

Faculty of Science

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DEPARTMENTS

1. Mathematics & Computer Science
2. Physics
3. Chemistry
4. Biological & Environmental Science

HISTORY

The Faculty of Science was established in 1976. It started with the Department of Physics followed by the Department of Mathematics in 1978, the Department of Chemistry in 1988 and finally the Department of Biology and Environmental Science in 1998. Postgraduate programs started in 1999. The initial number of students pursuing postgraduate degrees was around 40. Today the total number of students awarded Master Degrees alone is over 60.

In 2005, the faculty adopted the Credit hour system throughout its entire curriculum, both the undergraduate and postgraduate programs, thus providing a simple education scheme for its students.

MISSION

The Faculty of Science is committed to generating new knowledge, delivering quality and professional education, and building partnerships to solve fundamental problems that ultimately meet the needs of the community. Its mission is to:

- sustain the growth of the educational and cultural programs inline with the rapid technological developments in the world to ensure the provision of high quality education and the development of students to the best of their abilities;
- create and foster research collaboration networks;
- house advanced laboratories with particular emphasis on advanced computer laboratories to complement our existing facilities;
- establish and maintain vocational links with distinguished local, regional, and international scientific organizations and communities as well as professional bodies; and
- pursuit and promote staff development programs.

VISION

The vision of the Faculty of Science is to be recognized nationally and internationally as a leader in the pursuit and achievement of excellence in education and scientific research.

UNDERGRADUATE PROGRAMS

OFFERED DEGREES

The Faculty of Science offers a Bachelor of Science Degree in the following 8 specializations:

- | General Sciences
Group | Biological & Environmental Science
Group |
|--|--|
| <ul style="list-style-type: none">○ Mathematics○ Computer Science○ Information Systems○ Physics○ Chemistry | <ul style="list-style-type: none">○ Biology○ Biochemistry○ Environmental Science |

First year students enlist in either the General Science group or the Biological & Environmental Science group.

PROGRAM DESCRIPTION

The Bachelor Degree requirements consist of a total of 132 credit hours taken, in accordance to the field of specialization, as follows:

- **Mandatory Courses:** The number of credit hours of Mandatory courses varies from 80 to 92 credits according to the academic department.
- **Departmental and Faculty Elective Courses:** The number of credit hours varies from 24 to 36 credits according to the academic department, and courses are selected according to the field of specialization as offered by the department.
- **General University Requirements:** 16 Cr. divided according to the field of specialization into either:
 - * University Mandatory Courses: 7 Cr.
 - * University Elective Courses: 9 Cr.
 - or
 - * University Mandatory Courses: 5 Cr.
 - * University Elective Courses: 11 Cr.

The standard duration of study for a Bachelor Degree in Science in the 8 specializations is 8 semesters. There are two general semesters of study for the students of the General Science group, and four semesters of general study for the students of the Biological and Environmental Science group.

BACHELOR OF SCIENCE IN MATHEMATICS

Curriculum

(132 Credit Hours)

First Semester			Credit
MATH	101	Calculus & Analytical Geometry I	3
MATH	103	Applied Mathematics I	2
PHYS	111	General Physics I	4
CHEM	111	General Chemistry I	4
CMPS	113	Introduction to Programming I	2
		Elective (General) ¹	3

			18
Second Semester			
MATH	102	Calculus & Analytical Geometry II	3
MATH	104	Applied Mathematics II	2
PHYS	112	General Physics II	4
CHEM	112	General Chemistry II	4
CMPS	114	Introduction to Programming II	2
		Elective (General) ¹	3

			18
Third Semester			
MATH	201	Set Theory	2
MATH	203	Differential Equations	3
MATH	205	Dynamics of Particles	3
		Elective ²	6
		Elective (General) ¹	2

			16
Fourth Semester			
MATH	202	Math Analysis	3
MATH	204	Linear Algebra	3
MATH	206	Dynamics of Rigid Bodies	3
		Elective ²	5
		Elective (General) ¹	2

			16
Fifth Semester			
MATH	301	Abstract Algebra	3
MATH	303	Real Analysis	3
MATH	309	Fluid Dynamics	3
		Elective ²	7

			16

Sixth Semester			Credit
MATH	302	Topology	3
MATH	308	Analytical Dynamics	3
MATH	310	Quantum Mechanics	2
		Elective ²	6
		Elective (General) ¹	2

			16
Seventh Semester			
MATH	401	Seminar in Mathematics	1
MATH	403	Partial Differential Equations	3
MATH	405	Topics in Fluid Dynamics	3
		Elective ²	7
		Elective (General) ¹	2

			16
Eighth Semester			
MATH	406	Number Theory	3
MATH	414	Mathematical Theory of Elasticity	3
MATH	499	Senior Project	3
		Elective ²	5
		Elective (General) ¹	2

			16

¹ A total of 16 credits is required as General University Requirements; 5 credits are selected from the University Mandatory courses list including: ENGL 001 (2 Cr.), ARAB 001 (2Cr.), LAWS 001 (1 Cr.) and another 11 credits are selected from the University Elective courses list.

² Selected from Departmental and Faculty Elective courses. To qualify for a minor in any field in the Faculty, a minimum of 18 credits must be earned in that field.

