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Faculty of

Science & Technology

2023-24

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BS
Chemistry

Admission Requirements

• F.Sc. Pre-Medical/Pre-Engineering or equivalent with Chemistry securing at least 45% marks in aggregate. In case of foreign qualification, equivalence from IBCC will be required.
• All applicants are required to pass UCP Admission Test.

Degree Requirements

Each candidate of BS Chemistry degree is required to complete 138 Cr. Hrs. with the CGPA of 2.00 on the scale of 4.00 as per the following detail:

Area	No. of Courses	Cr. Hrs.
a) Compulsory	11	27
b) General	13	21
c) Foundation	13	24
d) Majors	17	34
e) Specialization	8	20
f) Elective	3	6
g) Research Project	2	6
Total	**67**	**138**

Program Duration

This is a four years degree program comprising 8 semesters. There is a Fall and a Spring semester each year. The summer semester is utilized for improve/repeat/deficiency courses. The maximum duration to complete the BS Chemistry program is 7 years.

Volunteer Service (CH3000)

Each student is required to complete 65 hours community work during the program, which would be a pre requisite for the award of degree.

Scheme of Studies
BS Chemistry

Semester I (16 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ENG 101	English-I	3	Compulsory
2	MAT 101	Mathematics I	3	Compulsory
3	PAK 101	Pakistan Studies	2	Compulsory
4	CHZO1032	Animal Diversity-I (Invertebrates)	2	General
5	CHZO1031	Animal Diversity-I (Invertebrates)	1	Lab
6	CHBO1012	Diversity of Plants	2	General
7	CHBO1011	Diversity of Plants Lab	1	Lab
8	CH1103	Inorganic Chemistry	3	Foundation
9	CH1101	Inorganic Chemistry Lab	1	Lab
10	ENT 101	Fundamentals of Entrepreneurship	1	Compulsory

Semester II (19 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ENG 102	English-II	3	Compulsory
2	CHCS1013	Computer Application & Programming	3	Compulsory
3	PSY 101	Introduction to Psychology	3	Compulsory
4	CHBO1022	Cell Biology, Genetics and Evolution	2	General
5	CHBO1021	Cell Biology, Genetics and Evolution	1	Lab
6	CHZO1042	Animal Diversity-II (Chordates)	2	General
7	CHZO1041	Animal Diversity-II (Chordates)	1	Lab
8	CH1203	Physical Chemistry	3	Foundation
9	CH1201	Physical Chemistry Lab	1	Lab

Semester III (19 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ENG 203	English-III	3	Compulsory
2	CHCS2023	Advanced Computer Application	3	Compulsory
3	CHZO2032	Biological Techniques	2	General
4	CHZO2031	Biological Techniques Lab	1	Lab
5	SCO 201	Introduction to Sociology	3	General
6	CH2303	Organic Chemistry	3	Foundation
7	CH2301	Organic Chemistry Lab	1	Lab
8	STS 101	Statistics I	3	Foundation

Semester IV (14 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ISL 201	Islamic Studies/Ethics	2	Compulsory
2	CHBO2032	Plant Physiology and Ecology	2	General
3	CHBO2031	Plant Physiology and Ecology Lab	1	Lab
4	CH2402	Basic Pharmaceutical and Forensic Chemistry	2	Foundation
5	CH2401	Basic Pharmaceutical and Forensic Chemistry Lab	1	Lab
6	CH2602	Biochemistry I	2	Foundation
7	CH2601	Biochemistry I Lab	1	Lab
8	CH2502	Analytical Chemistry I	2	Foundation
9	CH2501	Analytical Chemistry I Lab	1	Lab

Semester V (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	CH3113	Inorganic Chemistry II	3	Major
2	CH3111	Inorganic Chemistry II Lab	1	Lab
3	CH3313	Organic Chemistry II	3	Major
4	CH3311	Organic Chemistry II Lab	1	Lab
5	CH3213	Physical Chemistry II	3	Major
6	CH3211	Physical Chemistry II Lab	1	Lab
7	CH3513	Analytical Chemistry II	3	Major
8	CH3511	Analytical Chemistry II Lab	1	Lab
9	CH3012	Applied Chemistry	2	Major

Semester VI (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	CH3123	Inorganic Chemistry III	3	Major
2	CH3121	Inorganic Chemistry III Lab	1	Lab
3	CH3323	Organic Chemistry III	3	Major
4	CH3321	Organic Chemistry III Lab	1	Lab
5	CH3223	Physical Chemistry III	3	Major
6	CH3221	Physical Chemistry III Lab	1	Lab
7	CH3613	Biochemistry II	3	Major
8	CH3611	Biochemistry II Lab	1	Lab
9	CLB 301	Career Lab	1	Compulsory

Semester VII (16 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	CH4xx3	Specialization I	3	Specialization
2	CH4xx3	Specialization II	3	Specialization
3	CH4xx3	Specialization III	3	Specialization
4	CH4xx1	Specialization Lab I	1	Lab
5	CH4022	Instrumental Analysis and Analytical Techniques	2	Elective
6	CH4021	Instrumental Analysis and Analytical Techniques Lab	1	Lab
7	CH4903	Research Project I	3	Research Project

Semester VIII (16 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	CH4xx3	Specialization IV	3	Specialization
2	CH4xx3	Specialization V	3	Specialization
3	CH4xx3	Specialization VI	3	Specialization
4	CH4xx1	Specialization Lab II	1	Lab
5	CH4033	Environmental Chemistry	3	Elective
6	CH4913	Research Project II	3	Research Project

BS Chemistry-Post ADS

Admission Requirements

- At least 45% marks or 2.00/4.00 CGPA in ADS Chemistry or equivalent.
- All applicants are required to pass UCP admission test.

Degree Requirements

Students who will join BS Chemistry after completing their ADS/BSc are required to take one extra transitional semester to meet their deficiencies as per university requirement.

BS
Biochemistry

Admission Requirements

• Higher Secondary School Certificate (F.Sc. Pre-Medical) or Equivalent with Physics, Chemistry and Biology securing at least 45% marks in aggregate. In case of a foreign qualification, equivalence from IBCC will be required
• All applicants are required to pass UCP Admission Test

Degree Requirements

All applicants are required to pass UCP Admission Test

Area	No. of Courses	Cr. Hrs.
a) Inter Dept	10	24
b) General	13	27
c) Foundation	10	20
d) Core Including	22	45
e) Elective	5	12
f) Research Project	2	6
Total	**62**	**134**

Community Work (BC3000)

Each student is required to complete 65 hours of community work, usually after 4th semester which would be a prerequisite for the award of degree.

Program Duration

This is a four-year degree program comprising 8 semesters. There will be a Fall and a Spring semester each year. The summer semester will be utilized for internship or deficiency courses. The maximum duration to complete BS Biochemistry degree is 7 years.

Scheme of Studies
BS Biochemistry

Semester I (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ENG 101	English I	3	Inter. Dept.
2	ENT 101	Fundamentals of Entrepreneurship	1	Inter. Dept.
3	BC1332	Inorganic Chemistry	2	BC General
4	BC1331	Inorganic Chemistry-Lab	1	Lab
5	PAK 101	Pakistan Studies	2	Inter. Dept.
6	BCCS1013	Introduction to Computer Science	3	Inter. Dept.
7	MAT 101	Mathematics I	3	Inter. Dept.
8	BC1212	Introduction to Biochemistry	2	BC Foundation
9	BCL1211	Introduction to Biochemistry-Lab	1	Lab

Semester II (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ENG 102	English II	3	Inter. Dept.
2	BC1613	Biophysics	3	BC General
3	PSY 101	Introduction to Psychology	3	BC General
4	BCMG1013	Marketing and Management	3	BC General
5	BC1322	Organic Chemistry	2	BC General
6	BC1321	Organic Chemistry-Lab	1	Lab
7	BC1323	Carbohydrates and Lipids	3	BC Foundation

Semester III (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ENG 203	English III	3	Inter. Dept.
2	STS 101	Statistics I	3	Inter. Dept.
3	SCO 201	Introduction to Sociology	3	BC General
4	BC2412	Physical Chemistry	2	BC General
5	BC2411	Physical Chemistry-Lab	1	Lab
6	BC2352	Amino Acid & Proteins	2	BC Foundation
7	BC2351	Amino Acid & Proteins-Lab	1	Lab
8	BC2423	Human Physiology	3	BC Foundation

Semester IV (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ISL 201	Islamic Studies/Ethics	2	Inter. Dept.
2	BC2513	Genetics	3	BC General
3	BC2622	Microbiology	2	BC General
4	BC2621	Microbiology-Lab	1	Lab
5	BC2532	Enzymes	2	BC Foundation
6	BC2531	Enzymes-Lab	1	Lab
7	BC2242	Plant Biochemistry	2	BC Core
8	BC2241	Plant Biochemistry	1	Lab
9	BC2223	Metabolism	3	BC Foundation

Semester V (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	BC3632	Cell Biology	2	BC Core
2	BC3631	Cell Biology-Lab	1	Lab
3	BC3231	Biochemistry Techniques	1	BC Core
4	BC3232	Biochemistry Techniques-Lab	2	Lab
5	BC3013	Biosafety & Ethics	3	BC Core
6	BC3543	Molecular Biology	3	BC Core
7	BC3252	Clinical Biochemistr	2	BC Core
8	BC3251	Clinical Biochemistry-Lab	1	Lab
9	BC3642	General Virology	2	BC Elective
10	BC3641	General Virology-Lab	1	Lab

Semester VI (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	BC3553	Cell & Tissue Culture	3	BC Elective
2	BC3563	Bio-Membranes & Cell Signaling	3	BC Core
3	BC3583	Fermentation Biotechnology	3	BC Elective
4	BC3572	Bioenergetics	2	BC Core
5	BC3262	Nutritional Biochemistry	2	BC Core
6	BC3261	Nutritional Biochemistry-Lab	1	Lab
7	BC3021	Bioinformatics	1	BC Core
8	BC3022	Bioinformatics-Lab	2	Lab
9	CLB 301	Career Lab	1	Inter. Dept.

Semester VII (15 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	BC4272	Industrial Biochemistry	2	BC Core
2	BC4271	Industrial Biochemistry-Lab	1	Lab
3	BC4033	Biotechnology	3	BC Core
4	BC4653	Immunology	3	BC Core
5	BC4283	Current Trends in Biochemistry	3	BC Core
6	BC4903	Research Project I	3	Project

Semester VIII (12 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	BC4293	Environmental Biochemistry	3	BC Core
2	BC4203	Biochemistry and Entrepreneurship	3	BC Core
3	BC4663	Toxicology	3	BC Elective
4	BC4913	Research Project II	3	Project

MS
Biochemistry

Admission Requirements

- A minimum of 16 years of education leading to a BS Degree in a relevant discipline
- Minimum 2.00/4.00 CGPA or 50% marks in an annual system
- All applicants are required to pass UCP Admission Test and interview

Degree Requirements

A student is required to earn a minimum of 2.50/4.00 CGPA on the completion of his/her degree requirements. Each candidate for the MS Biochemistry degree is required to successfully earn 30 Cr. Hrs. as per the following details as well:

Area	Cr. Hrs.
a) Course Work	24
b) Thesis	06
Total	**30**

Program Duration

This is nominally a two-year degree program comprising 4 semesters. There will be a Fall and a Spring semester each year. The maximum duration to complete MS Biochemistry degree is 04 years.

