnow, apple, peach, strawberry, pomegranate and screening their antagonistic activity against plant pathogenic fungi. This lab is also pioneer to produce nanoparticles using some fungal strains which is a green approach to synthesize them. Our future aims are to screen the efficacy of antifungal antibiotics against human pathogenic fungi, to patent and commercialize antagonistic yeasts strains, to optimize production of nanoparticles and also to produce bio-transformed drugs using fungal strains.

Facilities & Student Services



Library and Research Resources

BUIITEMS has a central library that remains open to all students and faculty members from 9:00 a.m. to 5:00 pm. The library has a significant collection of books, references, research journals, magazines and periodicals. In addition, the library maintains a wide variety of specialized information, including publications of international and national organizations and statistical data. On-line research facilities and access to Internet are conveniently available to teachers as well as students. Pakistan Education & Research Network (PERN) facility is available on HEC website for downloading research materials.



Computer Laboratories

The faculty has two computer laboratories with more than 40 computers with Internet and latest software facilities.

The faculty members are provided with personal computers for use in their offices. Besides, adequate printing facilities are made available for the faculty members and students.



Audio Visual Facilities

The classrooms are equipped with audio visual facilities, smart boards and multimedia systems. The faculty members and students make optimal use of the audio-visual aids in their studies and research.



BUIITEMS BUSINESS INCUBATION AND ENTREPRENEURSHIP CENTER

BUIITEMS Business Incubation and Entrepreneurship Center has primary objective to support BUIITEMS Alumni and students to develop promising start-up firms in order to create jobs, revitalize community, commercialize new technology and strengthen local and national economy.

The goals encircle the area of entrepreneurial culture, management guidance, commercialize research and acceleration of local industry growth.

In addition to that business support services provide pre-incubation support, business planning and networking with the entrepreneurs in particular & public in general.



BUIITEMS CAREER SERVICES OFFICE

BUIITEMS career services office provides advice, services, programs and resources to empower the students and alumni throughout their career development journey from assisting in identifying majors (in line with their future occupation) to acquiring skills and discovering meaningful professional experiences.

The Career Services Office provides variety of services to the students and alumni like Career Assessment, Career Advising /Counseling, Workshops and Panel, Job Listing/Job Placement, Mock Interviews with Feedback, On-Campus Interviewing/Recruitment, Internship Program and Career Fairs.



BUIITEMS FINANCIAL ASSISTANCE OFFICE

Financial Assistance Office is committed to provide financial assistance to the students from the less developed areas of Pakistan in general and Balochistan in particular, as a key to increase access to higher education. The aim of financial assistance office is fostering mutually beneficial relationships with all our stakeholders as a mean to raise funds for the needy students.

One third students at BUIITEMS receive financial assistance either in the form of scholarship, fee waiver or work and study program. We offer financial assistance to students in two categories:



External Scholarships

- USAID Need-based Scholarships
- National ICT-R&D Scholarships
- HEC Balochistan-Fata Scholarships
- NTS scholarships
- Punjab Educational Endowment Fund
- FC Scholarship
- Professional Education Foundation
- Pakistan Engineering Congress
- PM Tuition Fee Reimbursement Scheme
- Balochistan Education Endowment Fund
- TIBM
- SSGC Scholarship



Internal Scholarships

- Fee waivers/Concessions
- Work & study
- BUIITEMS Kinship/Sibling Concession
- Merit Scholarship: Top 10% of the students in each class receive full tuition fee waiver



BUIITEMS STUDENT AFFAIRS OFFICE

BUIITEMS Student Affairs office is dedicated to deliver high quality co-curricular activities in a learning environment that supports student's holistic growth and acquisition of essential life skills to their full potential and mold them to be responsible, dedicated and successful citizens in national as well as global environment.

Clubs and Councils

- BUIITEMS Community Service Council
- BUIITEMS Diversity Council
- BUIITEMS Arts Council
- BUIITEMS Events Management Club
- BUIITEMS Emergency Response & Preparedness Club (ER&PC)
- BUIITEMS Writing Club
- BUIITEMS Dramatic Club
- BUIITEMS Debating Club
- BUIITEMS Music Club
- BUIITEMS Literary Club
- BUIITEMS Media Club



Industry Linkages

BUIITEMS is developing long term academia-industry linkages to enhance employment, internship and other development opportunities. A comprehensive employers database is maintained and employment opportunities are figured out by using various tools.

Potential employers are invited to participate in university mega events like job fairs and career development opportunities are facilitated for students and alumni. Employer's visibility on and off-campus is also enhanced by various other activities as well.