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

Curriculum

(132 Credit Hours)

First Semester			Credit
MATH	101	Calculus & Analytical Geometry I	3
MATH	103	Applied Mathematics I	2
PHYS	111	General Physics I	4
CHEM	111	General Chemistry I	4
CMPS	113	Introduction to Programming I	2
		Elective (General) ¹	3
		---	18
Second Semester			
MATH	102	Calculus & Analytical Geometry II	3
MATH	104	Applied Mathematics II	2
PHYS	112	General Physics II	4
CHEM	112	General Chemistry II	4
CMPS	114	Introduction to Programming II	2
		Elective (General) ¹	3
		---	18
Third Semester			
CMPS	201	Advanced Programming	3
CMPS	203	Fundamentals of Electric & Electronic Circuits	3
MATH	204	Linear Algebra	3
		Elective ²	5
		Elective (General) ¹	2
		---	16
Fourth Semester			
CMPS	202	Data Structures I	3
CMPS	204	Computer Organization & Assembly	3
MATH	216	Discrete Structures	3
		Elective ²	5
		Elective (General) ¹	2
		---	16
Fifth Semester			
CMPS	301	Data Structures II	3
CMPS	303	Software Engineering	3
CMPS	305	Theory of Computation	3
MATH	311	Statistical Methods and Computer Applications	3
		Elective ²	4
		---	16

Sixth Semester			Credit
CMPS	302	Data Base Systems	3
CMPS	304	Computer Architecture	3
CMPS	306	Computer Networks	3
MATH	312	Operation Research	3
		Elective ²	4

			16
Seventh Semester			
CMPS	401	Seminar in Computer Science	1
CMPS	403	Programming Languages	3
CMPS	405	Operating Systems	3
		Elective ²	5
		Elective (General) ¹	4

			16
Eighth Semester			
CMPS	404	Compiler Construction	3
CMPS	406	Artificial Intelligence	3
CMPS	499	Senior Project	3
		Elective ²	5
		Elective (General) ¹	2

			16

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² Selected from Departmental and Faculty Elective courses. To qualify for a minor in any field in the Faculty, a minimum of 18 credits must be earned in that field.

BACHELOR OF SCIENCE IN INFORMATION SYSTEMS

Curriculum

(132 Credit Hours)

First Semester			Credit
MATH	101	Calculus & Analytical Geometry I	3
MATH	103	Applied Mathematics I	2
PHYS	111	General Physics I	4
CHEM	111	General Chemistry I	4
CMPS	113	Introduction to Programming I	2
		Elective (General) ¹	3

			18
Second Semester			
MATH	102	Calculus & Analytical Geometry II	3
MATH	104	Applied Mathematics II	2
PHYS	112	General Physics II	4
CHEM	112	General Chemistry II	4
CMPS	114	Introduction to Programming II	2
		Elective (General) ¹	3

			18
Third Semester			
CMPS	201	Advanced Programming	3
ISYS	201	Introduction to Information Systems	3
ISYS	203	Managing Financial Resources	3
MATH	204	Linear Algebra	3
		Elective ²	2
		Elective (General) ¹	2

			16
Fourth Semester			
CMPS	202	Data Structures I	3
ISYS	202	E-Commerce	3
ISYS	204	Fundamentals of Management	3
MATH	216	Discrete Structures	3
		Elective ²	2
		Elective (General) ¹	2

			16
Fifth Semester			
ISYS	301	IS Analysis and Design	3
ISYS	303	Accounting Principles of Information Systems	3
MATH	312	Operation Research	3
		Elective ²	5
		Elective (General) ¹	2

			16

Sixth Semester			Credit
CMPS	302	Database Systems	3
ISYS	302	Organizational Behavior	3
ISYS	304	Operations Management	3
CMPS	306	Computer Networks	3
		Elective ²	4

			16
Seventh Semester			
ISYS	401	Seminar in Information Systems	1
ISYS	403	Management of Information Technology	3
ISYS	405	Internet Programming	3
		Elective ²	5
		Elective (General) ¹	4

			16
Eighth Semester			
ISYS	404	Multimedia	3
ISYS	406	Decision Support Systems	3
ISYS	499	Senior Project	3
		Elective ²	7

			16

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BACHELOR OF SCIENCE IN PHYSICS

Curriculum

(132 Credit Hours)

First Semester			Credit
MATH	101	Calculus & Analytical Geometry I	3
MATH	103	Applied Mathematics I	2
PHYS	111	General Physics I	4
CHEM	111	General Chemistry I	4
CMPS	113	Introduction to Programming I	2
		Elective (General) ¹	3

			18
Second Semester			
MATH	102	Calculus & Analytical Geometry II	3
MATH	104	Applied Mathematics II	2
PHYS	112	General Physics II	4
CHEM	112	General Chemistry II	4
CMPS	114	Introduction to Programming II	2
		Elective (General) ¹	3

			18
Third Semester			
PHYS	201	Thermal Physics	3
PHYS	203	Physical Optics and Optical Instruments	3
MATH	203	Differential Equations	3
MATH	207	Vector Analysis	3
		Elective ²	2
		Elective (General) ¹	2

			16
Fourth Semester			
PHYS	202	Classical Mechanics	3
PHYS	204	Modern Physics	3
PHYS	206	Electromagnetism	3
PHYS	208	Statistical Physics	2
MATH	306	Special Functions	3
		Elective (General) ¹	2

			16
Fifth Semester			
PHYS	303	Quantum Physics I	3
PHYS	305	Electronics	3
MATH	208	Numerical Analysis	3
		Elective ²	5
		Elective (General) ¹	2

			16

Sixth Semester

PHYS	302	Electrodynamics	2
PHYS	304	Quantum Physics II	3
PHYS	306	Nuclear Physics	3
		Elective ²	6
		Elective (General) ¹	2

			16

Seventh Semester

PHYS	401	Physics Seminar	1
PHYS	403	Theoretical Nuclear Physics	3
PHYS	405	Solid State Physics I	3
PHYS	407	Advanced Atomic Physics	3
		Elective ²	5

			15

Eighth Semester

PHYS	404	Molecular Physics	3
PHYS	406	Solid State Physics II	3
PHYS	499	Senior Project	3
		Elective ²	6
		Elective (General) ¹	2

			17

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BACHELOR OF SCIENCE IN CHEMISTRY

Curriculum

(132 Credit Hours)

First Semester			Credit
MATH	101	Calculus & Analytical Geometry I	3
MATH	103	Applied Mathematics I	2
PHYS	111	General Physics I	4
CHEM	111	General Chemistry I	4
CMPS	113	Introduction to Programming I	2
		Elective (General) ¹	3

			18
Second Semester			
MATH	102	Calculus & Analytical Geometry II	3
MATH	104	Applied Mathematics II	2
PHYS	112	General Physics II	4
CHEM	112	General Chemistry II	4
CMPS	114	Introduction to Programming II	2
		Elective (General) ¹	3