Scheme of Studies
MS Biochemistry

Semester I (12 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	BC---	Course 1	Elective	3
2	BC---	Course 2	Elective	3
3	BC---	Course 3	Elective	3
4	BC---	Course 4	Elective	3

Semester II (12 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	BC---	Course 1	Elective	3
2	BC---	Course 2	Elective	3
3	BC---	Course 3	Elective	3
4	BC---	Course 4	Elective	3

Semester III & IV (6 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	BC799	Thesis and Viva Voce	Project	6

List of Elective Courses

Course Title	Code	Category	Cr. Hrs.
Biochemistry of Signal Transduction	BC612	Elective	3
Recombinant DNA Technology	BC622	Elective	3
Advances in Clinical Biochemistry	BC641	Elective	3
Biochemistry of Metabolic Disorders	BC642	Elective	3
Biochemistry of Natural Products	BC651	Elective	3
Advanced Biochemical Techniques	BC661	Elective	3
Advances in Biochemistry	BC681	Elective	3
Advances in Endocrinology	BC682	Elective	3
Recent Trends in Immunology	BC683	Elective	3
Advances in Molecular Genetics	BC725	Elective	3
Advances in Medicinal Chemistry	BC751	Elective	3
Advances in Bioinformatics	BT680	Elective	3
Thesis and Viva Voce	BC799	Project	6

M.Phil.
Chemistry

Admission Requirements

- A minimum of a 16 years of education leading to a BS Degree in relevant discipline
- Minimum 2.00/4.00 CGPA or 50% marks in an annual system
- All applicants are required to pass UCP Admission Test and interview

Degree Requirements

A student is required to earn a minimum of 2.50/4.00 CGPA on the completion of his/her degree requirements. Each candidate for the M.Phil. Chemistry degree is required to successfully earn 30 Cr. Hrs. as per the following detail:

Area	Cr. Hrs.
a) Course Work	24
b) Thesis	06
Total	**30**

Program Duration

This is nominally a two-year degree program comprising 4 semesters. There will be a Fall and a Spring semester each year. The maximum duration to complete M.Phil. Chemistry degree is 04 years.

Scheme of Studies
M.Phil. Biochemistry

Semester I (12 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	BC---	Course 1	Elective	3
2	BC---	Course 2	Elective	3
3	BC---	Course 3	Elective	3
4	BC---	Course 4	Elective	3

Semester II (12 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	BC---	Course 1	Elective	3
2	BC---	Course 2	Elective	3
3	BC---	Course 3	Elective	3
4	BC---	Course 4	Elective	3

Semester III & IV (6 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	CH799	Thesis and Viva Voce	Project	6

List of Elective Courses

Course Title	Code	Category	Cr. Hrs.
Organometallic Chemistry	CH611	Elective	3
Organic Polymer Chemistry	CH612	Elective	3
Nuclear Magnetic Resonance Spectroscopy	CH613	Elective	3
Natural Products Chemistry	CH614	Elective	3
Medicinal Chemistry	CH615	Elective	3
Principles of Biochemical Processes	CH621	Elective	3
Separation Techniques	CH631	Elective	3
Instrumental Analysis	CH632	Elective	3
Advanced Spectroscopic Techniques	CH634	Elective	3
Computational Chemistry	CH641	Elective	3
Environmental Chemistry	CH642	Elective	3
Advanced Chemical Kinetics	CH651	Elective	3
Radiation Chemistry	CH652	Elective	3
Nano Chemistry	CH653	Elective	3
Modern Organic Synthesis	CH711	Elective	3
Spectral Analysis	CH712	Elective	3
Proteomics & Bioinformatics	CH721	Elective	3
Quality Assurance in Analytical Chemistry	CH731	Elective	3
Chemometrics	CH732	Elective	3
Supramolecular Chemistry	CH741	Elective	3
Atmospheric Chemistry	CH742	Elective	3
Nanomaterials	CH752	Elective	3
Thesis and Viva Voce	CH799	Project	6

PhD
Biochemistry

Admission Requirements

- MS degree in a relevant discipline
- Minimum CGPA 3.00/4.00 (Semester System) or 60% marks (Annual System)
- All applicants are required to pass UCP Admission Test and interview

Degree Requirements

A PhD candidate shall be awarded degree on successful completion of the following requirements:

1. (i) 18 Cr. Hrs. Course Work with minimum CGPA 3.00/4.00
   (ii) Comprehensive Examination (written and oral)
2. Synopsis Defense
3. 30 Cr. Hrs. Research Work
4. Publication of at least one research paper in HEC approved journal
5. Dissertation Foreign Reviews
6. Dissertation Final Defense

Note: PhD scholars are required to comply with the following timeline:

Activity	Preferred Time	Maximum
a) Course Work	2 Semesters	3 Semesters
b) Comprehensive Exam	3 Semesters	4 Semesters
c) Synopsis Qualification	4 Semesters	6 Semesters
d) Thesis Submission	6 Semesters	14 Semesters (7 years)

Scheme of Studies

PhD Biochemistry

Semester I (9 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	BC---	Course 1	Elective	3
2	BC---	Course 2	Elective	3
3	BC---	Course 3	Elective	3

Semester II (9 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	BC---	Course 1	Elective	3
2	BC---	Course 2	Elective	3
3	BC---	Course 3	Elective	3

Semester III & Onwards (30 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	BC899A	Thesis-I	Project	9
2	BC899B	Thesis-II	Project	9
3	BC899C	Thesis-III	Project	6
4	BC899D	Thesis-IV	Project	6

List of Elective Courses

Course Title	Code	Category	Cr. Hrs.
Advances in Molecular Genetics	BC725	Elective	3
Advances in Medicinal Chemistry	BC751	Elective	3
Biochemistry of Signal Transduction	BC612	Elective	3
Recombinant DNA Technology	BC622	Elective	3
Advances in Clinical Biochemistry	BC641	Elective	3
Biochemistry of Metabolic Disorders	BC642	Elective	3
Biochemistry of Natural Products	BC651	Elective	3
Advances in Biochemistry	BC681	Elective	3
Advances in Endocrinology	BC682	Elective	3
Recent Trends in Immunology	BC683	Elective	3
Enzymes - Mechanism & Kinetics	BC814	Elective	3
Thesis and Viva Voce	BC899	Project	30

FOST | Handbook | 2023-24

PhD
Chemistry

Admission Requirements

- MS degree in a relevant discipline
- Minimum CGPA 3.00/4.00 (Semester System) or 60% marks (Annual System)
- All applicants are required to pass UCP Admission Test and interview

Degree Requirements

A PhD candidate shall be awarded degree on successful completion of the following requirements:

1. (i) 18 Cr. Hrs. Course Work with minimum CGPA 3.00/4.00
   (ii) Comprehensive Examination (written and oral)
2. Synopsis Defense
3. 30 Cr. Hrs. Research Work
4. Publication of at least one research paper in HEC approved journal
5. Dissertation Foreign Reviews
6. Dissertation Final Defense

Note: PhD scholars are required to comply with the following timeline:

Activity	Preferred Time	Maximum
a) Course Work	2 Semesters	3 Semesters
b) Comprehensive Exam	3 Semesters	4 Semesters
c) Synopsis Qualification	4 Semesters	6 Semesters
d) Thesis Submission	6 Semesters	14 Semesters (7 years)

Scheme of Studies
PhD Chemistry

Semester I (9 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	BC---	Course 1	Elective	3
2	BC---	Course 2	Elective	3
3	BC---	Course 3	Elective	3

Semester II (9 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	BC---	Course 1	Elective	3
2	BC---	Course 2	Elective	3
3	BC---	Course 3	Elective	3

Semester III & Onwards (30 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	CH899A	Thesis-I	Project	9
2	CH899B	Thesis-II	Project	9
3	CH899C	Thesis-III	Project	6
4	CH899D	Thesis-IV	Project	6

List of Elective Courses

Course Title	Code	Category	Cr. Hrs.
Modern Organic Synthesis	CH711	Elective	3
Spectral Analysis	CH712	Elective	3
Proteomics & Bioinformatics	CH721	Elective	3
Quality Assurance in Analytical Chemistry	CH731	Elective	3
Chemometrics	CH732	Elective	3
Supramolecular Chemistry	CH741	Elective	3
Atmospheric Chemistry	CH742	Elective	3
Nanomaterials	CH752	Elective	3
Organometallic Chemistry	CH611	Elective	3
Organic Polymer Chemistry	CH612	Elective	3
Nuclear Magnetic Resonance Spectroscopy	CH613	Elective	3
Natural Products Chemistry	CH614	Elective	3
Medicinal Chemistry	CH615	Elective	3
Principles of Biochemical Processes	CH621	Elective	3
Sepration Techniques	CH631	Elective	3
Instrumental Analysis	CH632	Elective	3
Advanced Spectroscopic Techniques	CH634	Elective	3
Computational Chemistry	CH641	Elective	3
Environmental Chemistry	CH642	Elective	3
Advanced Chemical Kinetics	CH651	Elective	3
Radiation Chemistry	CH652	Elective	3
Nano Chemistry	CH653	Elective	3
Gene Technology	CH822	Elective	3
Solid State Chemistry	CH843	Elective	3
Thesis and Viva Voce	CH899	Project	3

BS
Biotechnology

Admission Requirements

• F.Sc. Pre-Medical or Equivalent with Physics, Chemistry and Biology securing at least 45% marks in aggregate. In case of foreign qualification, equivalence from IBCC will be required.
• All applicants are required to pass UCP Admission Test and interview

Degree Requirements

Each candidate for the BS Biotechnology degree is required to successfully earn 136 Cr. Hrs. with the CGPA of 2.00 on the scale of 4.00 as per the following detail:

Area	Cr. Hrs.
a) Biotechnology Foundation Courses	31
b) Biotechnology General Courses	24
c) Biotechnology Interdepartmental Courses	31
e) Biotechnology Core Courses	32
f) Biotechnology Elective Depth Courses	09
g) Industrial Internship	00
h) Research Project/Internship/Review Paper	06
Total	**133**

Community Work (BT3000)

Each student is required to complete 65 hours of community work, usually after 4th semester which would be a prerequisite for the award of degree.

Program Duration

This is a four-year degree program comprising of 8 semesters. There will be a Fall and a Spring semester in each year. The summer semester will be utilized for internship or deficiency courses. The maximum duration to complete BS Biotechnology degree is 7 years.