BUIITEMS Medical Center

BUIITEMS is providing extensive medical facilities to its students and all its employees at the medical center. The medical center provides health facilities to students and employees & their families. Services of qualified medical officers are available at the centre and patients get medicines free of cost. The medical team consists of three medical officers, two male nurses, a male nursing assistant, a junior clerk and a ward boy. The center has two wards and two emergency stations to handle minor emergencies. Ambulance remains standby in case of emergency referral.



BUIEMS Sports Complex

BUIEMS houses a state of the art sports complex outfitted with the latest equipments. Four hundred spectators can enjoy the events at a time. Additionally, a cafeteria and reception area can accommodate 200 people.

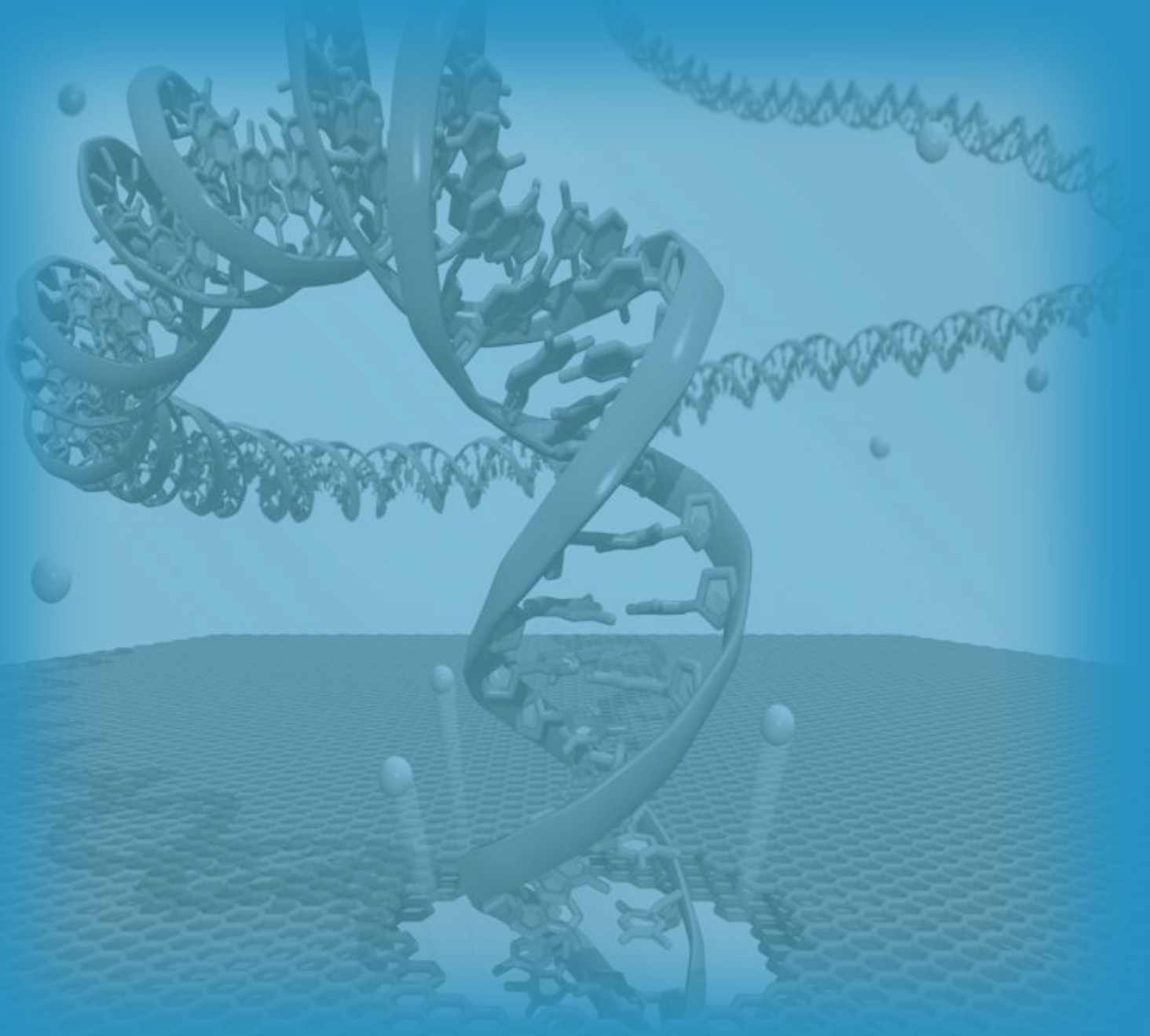
Following facilities are available at the Complex:

- Gymnasium
- Basketball Court
- Badminton Courts
- Table Tennis facility

Students can enjoy outdoor games at well-maintained cricket, football and volleyball grounds.







UAN: 111-717-111

www.buitms.edu.pk