			18
Third Semester			
CHEM	201	Analytical Chemistry I	3
CHEM	203	Organic Chemistry I	3
CHEM	205	Physical Chemistry I	3
		Elective ²	5
		Elective (General) ¹	2

			16
Fourth Semester			
CHEM	202	Inorganic Chemistry I	3
CHEM	204	Organic Chemistry II	3
CHEM	206	Physical Chemistry II	3
		Elective ²	5
		Elective (General) ¹	2

			16
Fifth Semester			
CHEM	301	Instrumental Analysis I	3
CHEM	303	Physical Chemistry III	3
CHEM	305	Physical Organic Chemistry	3
CHEM	307	Inorganic Chemistry II	3
		Elective ²	4

			16

Sixth Semester			Credit
CHEM	302	Chemistry of Biomolecules	3
CHEM	304	Analytical Chemistry II	3
CHEM	306	Physical Chemistry IV	3
CHEM	308	Materials Science I	3
		Elective ²	4

			16
Seventh Semester			
CHEM	401	Chemistry Seminar	1
CHEM	403	Analysis of Organic Compounds	3
CHEM	405	Solid State Chemistry	2
CHEM	407	Quantum Chemistry	3
		Elective ²	4
		Elective (General) ¹	4

			17
Eighth Semester			
CHEM	404	Nuclear and Radiochemistry	3
CHEM	406	Materials Science II	3
CHEM	499	Senior Project	3
		Elective ²	4
		Elective (General) ¹	2

			15

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BACHELOR OF SCIENCE IN BIOLOGY

Curriculum

(132 Credit Hours)

First Semester			Credit
BIOL	101	Botany I	4
BIOL	103	Zoology I	4
CHEM	107	Chemistry I	4
MATH	115	Pure Mathematics I	2
		Elective (General) ¹	4

			18
Second Semester			
BIOL	102	Botany II	4
BIOL	104	Zoology II	4
CHEM	108	Chemistry II	3
PHYS	114	Elementary Physics	3
		Elective (General) ¹	4

			18
Third Semester			
BIOL	201	General Microbiology	2
BIOL	203	Histology & Microtechniques	3
BIOL	205	Phylogeny & Biology of Invertebrates	3
CHEM	221	Organic Chemistry	3
		Elective ²	4
		Elective (General) ¹	2

			17
Fourth Semester			
BIOL	202	Cell Biology	3
BIOL	204	Comparative Anatomy & Embryology of Vertebrates	3
BIOL	206	Principles of Genetics	2
BIOL	208	Introduction to Environmental Studies	2
CHEM	222	Physical & Analytical Chemistry	3
		Elective ²	2

			15
Fifth Semester			
BIOL	301	Plant Physiology	3
BIOL	303	Mycology	3
BCHM	313	Introduction to Biochemistry	3
BIOL	305	Medical Entomology & Biological Control	2
		Elective ²	4

			15

Sixth Semester			Credit
BIOL	302	Human Physiology	3
BIOL	304	Biotechnology & Waste Recycling	2
BIOL	306	Parasitology	3
BIOL	308	Principles of Molecular Biology	3
		Elective ²	4
		Elective (General) ¹	2

			17
Seventh Semester			
BIOL	401	Biology Seminar	1
BIOL	403	Animal Ecology & Natural Resources	3
BIOL	405	Biology of Vascular Plants	3
BIOL	407	Immunology & Endocrinology	3
		Elective ²	4
		Elective (General) ¹	2

			16
Eighth Semester			
BIOL	404	Toxicology & Molecular Genetics	2
BIOL	408	Applied Microbiology	3
BIOL	499	Senior Project	3
		Elective ²	6
		Elective (General) ¹	2

			16

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BACHELOR OF SCIENCE IN BIOCHEMISTRY

Curriculum

(132 Credit Hours)

First Semester			Credit
BIOL	101	Botany I	4
BIOL	103	Zoology I	4
CHEM	107	Chemistry I	4
MATH	115	Pure Mathematics I	2
		Elective (General) ¹	4

			18
Second Semester			
BIOL	102	Botany II	4
BIOL	104	Zoology II	4
CHEM	108	Chemistry II	3
PHYS	114	Elementary Physics	3
		Elective (General) ¹	4

			18
Third Semester			
BIOL	201	General Microbiology	2
BIOL	203	Histology & Microtechniques	3
BIOL	205	Phylogeny & Biology of Invertebrates	3
CHEM	221	Organic Chemistry	3
		Elective ²	4
		Elective (General) ¹	2

			17
Fourth Semester			
BIOL	202	Cell Biology	3
BIOL	204	Comparative Anatomy & Embryology of Vertebrates	3
BIOL	206	Principles of Genetics	2
BIOL	208	Introduction to Environmental Studies	2
CHEM	222	Physical & Analytical Chemistry	3
		Elective ²	2

			15
Fifth Semester			
BCHM	301	Biochemistry I	2
BCHM	303	Metabolism I	3
BCHM	305	Biochemical Techniques	3
BCHM	307	Applied Microbiology	2
BCHM	309	Immunology	2
		Elective ²	2
		Elective (General) ¹	2

			16

Sixth Semester			Credit
BCHM	302	Biochemistry II	2
BCHM	304	Metabolism II	3
BIOL	302	Human Physiology	3
BCHM	308	Molecular Biology	2
CHEM	354	Chemistry of Natural Products	2
		Elective ²	2
		Elective (General) ¹	2

			16
Seventh Semester			
BCHM	401	Biochemistry Seminar	1
BCHM	403	Physical Biochemistry	3
BCHM	407	Enzymes	2
BCHM	409	Hormones	2
		Elective ²	5
		Elective (General) ¹	2

			15
Eighth Semester			
BCHM	404	Biotechnology	3
BIOL	404	Toxicology & Molecular Genetics	2
BCHM	499	Senior Project	3
		Elective ²	9

			17

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² Selected from Departmental and Faculty Elective courses. To qualify for a minor in any field in the Faculty, a minimum of 18 credits must be earned in that field.

BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCE

Curriculum

(132 Credit Hours)

First Semester			Credit
BIOL	101	Botany I	4
BIOL	103	Zoology I	4
CHEM	107	Chemistry I	4
MATH	115	Pure Mathematics I	2
		Elective (General) ¹	4

			18
Second Semester			
BIOL	102	Botany II	4
BIOL	104	Zoology II	4
CHEM	108	Chemistry II	3
PHYS	114	Elementary Physics	3
		Elective (General) ¹	4

			18
Third Semester			
BIOL	201	General Microbiology	2
BIOL	203	Histology & Microtechniques	3
BIOL	205	Phylogeny & Biology of Invertebrates	3
CHEM	221	Organic Chemistry	3
		Elective ²	4
		Elective (General) ¹	2

			17
Fourth Semester			
BIOL	202	Cell Biology	3
BIOL	204	Comparative Anatomy & Embryology of Vertebrates	3
BIOL	206	Principles of Genetics	2
BIOL	208	Introduction to Environmental Studies	2
CHEM	222	Physical & Analytical Chemistry	3
		Elective ²	2

			15
Fifth Semester			
ENVI	301	Planet Earth	2
ENVI	303	Ecosystems & Biosphere	2
ENVI	305	Ecosystems & Water Resources Management	2
ENVI	307	Ecological Impacts on Biodiversity	3
BCHM	313	Introduction to Biochemistry	3
		Elective ²	4

			16

Sixth Semester			Credit
ENVI	302	Environmental Pollution	3
ENVI	304	Management & Development of Coastal & Marine Ecosystem	2
ENVI	306	Environmental Risk Assessment & Management	2
ENVI	308	Energy Resources: Renewable & Non Renewable	2
ENVI	310	Natural and Environmental Disasters	2
		Elective (General) ¹	2
		Elective ²	3

			16
Seventh Semester			
ENVI	401	Environmental Seminar	1
ENVI	403	Biotechnology & Waste Recycling	2
ENVI	405	Geographic Information Systems & Remote Sensing	2
ENVI	409	Environmental Ecotoxicology	3
		Elective ²	6
		Elective (General) ¹	2

			16
Eighth Semester			
ENVI	404	Environmental Microbiology	2
ENVI	408	Environmental Impact Assessment	3
ENVI	499	Senior Project II	3
		Elective (General) ¹	2
		Elective ²	6

			16

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² Selected from Departmental and Faculty Elective courses. To qualify for a minor in any field in the Faculty, a minimum of 18 credits must be earned in that field.

ELECTIVE COURSES

Mathematics

MATH 153 Elementary Calculus and Analytical Geometry (2 Cr.), MATH 209 Probability and Mathematical Statistics (3 Cr.), MATH 210 Discrete Mathematics (3 Cr.), MATH 212 Pure Mathematics and Statistics (2 Cr.), MATH 213 Applied Differential Equations (2 Cr.), MATH 214 Statistics and Computing (3 Cr.), MATH 215 Pure Mathematics II (2 Cr.), MATH 217 Methods of Theoretical Physics (3 Cr.), MATH 218 Classical Mechanics (3 Cr.), MATH 219 Mathematical Physics (3 Cr.), MATH 304 Functions of Complex Variables (3 Cr.), MATH 305 Differential Geometry (2 Cr.), MATH 307 Dynamics in 3D (2 Cr.), MATH 313 Special Theory of Relativity (2 Cr.), MATH 314 Potential Theory (2 Cr.), MATH 315 Advanced Numerical Analysis (3 Cr.), MATH 317 Computational Methods (3 Cr.), MATH 404 Mathematical Logic (2 Cr.), MATH 407 Measure Theory (3 Cr.), MATH 408 Functional Analysis (3 Cr.), MATH 409 Boundary Value Problems (3 Cr.), MATH 410 Statistical Mechanics (2 Cr.), MATH 411 Advanced Quantum Mechanics (2 Cr.), MATH 412 Topics in Abstract Algebra (3 Cr.), MATH 413 Electrodynamics (2 Cr.).

University Requirement Elective Course

MATH 005 Introduction to Statistics (2 Cr.).

Computer Science

CMPS 101 Introductory to Programming I (2 Cr.), CMPS 102 Introductory to Programming II (2 Cr.), CMPS 103 Basic Computer Applications I (1 Cr.), CMPS 104 Basic Computer Applications II (1 Cr.), CMPS 105 Computer Applications I (2 Cr.), CMPS 106 Computer Applications II (2 Cr.), CMPS 111 Introduction to Computer (2 Cr.), CMPS 205 Computer Programming (3 Cr.), CMPS 207 Feasibility Study of (3 Cr.), CMPS 209 Computer and Society (2 Cr.), CMPS 211 Introduction to Computers (3 Cr.), CMPS 213 Computing for the Natural Sciences (3 Cr.), CMPS 215 Logic Design of Digital Systems (3 Cr.), CMPS 307 Object Oriented Programming (3 Cr.), CMPS 308 Internet Programming (3 Cr.), CMPS 309 Information Technology I (3 Cr.), CMPS 310 File Structure (3 Cr.), CMPS 311 Discrete Structures (3 Cr.), CMPS 407 Software Project Management (3 Cr.), CMPS 408 Information Technology II (3 Cr.), CMPS 409 Computer Graphics (3 Cr.).

Information Systems

ISYS 305 Internet Applications (3 Cr.), ISYS 306 Principles of Marketing (3 Cr.), ISYS 307 System Documentation (3 Cr.), ISYS 308 Managing Information Technology Resources (3 Cr.), ISYS 309 Process Modeling (3 Cr.), ISYS 311 Knowledge Management (3 Cr.), ISYS 407 IS Design (3 Cr.), ISYS 408 Office Automation (3 Cr.), ISYS 409 Customer Relations Management Systems (3 Cr.), ISYS 410 Forecasting and Time Series (3 Cr.), ISYS 411 Human Capital Management (3 Cr.), ISYS 412 Change Management (3 Cr.), ISYS 414 Business Ethics (3 Cr.), ISYS 415 Advanced Managerial Decision Making Models (3 Cr.), ISYS 416 Simulation Modeling (3 Cr.), ISYS 417 Decision Systems Seminars (3 Cr.), ISYS 418 Performance management (3 Cr.), ISYS 419 Corporate Information Technology (3Cr), ISYS 420 Decision Making Models (3Cr), ISYS 421 Inventory Models (3 Cr.).