Scheme of Studies
BS Biotechnology

Semester I (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ENG 101	English I	3	Inter. Dept.
2	PAK 101	Pakistan Studies	2	Inter. Dept.
3	MAT 101	Mathematics I	3	Inter. Dept.
4	BTCS1003	Introduction to Computer Science	3	Inter. Dept.
5	BT1203	Physical Chemistry	3	General
6	BT1303	Introduction to Biotechnology	3	Foundation
7	ENT 101	Fundamentals of Entrepreneurship	1	Foundation

Semester II (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ENG 102	English-II	3	Inter. Dept.
2	PSY 101	Introduction to Psychology	3	General.
3	BT1212	Inorganic Chemistry	2	General
4	BT1211	Inorganic Chemistry Lab	1	General
5	BT1222	Organic Chemistry	2	General
6	BT1221	Organic Chemistry-Lab	1	General
7	MAT 201	Mathematics II	3	Inter. Dept.
8	BT1232	Biochemistry-I	2	Foundation
9	BT1231	Biochemistry I – Lab	1	Foundation

Semester III (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ENG 203	English-III	3	Inter. Dept.
2	BT2803	Ecology, Biodiversity & Evolution-I	3	General.
3	STS 101	Statistics I	3	Inter. Dept.
4	BT2403	Biological Physics	3	General.
5	BT2242	Biochemistry-II	2	Foundation
6	BT2241	Biochemistry-II-Lab	1	Foundation
7	BT2602	Cell Biology	2	Foundation
8	BT2601	Cell Biology-Lab	1	Foundation

Semester IV (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ISL 201	Islamic Studies	2	Inter. Dept.
2	BT2812	Ecology, Biodiversity & Evolution-II	2	General.
3	BT2811	Ecology, Biodiversity & Evolution-II-Lab	1	General.
4	BT2103	Classical Genetics	3	General.
5	BTMG2003	Marketing Management	3	Inter. Dept.
6	BT2252	Analytical Chemistry & Instrumentation	2	Foundation
7	BT2251	Analytical Chemistry & Instrumentation-Lab	1	Foundation
8	BT2503	Molecular Biology	3	Foundation

Semester V (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	BT3262	Principles of Biochemical Engineering	2	Core.
2	BT3261	Principles of Biochemical Engineering-Lab	1	Core.
3	BT3312	Agriculture Biotechnology	2	Core.
4	BT3311	Agriculture Biotechnology-Lab	1	Core.
5	BT3703	General Immunology	3	Foundation
6	BT3272	Microbiology	2	Core.
7	BT3271	Microbiology-Lab	1	Core.
8	BT3511	Methods in Molecular Biology	1	Foundation
9	BT3512	Methods in Molecular Biology-Lab	2	Foundation
10	BT3113	Genetic Resources & Conservation	3	Foundation

Semester VI (19 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	BT3712	Virology	2	Elective.
2	BT3711	Virology-Lab	1	Elective.
3	BT3323	Microbial Biotechnology	3	Foundation
4	BT3333	Health Biotechnology	3	Core.
5	BT3343	Environmental Biotechnology	3	Core.
6	BT3353	Food Biotechnology	3	Core.
7	BT3363	Nano-Biotechnology	3	Elective.
8	CLB 301	Career Lab	1	Inter. Dept

Semester VII (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	BT4123	Genomics & Proteomics	3	Core.
2	BT4002	Entrepreneurship in Biotechnology	2	Core.
3	BT4821	Bioinformatics	1	Core.
4	BT4822	Bioinformatics-Lab	2	Core.
5	BT4373	Industrial Biotechnology	3	Core.
6	BT4622	Cell & Tissue Culture	2	Elective.
7	BT4621	Cell & Tissue Culture-Lab	1	Elective.
8	BT4903	Research Project I / Internship	3	Project

Semester VIII (8 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	BT4023	Research Methodology & Skill	3	Core.
2	BT4032	Enhancement	2	Inter. Dept.
3	BT4913	Sustainable Biosafety & Bioethics Research Project II / Internship	3	Project

MS
Biotechnology

Admission Requirements

- A minimum of 16 years of education leading to BS Degree in relevant discipline
- Minimum 2.00/4.00 CGPA or 50% marks in an annual system
- All applicants are required to pass UCP Admission Test and interview

Degree Requirements

A student is required to earn a minimum of 2.50/4.00 CGPA on the completion of his/her degree requirements. Each candidate for the MS Biotechnology degree is required to successfully earn 30 Cr. Hrs. as per the following detail:

Area	Cr. Hrs.
a) Course Work	24
b) Thesis	06
Total	**30**

CGPA Requirement

A student is required to earn a minimum of 2.50/4.00 CGPA on the completion of his/her degree requirements.

Program Duration

MS Biotechnology is nominally a two-year degree program comprising of 4 semesters. There will be a Fall and a Spring semester in each year. The maximum duration to complete MS Biotechnology degree is 04 years.

Scheme of Studies
MS Biotechnology

Semester I (12 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	BT630	Advances in Biotechnology	Core	3
2	BT632	Advances in Agriculture Biotechnology	Core	3
3	BT633	Recent trends in Health Biotechnology	Core	3
4	BT600	Biostatistics	Elective	3

Semester I (12 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	BT631	Advances in Nano biotechnology	Core	3
2	BT680	Advances in Bioinformatics	Core	3
3	BT636	Recombinant DNA and Applied GMO Technology	Core	3
4	BT638	Industrial Biotechnology & Bioprocessing	Elective	3

Semester III & IV (6 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	BT799	Research and Thesis	Project	6

PhD
Biotechnology

Admission Requirements

- Earned minimum CGPA of 3.00/4.00 or 60% aggregate marks if the degree is earned from an annual system in a relevant field
- Pass UCP Admission test in the subject area and the qualifying score for this will be 70% in total followed by an interview by the Graduate Admission Committee
- Fulfilled the minimum criteria of HEC for admission in PhD program. Meet the specific eligibility criteria, if any, of the department concerned
- In case of an equivalent foreign qualification, an equivalence certificate from Higher Education Commission is mandatory
- In case the foreign degree/transcript is in any language other than English or Urdu, an officially translated copy of the degree/transcript is mandatory along with an equivalence certificate from the concerned authority
- An officially translated copy is the one verified by the degree awarding institution, respective foreign ministry or an authorized public notary

Degree Requirements

A PhD candidate shall be awarded degree on successful completion of the following requirements:

1. (i) 18 Cr. Hrs. Course Work with minimum CGPA 3.00/4.00
   (ii) Comprehensive Examination (written and oral)
2. Synopsis Defense
3. 30 Cr. Hrs. including Research Work
4. Publication of at least one research paper in HEC approved journal
5. Dissertation Foreign Reviews
6. Dissertation Final Defense

Note: PhD scholars are required to comply with the following timeline:

Activity	Preferred Time	Maximum
a) Course Work	2 Semesters	3 Semesters
b) Comprehensive Exam	3 Semesters	4 Semesters
c) Synopsis Qualification	4 Semesters	6 Semesters
d) Thesis Submission	6 Semesters	14 Semesters (7 years)

Scheme of Studies
PhD Biotechnology

Semester I (9 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	BT---	Course 1	Elective	3
2	BT730	Frontiers in Biotechnology	Elective	3
3	BT731	Advances in Medical Biotechnology	Elective	3

Semester II (9 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	BT732	Recent Trends in Industrial Biotechnology	Elective	3
2	BT680	Advances in Bioinformatics	Elective	3
3	BT---	Course 4	Elective	3

Semester III & IV (30 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	BT899A	Thesis-I	Project	9
2	BT899B	Thesis-II	Project	9
3	BT899C	Thesis-III	Project	6
4	BT899D	Thesis-IV	Project	6

BS
Food Science & Technology

Admission Requirements

• Successful completion of at least 12 years of education i.e. F.Sc. Pre-Medical (or equivalent)/A level securing at least 50% marks
• Qualified the admission test of the undergraduate program, but the applicants who have taken HEC approved test may be exempted from the admission test
• In case of foreign qualification, an applicant shall be required to provide Inter Board Committee of Chairmen (IBCC) certification

Degree Requirements

Each candidate for the BS Food Sciences and Technology degree is required to successfully earn 135 Cr. Hrs. with the CGPA of 2.00 on the scale of 4.00 as per the following details:

Area	Cr. Hrs.
a) Core	18
b) General	42
c) Foundation	27
d) Internship and Research	10
e) Inter Department	27
f)	77
h) Elective	11
Total	**135**

Community Work (FS3000)

Each student is required to complete 65 hours of community work, usually after 4th semester which would be a prerequisite for the award of degree.

Program Duration

This is a four-year degree program comprising of 8 semesters. There will be a Fall and a Spring semester in each year. The summer semester will be utilized for internship or deficiency courses. The maximum duration to complete BS Food Sciences and Technology degree is 7 years.

Scheme of Studies
BS Food Science & Technology

Semester I (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	FS1102	Introduction to Food Science & Technology	2	General
2	FS1101	Introduction to Food Science & Technology-Lab	1	General
3	PAK101	Pakistan Studies	2	Inter Department
4	FS1202	Essentials of Biochemistry	2	General
5	FS1201	Essentials of Biochemistry-Lab	1	General
6	FSCS1003	Introduction to Information Technology	3	Inter Department
7	MAT 101	Mathematics I	3	Inter Department
8	ENG 101	English I	3	Inter Department
9	ENT101	Fundamentals of Entrepreneurship	1	Inter Department

Semester II (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	FS1403	Principles of Human Nutrition	3	General
2	MAT 201	Mathematics II	3	Inter
3	FS1602	Food Processing & Preservation	2	Department
4	FS1601	Food Processing & Preservation-Lab	1	General
5	ENG102	English-II	3	General
6	FS1302	General Microbiology	2	Inter
7	FS1301	General Microbiology-Lab	1	Department
8	FS1412	Postharvest Technology	2	General
9	FS1411	Postharvest Technology-Lab	1	General

Semester III (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	FS2312	Food Microbiology	2	General
2	FS2311	Food Microbiology-Lab	1	General
3	FS2502	Dairy Technology	2	General
4	FS2501	Dairy Technology-Lab	1	General
5	FS2422	Community Nutrition	2	General
6	FS2421	Community Nutrition-Lab	1	General
7	FS2213	Food Chemistry	3	General
8	ISL201	Islamic Studies	2	Inter Department
9	STS 101	Statistics I	3	Inter Department

Semester IV (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	FS2612	Unit Operation in Food Processing	2	General
2	FS2611	Unit Operation in Food Processing-Lab	1	General
3	FS2622	Fruits and Vegetables Processing	2	Foundation
4	FS2621	Fruits and Vegetables Processing-Lab	1	Foundation
5	FS2522	Meat and Sea Food Processing Technology	2	Foundation
6	FS2521	Meat and Sea Food Processing Technology-Lab	1	Foundation
7	FS2642	Cereal Technology	2	General
8	FS2641	Cereal Technology-Lab	1	General
9	STS 201	Statistics II	3	Inter Department
10	FS2513	Food Plant Layout and Sanitation	3	General

Semester V (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	FS3632	Public Health, Milk & Meat Hygiene	2	Foundation
2	FS3631	Public Health, Milk & Meat Hygiene-Lab	1	Foundation
3	FS3443	Food Safety and Quality Management	3	Elective
4	FS3662	Food Process Engineering	2	Foundation
5	FS3661	Food Process Engineering-Lab	1	Foundation
6	FS3462	Bakery Products Technology	2	Core
7	FS3461	Bakery Products Technology-Lab	1	Core
8	FS3432	Instrumental Techniques in Food Analysis	2	Foundation
9	FS3431	Instrumental Techniques in Food Analysis-Lab	1	Foundation
10	FS3703	Food Laws & Regulations	3	Core

Semester VI (19 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	FS3542	Food Biotechnology	2	Core
2	FS3541	Food Biotechnology-Lab	1	Core
3	FS3473	Food Toxicology	3	General
4	FS3713	Fundamentals of Halal foods	3	Elective
5	FS3652	Sugar Technology	2	Foundation
6	FS3651	Sugar Technology-Lab	1	Foundation
7	FS3532	Beverage Technology	2	Foundation
8	FS3531	Beverage Technology-Lab	1	Foundation
9	FS3552	Technology of Oils and Fats	2	Core
10	FS3551	Technology of Oils and Fats-Lab	1	Core
11	CLB301	Career Lab	1	Inter Department

FOST | Handbook | 2023-24

Semester VII (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	FS4572	Extrusion Technology	2	Core
2	FS4571	Extrusion Technology-Lab	1	Core
3	FS4562	Food Packaging	2	Core
4	FS4561	Food Packaging-Lab	1	Core
5	FS4452	Confectionery and Snack Foods	2	Foundation
6	FS4451	Confectionery and Snack Foods-Lab	1	Foundation
7	FS4682	Food Product Development and Sensory Evaluation	2	Elective
8	FS4681	Food Product Development and Sensory Evaluation – Lab	1	Elective
9	FS4472	Food Service Management	2	Elective
10	FSHU4053	Research Methodology & Skills	3	Foundation

Semester VIII (10 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	FS4910	Internship	10	Project

BS

Human Nutrition and Dietetics

Admission Requirements

• Successful completion of at least 12 years of education i.e. F.Sc. Pre-Medical (or equivalent)/A level securing at least 50% marks
• Qualified the admission test of the undergraduate program, but the applicants who have taken HEC approved test may be exempted from the admission test
In case of foreign qualification, an applicant shall be required to provide Inter Board Committee of Chairmen (IBCC) certification

Degree Requirements

Each candidate for the BS Human Nutrition and Dietetics degree is required to successfully earn 136 Cr. Hrs. with the CGPA of 2.00 on the scale of 4.00 as per the following details:

Area	Cr. Hrs.
a) Core	25
b) General	24
c) Foundation	33
d) Internship and Research	10
e) Major	32
f)	77
g) Elective	12
Total	**136**

Community Work (HND3000)

Each student is required to complete 65 hours of community work, usually after 4th semester which would be a prerequisite for the award of degree.

Program Duration

This is a four-year degree program comprising of 8 semesters. There will be a Fall and a Spring semester in each year. The summer semester will be utilized for internship or deficiency courses. The maximum duration to complete BS Human Nutrition and Dietetics degree is 7 years.

Scheme of Studies

BS Human Nutrition and Dietetics

Semester I (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	HND 110	Fundamentals of Human Nutrition	3	Foundation
2	PAK 101	Pakistan Studies	2	Core
3	HND 150	Essentials of Biochemistry	2	General
4	HND 150-P	Lab (Essentials of Biochemistry)	1	General
5	HNCS 100	Introduction to Information Technology	3	Core
6	MAT 101	Mathematics I	3	Core
7	ENG 101	English I	3	Core
8	ENT 101	Fundamentals of Entrepreneurship	1	General

Semester II (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	HND 130	Introduction to Food Science and Technology	3	General
2	HND 111	Macronutrients in Human Nutrition	3	Foundation
3	HND 131	Food Processing & Preservation	2	General
4	HND 131-P	Lab (Food Processing & Preservation)	1	General
5	ENG 102	English-II	3	Core
6	HND 140	Assessment of Nutritional Status	2	Major
7	HND 140-P	Lab (Assessment of Nutritional Status)	1	Major
8	SCO 201	Sociology	3	General

Semester III (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	HND 212	Micronutrients in Human Nutrition	3	Foundation
2	HND 260	Fundamentals of Human Anatomy	2	Foundation
3	HND 260-P	Lab (Fundamentals of Human Anatomy)	1	Foundation
4	HND 261	Human Physiology-I	2	Foundation
5	HND 261-P	Lab (Human Physiology-I)	1	Foundation
6	ENG 203	English III	3	Core
7	ISL 201	Islamic Studies	2	Core
8	STS 101	Statistics I	3	Core

Semester IV (19 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	HND 262	Human Physiology – II	2	Foundation
2	HND 262-P	Lab (Human Physiology – II)	1	Foundation
3	HND 213	Nutrition Through the Life Cycle	3	Foundation
4	HND 200	Introductory Molecular Genetics	2	General
5	HND 220	Functional and Nutraceutical Foods	3	Major
6	HND 214	Public Health Nutrition & Sustainability	2	Major
7	HND 214-P	Lab (Public Health Nutrition & Sustainability)	1	Major
8	STS 201	Statistics II	3	Core
9	HND 232	Food and Drug Laws	2	Major

Semester V (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	HND 363	General pathology	2	Foundation
2	HND 363-P	Lab (General pathology)	1	Foundation
3	HND 370	Food Microbiology	2	General
4	HND 370-P	Lab (Food Microbiology)	1	General
5	HND 333	Food Analysis	2	Foundation
6	HND 333-P	Lab (Food Analysis)	1	Foundation
7	HND 321	Dietetics-I	2	Major
8	HND 321-P	Lab (Dietetics-I)	1	Major
9	HND 315	Nutrition Policies and Programs	3	Major
10	HND 341	Nutritional Immunology	3	Major

Semester VI (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	HND 334	Food Service Management	3	General
2	HND 322	Dietetics-II	2	Major
3	HND 322-P	Lab (Dietetics-II)	1	Major
4	HND 316	Nutritional Practices in Clinical Care	2	Major
5	HND 316-P	Lab (Nutritional Practices in Clinical Care)	1	Major
6	HND 335	Fundamentals of Halal foods	3	Foundation
7		Elective-I	3	Elective
8		Elective-II	3	Elective

Semester VII (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	HND 423	Dietetics-III	2	Major
2	HND 423-P	Lab (Dietetics-III)	1	Major
3	HND 442	Infant and Young Child Feeding	2	Foundation
4	HND 442-P	Lab (Infant and Young Child Feeding)	1	Foundation
5	HND 451	Clinical Biochemistry	2	General
6	HND 451-P	Clinical Biochemistry	1	General
7	HND 480	Research Methodology & Skills	3	Major
8		Elective-III	3	
9		Elective-IV	3	

Semester VIII (10 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	HND 481	Internship & Report Writing	06	Major
2	HND 482	Research Project	04	Major

List of Elective Courses (2 courses equal to 5 credit hours)

Course Title	Code	Cr. Hrs.
Sports Nutrition	HND 317	2
Lab (Sports Nutrition)	HND 317-P	1
Meal Planning and Management	HND 324	2
Lab (Meal Planning and Management)	HND 324-P	1
Nutrition in Emergencies	HND 343	3
Preventive Nutrition	HND 344	3
Food Toxins & Allergens	HND 371	3
Nutrition and Psychology	HND 418	3
Nutritional Education and Awareness	HND 419	2
Lab (Nutritional Education and Awareness)	HND 419-P	1
Drug Nutrient and Interaction	HND 445	3
Food Supplements	HND 446	3
Nutrition Epidemiology	HND 447	2
Food Chemistry	HND 436	3
Metabolism of Basic Nutrients	HND 425	2
Nutritional Disorders	HND 426	3

MS
Food Technology

Admission Requirements

- A minimum of 16 years of education leading to BS Degree in relevant discipline
- Minimum 2.00/4.00 CGPA or 50% marks in an annual system
- All applicants are required to pass UCP Admission Test and interview

Degree Requirements

A student is required to earn a minimum of 2.50/4.00 CGPA on the completion of his/her degree requirements. Each candidate for the MS Biochemistry degree is required to successfully earn 30 Cr. Hrs. as per the following details as well:

Area	Cr. Hrs.
a) Course Work	24
b) Thesis	06
Total	**30**

Program Duration

This is nominally a two-year degree program comprising of 4 semesters. There will be a Fall and a Spring semester in each year. The maximum duration to complete MS Food Technology degree is 04 years.

Scheme of Studies
MS Food Technology

Semester I (12 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	FT---	Course 1	Core I	3
2	FT---	Course 2	Core II	3
3	FT---	Course 3	Elective I	3
4	FT---	Course 4	Elective II	3

Semester II (12 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	FT---	Course 1	Core I	3
2	FT---	Course 2	Core II	3
3	FT---	Course 3	Elective I	3
4	FT---	Course 4	Elective II	3

Semester III & IV (6 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	FT799	Thesis and Viva Voce	Project	6

List of Courses

Course Title	Code	Cr. Hrs.
Carbohydrates Chemistry and Technology	T611	3
Recent Advances in Food Science & Technology	FT622	3
Functional Beverage Technology	FT631	2
Lab (Functional Beverage Technology)	FT631P	1
Food Quality Assurance Management	FT651	3
Food Safety and Quality Control Systems	FT652	3
Halal Food Forensics	FT653	3
Technology of Processed Meat	FT671	3
Advances in Food Packaging	FT681	2
Lab (Advances in Food Packaging)	FT681P	1
Functional Foods and Nutraceuticals	FT721	3
Thermal and Non-Thermal Technologies	FT722	3
Advances in Food Biotechnology	FT741	2
Lab (Advances in Food Biotechnology)	FT741P	1
Baking Science and Technology	FT612	2
Lab (Baking Science and Technology)	FT612P	1
Milling of Cereals	FT613	3
Food Enzymology	FT641	3
Food Industry Waste Management	FT642	3
Technology of Spices and Condiments	FT722	2
Lab (Technology of Spices and Condiments)	FT722P	1
Processing of Milk and Milk Products	FT732	2
Lab (Processing of Milk and Milk Products)	FT732P	1
Food Chain Management	FT751	3
Advanced Biochemical Techniques	BC661	3
Biostatistics	BT600	3
Recombinant DNA and Applied GMO Technology	BT636	3
Advances in Bioinformatics	BT680	3
Advanced Immunology	MB671	3

PhD
Food Technology

Admission Requirements

- MS degree in relevant discipline
- Minimum CGPA 3.00/4.00 (Semester System) or 60% marks (Annual System)
- All applicants are required to pass UCP Admission Test and interview

Degree Requirements

A PhD candidate shall be awarded degree on successful completion of the following requirements:

1. (i) 18 Cr. Hrs. Course Work with minimum CGPA 3.00/4.00
   (ii) Comprehensive Examination (written and oral)
2. Synopsis Defense
3. 30 Cr. Hrs. including Research Work
4. Publication of at least one research paper in HEC approved journal
5. Dissertation Foreign Reviews
6. Dissertation Final Defense