Physics

PHYS 209 Biophysics I (2 Cr), PHYS 210 Biophysics II (2 Cr), PHYS 211 Matter and Energy (2 Cr), PHYS 212 High Vacuum Science (3 Cr.), PHYS 213 Evolution of the Physical Universe (2 Cr), PHYS 214 Special Theory of Relativity (3 Cr), PHYS 216 Circuit Analysis (3 Cr), PHYS 307 Environmental Health Physics (2 Cr), PHYS 308 Physics Of Radio Therapy (3 Cr), PHYS 309 Accelerators (2 Cr), PHYS 310 Nonlinear Optical Processes (3 Cr), PHYS 311 Radiation Science (3 Cr), PHYS 312 Microwave and Its Applications (3 Cr), PHYS 313 Biomedical Ultrasound (3 Cr.), PHYS 314 Resonance Spectroscopy (3 Cr), PHYS 315 Atomic Physics (2 Cr), PHYS 316 Advanced Electronics (3 Cr), PHYS 317 Radiation in Planetary Atmospheres (3 Cr), PHYS 318 Stars and Galaxies (3 Cr), PHYS 408 Theoretical Nuclear Physics (3 Cr), PHYS 409 Plasma Physics (3 Cr), PHYS 410 Physics and Technology of Thin Films (3 Cr), PHYS 411 Nanoparticles (3 Cr), PHYS 412 Advanced Solid State Physics (3 Cr), PHYS 413 Laser and Its Applications (3 Cr), PHYS 414 Super Conductivity and Its Applications (3 Cr), PHYS 415 Nonlinear Optical Devices (2 Cr), PHYS 416 Semiconductors (3 Cr), PHYS 417 Applied Magnetism (2 Cr), PHYS 418 Magnetism and Magnetic Order (2 Cr), PHYS 419 Low Temperature Physics (2 Cr), PHYS 420 Disordered Materials (2 Cr.), PHYS 422 Growth Techniques and Fabrication of Low-Dimensional Structures (3 Cr), PHYS 424 Physics of Surfaces and Interfaces (2 Cr).

University Requirement Elective Course

PHYS 006 Introduction to Astronomy (2Cr).

Chemistry

CHEM 101 Chemistry (2 Cr.), CHEM 207 Environmental Chemistry I (2 Cr.), CHEM 208 Environmental Chemistry II (2 Cr.), CHEM 209 Water Analysis (3 Cr.), CHEM 210 Phase Rule and Molecular Kinetic Theory of Gases (3 Cr.), CHEM 211 Chemistry of Silicates (2 Cr.), CHEM 212 Chemistry of the Elements (2 Cr.), CHEM 309 Chemistry of Polymer (2 Cr.), CHEM 310 Petroleum and Natural Gas (2 Cr.), CHEM 311 Heterocyclic Chemistry (2 Cr.), CHEM 312 Petrochemical Industry (2 Cr.), CHEM 313 Environmental Analysis (2Cr.), CHEM 314 Catalysis (2 Cr.), CHEM 315 Regulatory Environmental Aspects of Industrial Chemicals (2 Cr.), CHEM 409 Industrial Organic Chemistry (2 Cr.), CHEM 410 Industrial Inorganic Chemistry (2 Cr.), CHEM 411 Physical Photochemistry (2 Cr.), CHEM 412 Conducting Polymers (2 Cr.), CHEM 413 Mechanisms of Inorganic Reactions (2 Cr.), CHEM 414 Instrumental Analysis II (2 Cr.), CHEM 415 Bioinorganic Chemistry (2 Cr.), CHEM 417 Analysis of Inorganic Compounds (2 Cr.), CHEM 418 Medicinal Chemistry (2

Cr.).

Biology

BIOL 210 Animal Behavior (2 Cr.), BIOL 211 Human Anatomy (2 Cr.), BIOL 212 Food Microbiology (2 Cr.), BIOL 214 General Virology (2 Cr.), BIOL 307 Biology of Cancer (2 Cr.), BIOL 309 Plant Pigments and Hormones (3 Cr.), BIOL 310 Biology of Lower Autotrophes (2 Cr.), BIOL 311 Wildlife Ecology and Management (3 Cr.), BIOL 312 Nutrition (2 Cr.), BIOL 313 Introductory Plant Pathology (2 Cr.), BIOL 314 Diagnostic Microbiology (2 Cr.), BIOL 406 Ecology, Phytogeography & Flora of Lebanon (2 Cr.), BIOL 409 – Advanced Plant Physiology (2 Cr.), BIOL 410 Genetic Engineering & Applications (2 Cr.), BIOL 411 Medical Microbiology (2 Cr.), BIOL 412 Advanced Embryology (2 Cr.), BIOL 413 Environmental Assessment and Management (2 Cr.), BIOL 414 Marine Invertebrate Zoology (2 Cr.), BIOL 415 Advanced Human Physiology (2 Cr.).

Biochemistry

BCHM 310 Biomarkers and Molecular Epidemiology (2 Cr.), BCHM 311 Genetic Polymorphism (2 Cr.), BCHM 406 Clinical Chemistry (3 Cr.), BCHM 408 Nutrition and Food Science (2 Cr.), BCHM 411 Molecular Biology of Differentiation and Development (2 Cr.), BCHM 412 Cell Signaling (2 Cr.), BCHM 413 Nucleic Acid-Protein Interaction (2 Cr.), BCHM 414 Molecular Mechanisms of Xenobiotic Interaction (2 Cr.), BCHM 416 Biosignaling (2 Cr.).