Note: PhD scholars are required to comply with the following timeline:

Activity	Preferred Time	Maximum
a) Course Work	2 Semesters	3 Semesters
b) Comprehensive Exam	3 Semesters	4 Semesters
c) Synopsis Qualification	4 Semesters	6 Semesters
d) Thesis Submission	6 Semesters	14 Semesters (7 years)

Scheme of Studies

PhD Food Technology

Semester I (9 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	FT---	Course 1	Core I	3
2	FT---	Course 2	Elective I	3
3	FT---	Course 3	Elective II	3

Semester II (9 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	FT---	Course 1	Core I	3
2	FT---	Course 2	Elective I	3
3	FT---	Course 3	Elective II	3

Semester III & IV (30 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	FT899A	Thesis-I	Project	9
2	FT899B	Thesis-II	Project	9
3	FT899C	Thesis-III	Project	6
4	FT899D	Thesis-IV	Project	6

List of Courses

Course Title	Code	Cr. Hrs.
Carbohydrates Chemistry and Technology	FT611	3
Recent Advances in Food Science & Technology	FT622	3
Functional Beverage Technology	FT631	2
Lab (Functional Beverage Technology)	FT631P	1
Food Quality Assurance Management	FT651	3
Food Safety and Quality Control Systems	FT652	3
Halal Food Forensics	FT653	3
Technology of Processed Meat	FT671	3
Advanced Food Packaging	FT681	2
Lab (Advanced Food Packaging)	FT681P	1
Functional Foods and Nutraceuticals	FT721	3
Thermal & Non-thermal Technologies	FT722	3
Advances in Food Biotechnology	FT741	2
Lab (Advances in Food Biotechnology)	FT741P	1
Baking Science and Technology	FT612	2
Lab (Baking Science and Technology)	FT612P	1
Milling of Cereals	FT613	3
Food Enzymology	FT641	3
Food Industry Waste Management	FT642	3
Technology of Spices and Condiments	FT722	2
Lab (Technology of Spices and Condiments)	FT722P	1
Processing of Milk and Milk Products	FT732	2
Lab (Processing of Milk and Milk Products)	FT732P	1
Food Chain Management	FT751	3
Advanced Biochemical Techniques	BC661	3
Biostatistics	BT600	3
Recombinant DNA and Applied GMO Technology	BT636	3
Advances in Bioinformatics	BT680	3
Advanced Immunology	MB671	3
Starch Chemistry and Technology	FT811	3
Advancements in Food Fermentation	FT842	3

FOST | Handbook | 2023-24

BS
Mathematics

Admission Requirements

- F.Sc. Pre-Engineering or equivalent with Mathematics securing at least 45% marks in aggregate. In case of foreign qualification, equivalence from IBCC will be required
- All applicants are required to pass UCP Admission Test

Degree Requirements

Each candidate of BS Mathematics degree is required to complete 130 Cr. Hrs. with the CGPA of 2.00 on the scale of 4.00 as per the following detail:

Area		Cr. Hrs.
a)	Compulsory	24
b)	General	21
c)	Foundation	31
d)	Major	42
e)	Elective	12
Total		**130**

Program Duration

This is a four-year degree program comprising of 8 semesters. There will be a Fall and a Spring semester in each year. The summer semester will be utilized for intern- ship / improvement or deficiency courses. The maximum duration to complete BS Mathematics degree is 7 years.

Volunteer Service (CH3000)

Each student is required to complete 65 hours' community work during the program, which would be a pre requisite for the award of degree.

Scheme of Studies
BS Mathematics

Semester I (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	MT1303	Calculus I	3	Foundation
2	MT1353	Analytic Geometry	3	Foundation
3	PAK 101	Pakistan Studies	2	Compulsory
4	ENG 101	English I	3	Compulsory
5	ENT 101	Fundamentals of Entrepreneurship	1	Compulsory
6	MTCS1003	Introduction to Computer	3	Compulsory
7	MT1702	Mechanics	2	General
8	MT1701	Lab (Mechanics)	1	General

Semester II (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	MT1313	Calculus II	3	Foundation
2	ENG 102	English II	3	Compulsory
3	PSY 101	Introduction to Psychology	3	General
4	MTPY1002	Waves and Oscillation	2	General
5	MTPY1001	Lab (Waves and Oscillation)	1	General
6	FNL 101	Foreign Language (Chinese)	3	Compulsory
7	MTCS1013	Computer Programming	3	General

Semester III (19 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ENG 203	English III	3	Compulsory
2	MT2214	Linear Algebra	4	Foundation
3	MT2323	Calculus III	3	Foundation
4	SCO 201	Introduction to Sociology	3	General
5	MTCS2023	Software Packages	3	General
6	STS 101	Statistics I	3	General

Semester IV (14 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	MT2203	Vector and Tensor Analysis	3	Foundation
2	MT2413	Number Theory	3	Foundation
3	ISL 101	Islamic Studies/Ethics	2	Compulsory
4	MT2343	Discrete Mathematics	3	Compulsory
5	MT2513	Ordinary Differential Equations	3	Foundation

Semester V (15 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	MT3003	Topology	3	Major
2	MT3353	Differential Geometry	3	Major
3	MT3603	Real Analysis I	3	Major
4	MT3523	Partial Differential Equations	3	Major
5	MT3403	Group Theory	3	Major

Semester VI (16 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	MT3613	Complex Analysis	3	Foundation
2	MT3713	Classical Mechanics	3	Major
3	MT3203	Rings and Fields	3	Foundation
4	MT3623	Functional Analysis	3	Major
5	MT3633	Real Analysis II	3	Major
6	CLB 101	Career Lab	1	Compulsory

Semester VII (15 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	MT4643	Numerical Analysis I	3	Major
2	MT4353	Graph Theory	3	Major
3	MT4013	Mathematical Methods	3	Major
4	MT4xx3	Elective I	3	Elective
5	MT4xx3	Elective II	3	Elective

Semester VIII (15 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	MT4113	Probability Theory	3	Major
2	MT4533	Integral Equations	3	Major
3	MT4xx3	Elective III	3	Elective
4	MT4xx3	Elective IV	3	Elective
5	MT4653	Numerical Analysis II	3	Major

BS

Mathematics – Post ADS/Post BSc

Admission Requirements

- At least 45% marks or 2.00/4.00 CGPA in ADS Mathematics or equivalent. All applicants are required to pass the UCP admission test

Degree Requirements

Students who will join BS Mathematics after completing their ADS/BSc are required to take one extra transitional semester to meet their deficiencies as per university requirement.

MS
Mathematics

Admission Requirements

• Sixteen years of schooling or 4 years education (124 credit hours) after HSSC/F.A. /F.Sc/A-Levels/Grade 12 equivalent
• A minimum CGPA 2.00 (out of 4.00 in semester system) or 2nd division (in annual system) in bachelor/master/equivalent degree in Mathematics is required
• The GAT-General (www.nts.org.pk/gat/gat.asp) conducted by the National Testing Service with a minimum 50% cumulative score. The GAT-General test is valid for a period of two years
• A subject-based written test will be conducted to shortlist the students for interviews by the Graduate Programme Committee, if required

Degree Requirements

Program Duration	1.5-4 years
Course Work	24 credit hours
Research Work	6 credit hours
Total Credit Hours	30

Scheme of Studies

Students will be required to complete the course work of 24 credit hours with minimum CGPA of 2.5 out of 4.0. Students will, then, be required to undertake research work (thesis) of 6 credit hours.

Note:
1. The further detail can be found in UCP/HEC Regulations for MS/MPhil Degree Programme.
2. The list of core/elective courses along with the course outlines is given as under.

Scheme of Studies
MS Mathematics

Semester I (12 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1		Course-I	Core	3
2		Course-II	Core	3
3		Course-III	Optional	3
4		Course-IV	Optional	3

Semester II (12 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1		Course-V	Core	3
2		Course-VI	Core	3
3		Course-VII	Optional	3
4		Course-VIII	Optional	3

Semester III & IV (6 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1		Thesis		

List of Courses (Applied Mathematics)

Course Title	Code	Category
General Relativity	MT612	Core
Advanced Partial Differential Equations	MT613	Core
Mathematical Techniques	MT614	Core
Advanced Mathematical Physics	MT615	Core
Advanced General Relativity	MT616	
Integral Transforms	MT617	
Fluid Dynamics	MT618	

List of Courses (Computational Mathematics)

Course Title	Code	Category
Numerical Solution of ODEs	MT621	Core
Multi-Criteria Decision Making Techniques	MT622	
Fuzzy Graphs with Applications	MT623	Core
Theory of Spline Functions	MT624	
Optimization Theory	MT625	

List of Courses (Pure Mathematics)

Course Title	Code	Category
Advanced Linear Algebra	MT631	Core
Advanced Functional Analysis	MT632	Core
Advanced Topology	MT633	Core
Algebraic Graph Theory	MT634	Core
Field Extensions and Galois Theory	MT635	

List of Courses (Research Methods)

Course Title	Code	Category
Research Methodology	MT642	

Note: The Students may be offered the courses from the following list of further courses, as per need.

List of Further Courses (Applied Mathematics)

Course Title	Code	Category
Cosmology	MT711	
Nonlinear Dynamics	MT712	
Fractional Calculus	MT713	
Mathematical Biology	MT714	
Advanced Mathematical Biology	MT815	
Applied Game Theory	MT716	
Fuzzy Optimization and Decision Analysis	MT717	

List of Further Courses (Computational Mathematics)

Course Title	Code	Category
Numerical Solution of PDEs	MT721	
Subdivision Schemes	MT722	
Advanced Theory of Spline Functions	MT723	
Mathematical Modeling and Simulations	MT724	
Advanced Mathematical Modeling	MT825	
Advanced Optimization Theory	MT726	

List of Further Courses (Pure Mathematics)

Course Title	Code	Category
Algebraic Topology	MT731	
Knot Theory	MT732	
Combinatorics	MT733	
Advanced Number Theory	MT734	
Advanced Knot Theory	MT835	

PhD
Mathematics

Admission Requirements

- A minimum CGPA 3.00/4.00 in the semester system or 60% in an annual system in M.Phil./MS or equivalent degree in a relevant discipline
- All applicants are required to pass UCP Admission Test and interview

Degree Requirements

A student admitted in this programme will have to complete the degree requirements by as follows:

Area		Cr. Hrs.
a)	Course Work	18
b)	Research Work	30
Total		**48**

Students will be required to complete the course work of 18 credit hours with minimum CGPA of 3.00/4.00. After qualifying the comprehensive examination, the students will be required to undertake research work (dissertation) of 30 credit hours.

Programme Duration

1. Minimum duration 3 years (six semesters) and
2. Maximum 8 years (16 semesters) including semester breaks/semester freeze

Scheme of Studies
PhD Mathematics

Semester I (9 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1		Course-I		3
2		Course-II		3
3		Course-III		3

Semester II (9 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1		Course-IV		3
2		Course-V		3
3		Course-VI		3

Semester III, IV, V and VI

S. No	Course Code	Course Title	Category	Cr. Hrs.
1		Thesis		

Note: The further detail can be found in UCP/HEC Regulations for PhD Degree Programme.

List of Courses (Applied Mathematics)

Course Title	Code	Category
Cosmology	MT711	
Nonlinear Dynamics	MT712	
Fractional Calculus	MT713	
Mathematical Biology	MT714	
Advanced Mathematical Biology	MT815	
Applied Game Theory	MT716	
Fuzzy Optimization and Decision Analysis	MT717	

List of Courses (Computational Mathematics)

Course Title	Code	Category
Numerical Solution of PDEs	MT721	
Subdivision Schemes	MT722	
Advanced Theory of Spline Functions	MT723	
Mathematical Modeling and Simulations	MT724	
Advanced Mathematical Modeling	MT825	
Advanced Optimization Theory	MT726	

List of Courses (Pure Mathematics)

Course Title	Code	Category
Algebraic Topology	MT731	
Knot Theory	MT732	
Combinatorics	MT733	
Advanced Number Theory	MT734	
Advanced Knot Theory	MT835	

Note: The Students may be offered the courses from the following list of further courses, as per need.

List of Further Courses (Applied Mathematics)

Course Title	Code	Category
General Relativity	MT612	
Advanced Partial Differential Equations	MT613	
Mathematical Techniques	MT614	
Advanced Mathematical Physics	MT615	
Advanced General Relativity	MT616	
Integral Transforms	MT617	
Fluid Dynamics	MT618	

List of Further Courses (Computational Mathematics)

Course Title	Code	Category
Numerical Solution of ODEs	MT621	
Multi-Criteria Decision Making Techniques	MT622	
Fuzzy Graphs with Applications	MT623	
Theory of Spline Functions	MT624	
Optimization Theory	MT625	

List of Further Courses (Pure Mathematics)

Course Title	Code	Category
Advanced Linear Algebra	MT631	
Advanced Functional Analysis	MT632	
Advanced Topology	MT633	
Algebraic Graph Theory	MT634	
Field Extensions and Galois Theory	MT635	

BS
Microbiology

Admission Requirements

- F.Sc. Pre-Medical or Equivalent with Physics, Chemistry and Biology securing at least 45% marks in aggregate. In case of foreign qualification, equivalence from IBCC will be required
- All applicants are required to pass UCP Admission Test

Degree Requirements

Each candidate for the BS Microbiology degree is required to successfully earn 132 Cr. Hrs. with the CGPA of 2.00 on the scale of 4.00 as per the following detail:

Area	Cr. Hrs.
a) Inter Department	21
b) General	21
c) Foundation	34
d) Core including Research Project	42
e) Elective	12
Total	**130**

Program Duration

This is a four-year degree program comprising of 8 semesters. There will be a Fall and a Spring semester in each year. The summer semester will be utilized for internship or deficiency courses. The maximum duration to complete BS Microbiology degree is 7 years.

Community Work (MB3000)

Each student is required to complete 65 hours of community work, usually after 4th semester which would be a prerequisite for the award of degree.

Scheme of Studies
BS Microbiology

Semester I (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ENG101	English I	3	Inter Department
2	PAK101	Pakistan Studies	2	Inter Department
3	MAT101	Mathematics I	3	Inter Department
4	MBCS1013	Computer Application	3	Inter Department
5	MB1602	Fundamentals of Microbiology-I	2	MB Foundation
6	MB1601	Fundamentals of Microbiology-I-Lab	1	MB Foundation
7	MB1202	Biochemistry-1	2	MB Foundation
8	MB1201	Biochemistry-1-Lab	1	MB Foundation
9	ENT 101	Fundamentals of Entrepreneurship	1	Inter Department

Semester II (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ENG102	English II	3	Inter Department
2	MB2702	General Immunology	2	MB Foundation
3	MB2701	General Immunology-Lab	1	MB Foundation
4	MB2813	Biodiversity of Plants & Fungi	3	MB General
5	MB1212	Biochemistry-II	2	MB General
6	MB1211	Biochemistry-II-Lab	1	MB General
7	MB1612	Fundamentals of Microbiology-II	2	MB Foundation
8	MB1611	Fundamentals of Microbiology-II-Lab	1	MB Foundation
9	MB1803	Ecology & Ecosystem	3	MB General

Semester III (15 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	STS101	Statistics I	3	Inter Department
2	SCO201	Sociology	3	MB General
3	MB2102	General Genetics	2	MB General
4	MB2101	General Genetics-Lab	1	MB General
5	MB2623	Introduction to Medical Microbiology	3	MB Foundation
6	MB2621	Introduction to Medical Microbiology-Lab	1	MB Foundation
7	ISL101	Islamic Studies	2	Inter Department

Semester VI (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	MB2743	Epidemiology, Public Health & Bioethics	3	MB Core
2	MB2823	Biosafety & Risk Management	3	MB Foundation
3	MB2713	Microbial Taxonomy	3	MB Foundation
4	MB2722	General Virology	2	MB Foundation
5	MB2721	General Virology-Lab	1	MB Foundation
6	MB2522	Cell Biology	2	MB Foundation
7	MB2521	Cell Biology-Lab	1	MB Foundation
8	MB2402	Human Physiology	2	MB General
9	MB2401	Human Physiology-Lab	1	MB General

Semester V (19 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	MB3682	Food Microbiology	2	MB General
2	MB3681	Food Microbiology-Lab	1	MB General
3	MB3902	Research Methodology	2	MB Foundation
4	MB3901	Research Methodology-Lab	1	MB Foundation
5	MB3632	Mycology	2	MB Foundation
6	MB3631	Mycology-Lab	1	MB Foundation
7	MB3422	Microbial Anatomy & Physiology	2	MB Core
8	MB3421	Microbial Anatomy & Physiology-Lab	1	MB Core
9	MB3652	Freshwater Microbiology	2	MB Core
10	MB3651	Freshwater Microbiology-Lab	1	MB Core
11	MB3733	Clinical Bacteriology	3	MB Core
12	MB3731	Clinical Bacteriology-Lab	1	MB Core

Semester VI (19 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	MB3312	Introduction to Bioinformatics	2	MB Elective
2	MB3311	Introduction to Bioinformatics- Lab	1	MB Elective
3	MB3113	Bacterial Genetics	3	MB Core
4	MB3111	Bacterial Genetics-Lab	1	MB Core
5	MB3673	Cell & tissue culture	3	MB Elective
6	MB3642	Pharmaceutical Microbiology	2	MB Core
7	MB3641	Pharmaceutical Microbiology-Lab	1	MB Core
8	MB3662	Soil Microbiology	2	MB Core
9	MB3661	Soil Microbiology-Lab	1	MB Core
10	MB3132	Genetic Engineering	2	MB Core
11	MB3131	Genetic Engineering-Lab	1	MB Core

Semester VII (19 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	MB4302	Environmental Biotechnology	2	MB Core
2	MB4301	Environmental Biotechnology-Lab	1	MB Core
3	MB4503	Molecular Mechanism of Antimicrobial Agent	3	MB Core
4	MB4501	Molecular Mechanism of Antimicrobial Agent-Lab	1	MB Core
5	MB4512	Applied Microbial Technology	2	MB Elective
6	MB4511	Applied Microbial Technology-Lab	1	MB Elective
7	MB4752	Medical Virology	2	MB Core
8	MB4751	Medical virology-Lab	1	MB Core
9	MB4322	Nano-biotechnology	2	MB Elective
10	MB4321	Nano-biotechnology-Lab	1	MB Elective
11	MB4903	(Research Project/Internship)	3	Research Project

Semester VIII (4 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	MB4913	(Research Project/Internship)	3	Research Project
2	CLB 301	Career Lab	1	Inter Department

BS

Medical Laboratory Technology (MLT)

Admission Requirements

- F.Sc. Pre-Medical or Equivalent with Physics, Chemistry and Biology securing at least 45% marks in aggregate. In case of foreign qualification, equivalence from IBCC will be required
- All applicants are required to pass UCP Admission Test

Degree Requirements

Each candidate for the BS MLT degree is required to successfully earn 126 Cr. Hrs. with the CGPA of 2.00 on the scale of 4.00 as per the following detail:

Area	Cr. Hrs.
a) Foundation	21
b) Inter Departmental	24
c) General	30
d) Core	48
e) Research Project	6
Total	**129**

Program Duration

This is a four-year degree program comprising of 8 semesters. There will be a Fall and a Spring semester in each year. The summer semester will be utilized for internship or deficiency courses. The maximum duration to complete BS MLT degree is 7 years.

Community Work (MB3000)

Each student is required to complete 65 hours of community work, usually after 4th semester which would be a prerequisite for the award of degree.

Scheme of Studies

BS Medical Laboratory Technology (MLT)

Semester I (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	LT1402	Human Physiology-I	2	Foundation
2	LT1401	Human Physiology-I-Lab	1	Foundation
3	LT1802	Human Anatomy	2	Foundation
4	LT1801	Human Anatomy-Lab	1	Foundation
5	LT1202	Biochemistry-I	2	Foundation
6	LT1201	Biochemistry-I-Lab	1	Foundation
7	LTCS1013	Computer Applications	3	Inter Department
8	ENG 101	English I	3	Inter Department
9	PAK 101	Pakistan Studies	2	Inter Department
10	ENT 101	Fundamentals of Entrepreneurship	1	Inter Department

Semester II (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	LT1812	General Pathology	2	General
2	LT1811	General Pathology-Lab	1	General
3	LT1412	Human Physiology-II	2	Foundation
4	LT1411	Human Physiology-II-Lab	1	Foundation
5	LT1212	Biochemistry-II	2	Foundation
6	LT1211	Biochemistry-II-Lab	1	Foundation
7	LTHUM1013	Behavioral Sciences	3	General
8	LT1002	One Health	2	General
9	LT1001	One Health-Lab	1	General
10	LT1622	General Microbiology	2	General
11	LT1621	General Microbiology-Lab	1	General

Semester IV (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	LT2802	Chemical Pathology	2	Core
2	LT2801	Chemical Pathology-Lab	1	Core
3	LT2812	Hematology-II	2	Core
4	LT2811	Hematology-II-Lab	1	Core
5	LT2832	Blood Banking	2	Core
6	LT2831	Blood Banking-Lab	1	Core
7	LT2892	Histopathology and Cytopathology	2	Inter Department
8	LT2891	Histopathology and Cytopathology-Lab	1	Inter Department
9	LT2522	Cell Biology	2	General
11	LT2521	Cell Biology-Lab	1	General
12	LT2852	Laboratory Instrumentation and Analytical Techniques	2	Core
13	LT2851	Laboratory Instrumentation and Analytical Techniques-Lab	1	Core

Semester V (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	LT3302	Gene Manipulation and Genetic Engineering	2	General
2	LT3301	Gene Manipulation and Genetic Engineering-Lab	1	General
3	LT4802	Hematological Malignancies	2	Core
4	LT4801	Hematological Malignancies-Lab	1	Core
5	LT3502	Mechanisms of Antimicrobial Agents	2	Core
6	LT3501	Mechanisms of Antimicrobial Agents-Lab	1	Core
7	LT3802	Advances in Medical Laboratory Technology	2	Core
8	LT3801	Advances in Medical Laboratory Technology-Lab	1	Core
9	LT3903	Research Methodologies	3	Foundation
11	LT3003	Bio-entrepreneurship	3	Inter Department