Environmental Science

ENVI 001 Water Resources (2 Cr.), ENVI 002 Natural Hazards (2 Cr.), ENVI 007 Man and Environment (2 Cr.), ENVI 008 Introduction to Ecology (1 Cr.), ENVI 309 Bioremediation (1 Cr.), ENVI 312 Introduction to Marine Science (3 Cr.), ENVI 314 Plant Physiology (3 Cr.), ENVI 316 Medical Entomology & Biological Control. (3 Cr.), ENVI 406 Environmental Policy Economics and Laws (2 Cr.), ENVI 407 Metabolic Biotransformations of Environmental Chemicals (3 Cr.), ENVI 411 Conservation Biology and Biodiversity (4 Cr.), ENVI 412 Genetic Engineering & Applications (3 Cr.), ENVI 413 Medical Microbiology (4 Cr.), ENVI 414 Aquatic and Wetland Vascular Plants (3 Cr.), ENVI 416 Human Physiology (3 Cr.).

POSTGRADUATE PROGRAMS OFFERED DEGREES

The Faculty of Science offers a Diploma in Nuclear Physics. Master & PhD Degrees are offered in the following specializations:

1. Pure Mathematics
2. Applied Mathematics
3. Computer Science
4. Information Systems
5. Physics
6. Chemistry
7. Biology
8. Biochemistry
9. Environmental Science

PROGRAM DESCRIPTION

DIPLOMA

The Diploma Degree in Nuclear Physics requires the completion of 40 Credit hours divided as follows:

- Mandatory Courses: 14 Cr.
- Elective Courses: 6 Cr.
- Practical Training: 20 Cr.

MASTER DEGREES

The Master Degree requirements (all 9 specializations) consist of 36 Credit hours divided (in accordance to the field of specialization) as follows:

- Mandatory Courses: 18 – 24 Cr.
- Elective Courses: 6 – 12 Cr.
- Thesis: 6 Cr.

PhD DEGREES

The PhD Degree requirements (all 9 specializations) consist of 40 Credit hours divided as follows:

- Courses: 12 Cr. (Mandatory and/or Elective courses depending on the field of specialization)
- Thesis: 28 Cr.

DIPLOMA IN NUCLEAR PHYSICS

Curriculum

(40 Credit Hours)

First Semester	Credit
PHYS 501 Review of Fundamentals	2
PHYS 503 Quantities & Measurements	2
PHYS 505 Biological Effects of Ionizing Radiation	1
PHYS 507 Principles of Radiation Protection & the International Framework	1
PHYS 509 Regulatory Control	1
PHYS 511 Assessment of External & Internal Exposures	3
PHYS 513 Protection against Occupational Exposure	3
PHYS 515 Training the Trainers	1
Elective ¹	6

	20
 Second Semester	
PHYS 522 Practical Training	20

	20

¹ A total of 6 credits are selected from courses offered by the department (2 Cr. Each):

PHYS 517 Exposures of the Public Due to Practices, PHYS 519 Intervention in Situation of Chronic and Emergency Exposure, PHYS 521 Medical Exposure in Diagnostic Radiology, Radiotherapy & Nuclear Medicine, PHYS 523 Gamma Spectroscopy, PHYS 525 Radiation Science, PHYS 527 Environmental Health Physics, PHYS 529 Physics of Radiotherapy.

MASTER OF SCIENCE IN PURE MATHEMATICS

Curriculum

(36 Credit Hours)

First Semester	Credit
MATH 601 Topics in Abstract Algebra I	3
MATH 603 Point Set Topology	3
MATH 640 Technical Writing and Research Skills	3
Elective ¹	6

	15
Second Semester	
MATH 602 Advanced Topics in Analysis	3
MATH 604 Advanced Number Theory	3
MATH 606 Independent Studies in Pure Mathematics	3
Elective ¹	6

	15
MATH 699 Thesis	6

	6

¹ A total of 12 credits are selected from courses offered by the department (3 Cr. Each):

MATH 607 Advanced Numerical Analysis, MATH 608 Algebraic Topology, MATH 610 Topics in Abstract Algebra II, MATH 611 Linear Models, MATH 613 Thermoelasticity, MATH 615 Integral Transforms, MATH 617 Nonlinear Models, MATH 618 Advanced Quantum Mechanics, MATH 619 Aerodynamics, MATH 620 Topics in Electrodynamics, MATH 621 Fluid Dynamics in Electromagnetic Field, MATH 622 General Theory of Relativity, MATH 623 Probability and Statistics, MATH 624 Network Optimization: Algorithms and Applications, MATH 625 Advanced Statistical Method, MATH 626 Forecasting Methods and Applications, MATH 627 Simulation, MATH 628 Decision Analysis, MATH 629 Deterministic Optimization Models, MATH 630 Stochastic Models and Applications, MATH 664 Advanced Biostatistics.

MASTER OF SCIENCE IN APPLIED MATHEMATICS

Curriculum

(36 Credit Hours)

		Credit
First Semester		
MATH 605	Advanced Boundary Value Problems	3
MATH 609	Advanced Fluid Dynamics	3
MATH 640	Technical Writing and Research Skills	3
	Elective ¹	6

		15
 Second Semester		
MATH 612	Computational Methods	3
MATH 614	Advanced Topics in Applied Math	3
MATH 616	Independent Studies in Applied Mathematics	3
	Elective ¹	6

		15
MATH 699	Thesis	6

		6

¹ A total of 12 credits are selected from courses offered by the department (3 Cr. Each):

MATH 607 Advanced Numerical Analysis, MATH 608 Algebraic Topology, MATH 610 Topics in Abstract Algebra II, MATH 611 Linear Models, MATH 613 Thermoelasticity, MATH 615 Integral Transforms, MATH 617 Nonlinear Models, MATH 618 Advanced Quantum Mechanics, MATH 619 Aerodynamics, MATH 620 Topics in Electrodynamics, MATH 621 Fluid Dynamics in Electromagnetic Field, MATH 622 General Theory of Relativity, MATH 623 Probability and Statistics, MATH 624 Network Optimization: Algorithms and Applications, MATH 625 Advanced Statistical Method, MATH 626 Forecasting Methods and Applications, MATH 627 Simulation, MATH 628 Decision Analysis, MATH 629 Deterministic Optimization Models, MATH 630 Stochastic Models and Applications, MATH 664 Advanced Biostatistics.

MASTER OF SCIENCE IN COMPUTER SCIENCE

Curriculum

(36 Credit Hours)

First Semester	Credit
CMPS 601 Advanced Computer Graphics	3
CMPS 603 Advanced Database Management Systems	3
CMPS 640 Technical Writing and Research Skills	3
Elective ¹	6

	15
Second Semester	
CMPS 602 Building AI Systems	3
CMPS 604 Data Warehousing and Data Mining	3
CMPS 608 Independent Studies	3
Elective ¹	6

	15
CMPS 699 Thesis	6

	6

¹ A total of 12 credits are selected from courses offered by the department (3 Cr. Each):

CMPS 605 Computer Network Administration, CMPS 606 Hardware and Software Interface Design, CMPS 607 Advanced Computer Architecture, CMPS 609 Data Visualization, CMPS 610 Special Topics in Computer Science, CMPS 611 Advanced Software Engineering, CMPS 612 Complexity Theory, CMPS 613 Parallel Computing, CMPS 614 Advanced Operating Systems, CMPS 615 Scientific Programming Methods.

MASTER OF SCIENCE IN INFORMATION SYSTEMS

Curriculum

(36 Credit Hours)

First Semester			Credit
ISYS	601	IS Project Management	3
ISYS	603	Advanced Financial Resource Management	3
ISYS	640	Technical Writing and Research Skills	3
		Elective ¹	6

			15
Second Semester			
ISYS	602	IS Strategies	3
ISYS	604	Special Topics in Information Systems	3
ISYS	606	Independent Studies	3
		Elective ¹	6

			15
ISYS	699	Thesis	6

			6

¹ A total of 12 credits are selected from courses offered by the department (3 Cr. Each):

ISYS 607 IS Social and Intellectual Aspects, ISYS 608 Software Verification and Testing, ISYS 609 Supply Chain Management, ISYS 610 Expert Decisions Support Systems, ISYS 611 IS Project Evaluation and Financing, ISYS 612 Data Analysis and Modeling, ISYS 613 Manufacturing Systems and Facilities Planning, ISYS 614 Human Factors Information Systems, ISYS 615 Pre-Project Planning and Feasibility Analysis, ISYS 616 Production-Inventory Planning and Control, ISYS 617 Queuing Theory, ISYS 618 Forecasting Methods and Applications.

MASTER OF SCIENCE IN PHYSICS

Curriculum

(36 Credit Hours)

First Semester			Credit
PHYS	601	Advanced Quantum Physics	3
PHYS	603	Advanced Nuclear Physics	3
PHYS	607	Condensed Matter Physics	2
		Elective ¹	7

			15
Second Semester			
PHYS	602	Advanced Molecular Physics	3
PHYS	604	Materials Science	2
PHYS	606	Independent Studies	3
		Elective ¹	7

			15
PHYS	699	Thesis	6

			6

¹ A total of 14 credits are selected from courses offered by the department:

PHYS 608 High Energy Physics (3 Cr.), PHYS 609 Nanoscience and Technology (2 Cr.), PHYS 610 Quantum Field Theory (3 Cr.), PHYS 611 Fluid Mechanics (2 Cr.), PHYS 612 General Relativity (3 Cr.), PHYS 613 Fourier Optics (2 Cr.), PHYS 614 Cartesian Tensors (2 Cr.), PHYS 615 Advanced Experimental Techniques in Physics (3 Cr.), PHYS 616 Solar Photovoltaics (2 Cr.), PHYS 617 Gamma Spectroscopy (2 Cr.), PHYS 618 Biophysics and Medical Instruments (3 Cr.), PHYS 619 Critical Phenomena and Field Theory (3 Cr.), PHYS 620 Scientific Programming Methods (2 Cr.), PHYS 621 Standard Model of Elementary Particles Physics (3 Cr.), PHYS 622 Transport Phenomena in Solids (3 Cr.), PHYS 623 Chaos in Physical Systems, PHYS 624 Hopping Conduction in Disordered Systems (3 Cr.).

MASTER OF SCIENCE IN CHEMISTRY

Curriculum

(36 Credit Hours)

First Semester	Credit
CHEM 601 Advanced Analytical Chemistry	3
CHEM 603 Advanced Organic Chemistry I	3
CHEM 605 Advanced Physical Chemistry I	3
CHEM 607 Advanced Inorganic Chemistry I	3
Elective ¹	3

	15
Second Semester	
CHEM 602 Advanced Physical Organic Chemistry	3
CHEM 610 Independent Studies	3
Elective ¹	9

	15
CHEM 699 Thesis	6

	6

¹ A total of 12 credits are selected from courses offered by the department (3 Cr. Each):

CHEM 604 Advanced Instrumental Analysis, CHEM 606 Advanced Heterocyclic Chemistry, CHEM 608 Advanced Organometallic Chemistry, CHEM 609 Advanced Natural Products, CHEM 611 Ionic Processes in Solution, CHEM 612 Advanced Organic Synthesis, CMPS 613 New Synthetic Reactions and Catalysts, CHEM 614 Solvent Effects on Reaction Rate, CHEM 615 Radiation Uses and Protection, CHEM 616 Advanced Electrochemistry, CHEM 617 Special Topics.

MASTER OF SCIENCE IN BIOLOGY

Curriculum

(36 Credit Hours)

First Semester			Credit
BIOL	601	Biotechnology	3
BIOL	603	Genetic Engineering for Biology	3
BIOL	640	Technical Writing & Research Skills	3
		Elective ¹	6

			15
Second Semester			
BIOL	602	Neurophysiology	3
BIOL	604	Biodiversity & Pollution	3
BIOL	606	Independent Studies	3
		Elective ¹	6

			15
BIOL	699	Thesis	6

			6

¹ A total of 12 credits are selected from courses offered by the department (3 Cr. Each):

BIOL 661 Medical Microbiology, BIOL 663 Immunology, BIOL 665 Advanced Cell Biology and Techniques, BIOL 666 Industrial Microbiology.