Semester VI (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	LT3752	Virology	2	Core
2	LT3751	Virology-Lab	1	Core
3	LT3202	Cytology and Cytogenetics	2	Core
4	LT3201	Cytology and Cytogenetics-Lab	1	Core
5	LT3312	Biotechnology	2	Inter Department
6	LT3311	Biotechnology-Lab	1	Inter Department
7	LT3632	Mycology	2	Core
8	LT3631	Mycology-Lab	1	Core
9	LT3102	Human Genetics	2	General
11	LT3101	Human Genetics-Lab	1	General
12	LT2823	Biosafety and Biosecurity	3	Foundation

Semester VII (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	LT3602	Clinical Parasitology	2	Core
2	LT3601	Clinical Parasitology-Lab	1	Core
3	LT4813	Laboratory Quality Management System	3	Core
4	LT4022	Bioinformatics	2	General
5	LT4021	Bioinformatics-Lab	1	General
6	LTMT1012	Biostatistics	2	Inter Department
7	LTMT1011	Biostatistics-Lab	1	Inter Department
8	LT4812	Medical Laboratory Management Skills	2	Core
9	LT4811	Medical Laboratory Management Skills-Lab	1	Core
11	LT4903	Research Project-I / Internship	3	Research Project

Semester VIII (4 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	CLB 301	Career Lab	1	Inter Department
2	LT4913	Research Project-II / Internship	3	Research Project

MS
Microbiology

Admission Requirements

- A minimum of 16 years of education leading to BS degree in relevant discipline. (ii) Minimum 2.00/4.00 CGPA or 50% marks in annual system
- All applicants are required to pass UCP Admission Test and interview

Degree Requirements

A student is required to earn a minimum of 2.50/4.00 CGPA on the completion of his/her degree requirements. Each candidate for the MS Biochemistry degree is required to successfully earn 30 Cr. Hrs. as per the following detail:

Area	Cr. Hrs.
a) Course Work	24
b) Thesis	06
Total	**30**

Program Duration

This is nominally a two-year degree program comprising of 4 semesters. There will be a Fall and a Spring semester in each year. The maximum duration to complete MS Microbiology degree is 04 years.

Scheme of Studies
MS Microbiology

Semester I (12 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	MB664	Advanced Techniques in Microbiology	Core	3
2	MB670	Advanced Virology	Core	3
3	MB663	Advances in Microbiology	Elective	3
4	MB601	Writing Skills and Research Methodology	Elective	3

Semester II (12 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	MB665	Advanced Medical Microbiology	Core	3
2	MB762	Food Microbiology	Core	3
3	MB671	Advanced Immunology	Elective	3
4	BT680	Advances in Bioinformatics	Elective	3

Semester III & IV (6 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	MB699	Research and Thesis	Project	6

List of Courses

Course Title	Code	Cr. Hrs.
Advanced Techniques in Microbiology	MB664	3
Advanced Medical Microbiology	MB665	3
Advanced Virology	MB670	3
Food Microbiology	MB762	3
Advances in Microbiology	MB663	3
Writing Skills and Research Methodology	MB601	3
Advanced Immunology	MB671	3
Advances in Bioinformatics	BT680	3
Microbial Biotechnology	MB630	3
Molecular Microbial Genetics	MB710	3
Microbial Genetics	MB711	3
Microbial Biochemistry	MB720	3
Industrial Microbiology	MB760	3
Frontiers in Microbiology	MB761	3
Genomics and Proteomics	MB751	3
Environmental and Microbial Control	MB766	3
Advances in Soil and Agriculture	MB767	3
Bacterial Biofilms	MB768	3
Mechanistic Virology and Vaccinology	MB772	3

PhD
Microbiology

Admission Requirements

- MS/MPhil degree in relevant discipline
- Minimum CGPA 3.00/4.00 (Semester System) or 60% marks (Annual System)
- All applicants are required to pass UCP Admission Test and interview

Degree Requirements

A PhD candidate shall be awarded degree on successful completion of the following requirements:

1. (i) 18 Cr. Hrs. Course Work with minimum CGPA 3.00/4.00
   (ii) Comprehensive Examination (written and oral)
2. Synopsis Defense
3. 30 Cr. Hrs. including Research Work
4. Publication of at least one research paper in HEC approved journal
5. Dissertation Foreign Reviews
6. Dissertation Final Defense

Note: PhD scholars are required to comply with the following timeline:

Activity	Preferred Time	Maximum
a) Course Work	2 Semesters	3 Semesters
b) Comprehensive Exam	3 Semesters	4 Semesters
c) Synopsis Qualification	4 Semesters	6 Semesters
d) Thesis Submission	6 Semesters	14 Semesters (7 years)

Scheme of Studies
PhD Microbiology

Semester I (9 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	MB711	Microbial Genetics	Elective	3
2	MB761	Frontiers in Microbiology	Elective	3
3	MB768	Bacterial Biofilms	Elective	3

Semester II (9 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	MB760	Industrial Microbiology	Elective	3
2	MB767	Advances in Soil and Agriculture Microbiology	Elective	3
3	MB772	Mechanistic Virology and Vaccinology	Elective	3

Semester III & IV (30 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	MB799A	Thesis-I	Project	9
2	MB799B	Thesis-II	Project	9
3	MB799C	Thesis-III	Project	6
4	MB799D	Thesis-IV	Project	6

List of Courses

Course Title	Code	Cr. Hrs.
Microbial Genetics	MB711	3
Industrial Microbiology	MB760	3
Frontiers in Microbiology	MB761	3
Bacterial Biofilms	MB768	3
Advances in Soil and Agriculture	MB767	3
Mechanistic Virology and	MB772	3
Advanced Techniques in	MB664	3
Advanced Virology	MB665	3
Advanced Medical Microbiology	MB670	3
Food Microbiology	MB762	3
Advances in Microbiology	MB663	3
Writing Skills and Research	MB601	3
Advanced Immunology	MB671	3
Advances in Bioinformatics	BT680	3
Microbial Biotechnology	MB630	3
Molecular Microbial Genetics	MB710	3
Microbial Biochemistry	MB720	3
Genomics and Proteomics	MB751	3
Environmental and Microbial Control	MB766	3

BS
Physics

Admission Requirements

- F.Sc. Pre-Engineering or equivalent with Mathematics and Physics securing at least 45% marks in aggregate. In case of foreign qualification, equivalence from IBCC will be required
- All applicants are required to pass UCP Admission Test

Degree Requirements

Each candidate of BS Physics degree is required to complete 136 Cr. Hrs. with the CGPA of 2.00 on the scale of 4.00 as per the following detail:

Area	Cr. Hrs.
a) Compulsory	27
b) General	18
c) Foundation	24
d) Majors	49
e) Elective	12
f) Research Project	6
Total	**136**

Program Duration

This is a four years' degree program comprising of 8 semesters. There is a Fall and a Spring semester in each year. The summer semester is utilized for improve / repeat / deficiency courses. The maximum duration to complete the BS Physics program is 7 years.

Volunteer Service (PY3000)

Each student is required to complete 65 hours' community work during the program, which would be a pre requisite for the award of degree.

Scheme of Studies

BS Physics

Semester I (19 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	PYHU1003	Functional English	3	Compulsory
2	PYHU1013	Pakistan Studies	3	Compulsory
3	PYMT1003	Calculus I	3	Compulsory
4	PYCS1003	Introduction to Computer	3	Compulsory
5	PY1103	Mechanics	3	Foundation
6	PY1101	Mechanics Lab	1	Foundation
7	PYHU1023	Introduction to Sociology	3	General

Semester II (19 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	PYHU1033	Communication Skills	3	Compulsory
2	PYMT1013	Calculus II	3	Compulsory
3	PYCS1013	Computer Programming	3	Compulsory
4	PY1203	Electricity and Magnetism	3	Foundation
5	PY1201	Electricity and Magnetism Lab	1	Foundation
6	PY1113	Waves and Oscillation	3	Foundation
7	PYMT1023	Differential Equations	3	General

Semester III (16 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	PYHU2043	Technical Writing & Presentation Skills	3	Compulsory
2	PYMT2033	Statistics	3	Compulsory
3	PYHU2053	Islamic Studies/Ethics	3	Compulsory
4	PY2503	Environmental Physics	3	General
5	PY2403	Heat & Thermodynamics	3	Foundation
6	PY2401	Heat & Thermodynamics Lab	1	Foundation

Semester IV (16 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	PYMT2043	Linear Algebra	3	General
2	PYHU2063	Introduction to Psychology	3	General
3	PY2123	Classical Mechanics	3	Major
4	PY2513	Modern Physics	3	Foundation
5	PY2603	Optics	3	Foundation
6	PY2601	Optics Lab	1	Foundation

Semester V (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	PY3213	Electrodynamics I	3	Major
2	PY3523	Mathematical Methods of Physics I	3	Major
3	PY3803	Quantum Mechanics I	3	Major
4	PY3703	Electronics I	3	Major
5	PY3702	Electronics I Lab	2	Major
6	PY3133	Statistical Mechanics	3	Major

Semester VI (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	PY3512	Modern Physics Lab	2	Foundation
2	PY3533	Mathematical Methods of Physics II	3	Major
3	PY3813	Quantum Mechanics II	3	Major
4	PY3223	Electrodynamics II	3	Major
5	PY3543	Solid State Physics I	3	Major
6	PY3713	Electronics II	3	Major

Semester VII (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	PY4553	Solid State Physics II	3	Major
2	PY4563	Plasma Physics	3	Major
3	PY4173	Atomic & Molecular Physics	3	Major
4	PY4582	Advanced Physics Experiments Simulation Lab	2	Major
5	PY4903	Research Project-I	3	Research Project
6	PY4xx3	Elective I	3	Elective

Semester VIII (15 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	PY4823	Nuclear Physics	3	Major
2	PY4913	Research Project -II	3	Research Project
3	PY4xx3	Elective II	3	Elective
4	PY4xx3	Elective III	3	Elective
5	PY4xx3	Elective IV	3	Elective

BS Physics – Post ADS

Admission Requirements

• At least 45% marks or 2.00/4.00 CGPA in ADS Physics or equivalent. All applicants are required to pass the UCP admission test

Degree Requirements

Students who will join BS Physics after completing their ADS/BSc are required to take one extra transitional semester to meet their deficiencies as per university requirement.

M.Phil.

Physics

Admission Requirements

• A qualifying degree (Bachelor or equivalent degree having sixteen years of education or four years' education after Higher Secondary School Certificate) in the relevant discipline
• At least 2.0 (on the scale of 4.0) Cumulative Grade Point Average (CGPA) in the qualifying degree or 50% aggregate marks if the qualifying degree is earned from an annual system
• Qualify university admission test or HEC approved test with minimum 50% marks and interview

Degree Requirements

Each candidate of M.Phil. Physics degree is required to complete 30 Cr. Hrs. with the CGPA of 2.50 on the scale of 4.00 as per the following detail:

Area	Cr. Hrs.
a) Course Work	24
b) Thesis	06
Total	**30**

Program Duration

This is nominally a two-year degree program comprising of four semesters. There will be a Fall and a Spring semester in each year. The maximum duration to complete M.Phil. degree is 04 years.

Scheme of Studies

M.Phil. Physics

Semester I (12 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	PH641	Advanced Electrodynamics	Compulsory	3
2	PH610	Materials Science	Compulsory	3
3	PH651	Advanced Computational Physics	Compulsory	3
4	MT611	General Relativity	Elective	3

Semester II (12 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	PH621	Advanced Plasma Physics	Compulsory	3
2	PH611	Applied Nanotechnology	Elective	3
3	PH623	Spacecraft Environment Interaction	Elective	3
4	PH618	Renewable Energy Sources	Elective	3

Semester III & IV (6 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	PH699A	Thesis	Research	3
2	PH699B	Thesis	Research	3

List of Courses

Course Title	Code	Cr. Hrs.
Advanced Quantum Mechanics	PH631	3
Advanced Mathematical Methods of Physics	PH661	3
Nuclear Physics	PH671	3
Advanced Plasma Physics II	PH622	3
Experimental Plasma Physics	PH624	3
Accelerator and Detector Physics	PH632	3
Environmental Physics and Applied Technology	PH625	3
Advanced Techniques in LASERs Applications	PH613	3
Applied Optics	PH614	3
Superconductivity	PH615	3
Semiconductors Physics	PH616	3
Photovoltaic System Designs	PH617	3
Renewable Energy Resources	PH618	3

BS

Zoology

Admission Requirements

- F.Sc. Pre-Medical or equivalent with Physics, Chemistry & Biology securing at least 45% marks in aggregate. In case of foreign qualification, equivalence from IBCC will be required
- All applicants are required to pass UCP Admission Test

Degree Requirements

Each candidate of BS Zoology degree is required to complete 135 Cr. Hrs. with the CGPA of 2.00 on the scale of 4.00 as per the following detail:

Area	Cr. Hrs.
a) Compulsory	27
b) General	22
c) Foundation	33
d) Majors	35
e) Elective	12
f) Research Project	6
Total	**135**

Program Duration

This is a four years' degree program comprising of 8 semesters. There is a Fall and a Spring semester in each year. The summer semester is utilized for improve / repeat / deficiency courses. The maximum duration to complete the BS Zoology program is 7 years.

Volunteer Service (CH3000)

Each student is required to complete 65 hours' community work during the program, which would be a pre requisite for the award of degree.

Scheme of Studies

BS Zoology

Semester I (19 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ENG 101	English I	3	Compulsory
2	PAK 101	Pakistan Studies	2	Compulsory
3	ENT 101	Fundamentals of Entrepreneurship	1	Compulsory
4	MAT 101	Mathematics I	3	Compulsory
5	ZOBO1302	Diversity of Plants	2	General
6	ZOBO1301	Diversity of Plants-Lab	1	General Lab
7	ZOCH1202	Inorganic Chemistry	2	General
8	ZOCH1201	Inorganic Chemistry-Lab	1	General Lab
9	ZO1703	Animal Diversity-I (Invertebrates)	3	Foundation
10	ZO1701	Animal Diversity-I (Invertebrates) Lab	1	Foundation Lab

Semester II (19 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ENG 102	English II	3	Compulsory
2	ZOCS1003	Introduction to Computer	3	Compulsory
3	ZOBO1312	Plant Systematics, Anatomy & Development	2	General
4	ZOBO1311	Plant Systematics, Anatomy & Development-Lab	1	General Lab
5	ZOCH1212	Physical Chemistry	2	General
6	ZOCH1211	Physical Chemistry-Lab	1	General Lab
7	ZO1713	Animal Diversity-II (Chordates)	3	Foundation
8	ZO1711	Animal Diversity-II (Chordates) Lab	1	Foundation Lab
9	ZO1722	Cell Biology	2	Foundation
10	ZO1721	Cell Biology-Lab	1	Foundation Lab

Semester III (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ENG 203	English III	3	Compulsory
2	ISL201	Islamic Studies/Ethics	2	Compulsory
3	ZOBO2102	Bacteriology and Virology	2	General
4	ZOBO2101	Bacteriology and Virology -Lab	1	General Lab
5	ZOCH2222	Organic Chemistry	2	General
6	ZOCH2221	Organic Chemistry-Lab	1	General Lab
7	SCO201	Introduction to Sociology	2	General
8	ZO2733	Animal Form & Function-I	3	Foundation
9	ZO2731	Animal Form & Function-I Lab	1	Foundation Lab

Semester IV (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ZO2702	Biostatistics	2	Compulsory
2	ZO2701	Biostatistics-Lab	1	Compulsory Lab
3	ZO2802	Geography	2	General
4	ZO2742	Biochemistry-I	2	Foundation
5	ZO2741	Biochemistry-I Lab	1	Foundation Lab
6	ZO2701	Biological Techniques	1	Major
7	ZO2702	Biological Techniques Lab	2	Major Lab
8	ZO2713	Animal Behavior	3	Major
9	ZO2753	Animal Form & Function-II	3	Foundation
10	ZO2751	Animal Form & Function-II Lab	1	Foundation Lab

Semester V (15 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ZO3762	Economic Zoology	2	Foundation
2	ZO3761	Economic Zoology -Lab	1	Foundation Lab
3	ZO3772	Biochemistry-II	2	Foundation
4	ZO3771	Biochemistry-II -Lab	1	Foundation Lab
5	ZO3603	Physiology	3	Major
6	ZO3601	Physiology-Lab	1	Major Lab
7	ZO3722	Ecology	2	Major
8	ZO3721	Ecology -Lab	1	Major Lab
9	ZO3502	Evolution	2	Foundation

Semester VI (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ZO3782	Principles of Systematics	2	Foundation
2	ZO3781	Principles of Systematics-Lab	1	Foundation Lab
3	ZO3732	Research Methodology	2	Major
4	ZO3743	Developmental Biology	3	Major
5	ZO3741	Developmental Biology-Lab	1	Major Lab
6	ZO3513	Genetics	3	Major
7	ZO3511	Genetics-Lab	1	Major Lab
8	ZO3852	Wildlife	2	Major
9	ZO3851	Wildlife-Lab	1	Major Lab
10	CBL 301	Career Lab	1	Compulsory

Semester VII (15 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ZO4712	General Microbiology	2	Compulsory
2	ZO4711	General Microbiology-Lab	1	Compulsory Lab
3	ZO4402	Molecular Biology	2	Major
4	ZO4401	Molecular Biology-Lab	1	Major Lab
5	ZO4903	Research Project I	3	Project
6	ZO4xx2	Elective I	2	Elective
7	ZO4xx1	Elective I lab	1	Elective Lab
8	ZO4xx2	Elective II	2	Elective
9	ZO4xx1	Elective II lab	1	Elective Lab

Semester VIII (15 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Type
1	ZO4762	Bioinformatics	2	Major
2	ZO4761	Bioinformatics-Lab	1	Major Lab
3	ZO4772	Zoogeography & Paleontology	2	Major
4	ZO4771	Zoogeography & Paleontology-Lab	1	Major Lab
5	ZO4xx3	Research Project II	3	Project
6	ZO4xx2	Elective III	2	Elective
7	ZO4xx1	Elective III Lab	1	Elective Lab
8	ZO4xx2	Elective-IV	2	Elective
9	ZO4xx1	Elective-IV Lab	1	Elective Lab

List of Courses

Course Title	Code	Cr. Hrs.
Environmental Biology	ZO4803	3
Vector Biology	ZO4703	3
Sericulture	ZO4712	2
Sericulture-Lab	ZO4711	1
Environmental Issues and sustainability	ZO4812	2
Environmental Issues and sustainability-Lab	ZO4811	1
Fish Culture	ZO4722	2
Fish Culture-Lab	ZO4721	1
Reproductive Biology	ZO4732	2
Reproductive Biology-Lab	ZO4731	1
Restoration Ecology and Sustainable Development	ZO4822	2
Restoration Ecology and Sustainable Development-Lab	ZO4821	1
Immunology	ZO4742	2
Immunology-Lab	ZO4741	1
aquaculture	ZO4752	2
aquaculture-Lab	ZO4751	1
Taxidermy	ZO4762	2
Taxidermy-Lab	ZO4761	1
Entomology	ZO4772	2
Entomology-Lab	ZO4771	1

BS Zoology-Post ADS

Admission Requirements

• At least 45% marks or 2.00/4.00 CGPA in ADS Zoology or equivalent. All applicants are required to pass the UCP admission test

Degree Requirements

Students who will join BS Zoology after completing their ADS/BSc are required to take one extra transitional semester to meet their deficiencies as per university requirement.

M.Phil.
Zoology

Admission Requirements

- A minimum of 16 years of education leading to BS Degree in relevant discipline
- Minimum 2.00/4.00 CGPA or 50% marks in annual system
- All applicants are required to pass UCP Admission Test and interview

Degree Requirements

A student is required to earn a minimum of 2.50/4.00 CGPA on the completion of his/her degree requirements. Each candidate for the M.Phil. Zoology degree is required to successfully earn 30 Cr. Hrs. as per the following details:

Area	Cr. Hrs.
a) Course Work	24
b) Thesis	06
Total	**30**

Program Duration

This is nominally a two-year degree program comprising 4 semesters. There will be a Fall and a Spring semester in each year. The maximum duration to complete M.Phil. Zoology degree is 04 years.

Scheme of Studies
M.Phil. Zoology

Semester I (12 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	ZO600	Advanced Biological Techniques	Core	3
2	ZO000	Course 1	Elective	3
3	ZO000	Course 2	Elective	3
4	ZO000	Course 3	Elective	3

Semester II (12 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	ZO601	Applied Biostatistics	Core	3
2	ZO000	Course 1	Elective	3
3	ZO000	Course 2	Elective	3
4	ZO000	Course 3	Elective	3

Semester III & IV (6 Cr. Hrs.)

S. No	Course Code	Course Title	Category	Cr. Hrs.
1	ZO799	Thesis and Viva Voce	Research	6

List of Courses

Course Title	Code	Cr. Hrs.
Advanced Biological Techniques	ZO600	3
Applied Biostatistics	ZO601	3
Insect Toxicology	ZO611	3
Classification of Insects and Pest Management	ZO612	3
Medical Entomology	ZO613	3
Aquaculture and Fisheries	ZO621	3
Fish Breeding and Hatchery Management	ZO622	3
Aerosol and Environmental Health	ZO631	3
Conservation Biology of Wildlife	ZO641	3
Advanced Mammalogy	ZO651	3
Advanced Enzymology	ZO661	3
Advanced Immunology	ZO662	3
Advanced Cell Biology	ZO663	3
Advanced Cancer biology	ZO664	3
Gene Therapy	ZO665	3

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