MASTER OF SCIENCE IN BIOCHEMISTRY

Curriculum

(36 Credit Hours)

First Semester		Credit
BCHM 601	Medical Biochemistry	3
BCHM 603	Advanced Biochemistry I	3
BCHM 640	Technical Writing & Research Skills	3
	Elective ¹	6

		15
Second Semester		
BCHM 602	Modern Techniques in Molecular Biology	3
BCHM 604	Advanced Biochemistry II	3
BCHM 606	Independent Studies	3
	Elective ¹	6

		15
BCHM 699	Thesis	6

		6

¹ A total of 12 credits are selected from courses offered by the department (3 Cr. Each):

BCHM 662 Quantitative Methods in Biochemistry, BCHM 663 Molecular Genetics.

MASTER OF SCIENCE IN ENVIRONMENTAL SCIENCE

Curriculum

(36 Credit Hours)

First Semester			Credit
ENVI	601	Principles of Environmental Pollution	3
ENVI	603	Laboratories Measurements	3
ENVI	605	Geographic Information Systems	3
ENVI	640	Technical Writing & Research Skills	3
		Elective ¹	3

			15
Second Semester			
ENVI	602	Environmental Biochemistry & Toxicology	3
ENVI	604	Environmental Impact Assessment	3
ENVI	606	Ecosystem Types	3
ENVI	608	Environmental Geochemistry	3
		Elective ¹	3

			15
ENVI	699	Thesis	6

			6

¹ A total of 6 credits are selected from courses offered by the department:

ENVI 611 Coastal Zone Management (3 Cr.), ENVI 612 Energy and the Environment (3 Cr.), ENVI 613 Natural Hazard Assessments (3 Cr.), ENVI 615 Environmental Microbiology (3 Cr.), ENVI 618 Marine Pollution (3 Cr.), ENVI 621 Advanced Groundwater Hydrology (3 Cr.), ENVI 627 Medical Geology (3 Cr.), ENVI 632 Environmental Management Systems (3 Cr.), ENVI 637 Environment and Public Health (2 Cr.), ENVI 641 Contaminant Hydrology (3 Cr.), ENVI 642 Aquatic Chemistry (3 Cr.), ENVI 643 Solid Waste Management (2 Cr.), ENVI 646 Air Pollution and Air Quality Management (3 Cr.), ENVI 647 Hazardous and Toxic Waste Management (3 Cr.).

PhD IN PURE MATHEMATICS

Curriculum

(40 Credit Hours)

Courses	Credit
Mandatory / Elective Courses ¹	12

	12
MATH 799 Thesis	28

	18

¹ Selected from Mandatory or Elective courses depending on the major field of specialization.

Proposed Elective courses can be chosen from the following list (3 Cr. Each):

MATH 701 Differential Equations, MATH 702 Homological Algebra, MATH 703 Universal Algebra, MATH 704 Radical Theory, MATH 705 Numerical Linear Algebra, MATH 706 Topics in Functional Analysis, MATH 707 Topics in Fractional Calculus, MATH 708 Optimal Control, MATH 709 Numerical Optimization, MATH 710 Applied Math Logic, MATH 711 Advanced Quantum Mechanics, MATH 712 Advanced Nuclear Quantum Mechanics, MATH 713 Advanced Applications of Group Theory in Quantum Mechanics, MATH 714 Advanced Fluid Mechanics, MATH 715 Non Newtonian Fluids, MATH 716 Advanced Aerodynamics, MATH 717 Advanced Thermoelasticity Theory, MATH 718 Advanced Topics in the Theory of Elasticity, MATH 719 Advanced Methods of Applied Math, MATH 720 Field Theory, MATH 721 Measure Theory and Advanced Probability, MATH 722 Advanced Topics in Time Series Analysis, MATH 723 Advanced Computations in Statistics, MATH 724 Statistical Linear and Non Linear Models, MATH 725 Advanced Statistical Inference, MATH 726 Advanced Theory of Nonparametric Statistics, MATH 727 Topics in Operations Research, MATH 728 Special Topics, MATH 729 Research Seminar.

PhD IN APPLIED MATHEMATICS

Curriculum

(40 Credit Hours)

Courses	Credit
Mandatory / Elective Courses ¹	12

	12
MATH 799 Thesis	28

	18

¹ Selected from Mandatory or Elective courses depending on the major field of specialization.

Proposed Elective courses can be chosen from the following list (3 Cr. Each):

MATH 701 Differential Equations, MATH 702 Homological Algebra, MATH 703 Universal Algebra, MATH 704 Radical Theory, MATH 705 Numerical Linear Algebra, MATH 706 Topics in Functional Analysis, MATH 707 Topics in Fractional Calculus, MATH 708 Optimal Control, MATH 709 Numerical Optimization, MATH 710 Applied Math Logic, MATH 711 Advanced Quantum Mechanics, MATH 712 Advanced Nuclear Quantum Mechanics, MATH 713 Advanced Applications of Group Theory in Quantum Mechanics, MATH 714 Advanced Fluid Mechanics, MATH 715 Non Newtonian Fluids, MATH 716 Advanced Aerodynamics, MATH 717 Advanced Thermoelasticity Theory, MATH 718 Advanced Topics in the Theory of Elasticity, MATH 719 Advanced Methods of Applied Math, MATH 720 Field Theory, MATH 721 Measure Theory and Advanced Probability, MATH 722 Advanced Topics in Time Series Analysis, MATH 723 Advanced Computations in Statistics, MATH 724 Statistical Linear and Non Linear Models, MATH 725 Advanced Statistical Inference, MATH 726 Advanced Theory of Nonparametric Statistics, MATH 727 Topics in Operations Research, MATH 728 Special Topics, MATH 729 Research Seminar.

PhD IN COMPUTER SCIENCE

Curriculum

(40 Credit Hours)

Courses	Credit
Mandatory / Elective Courses ¹	12

	12
CMPS 799 Thesis	28

	18

¹ Selected from Mandatory or Elective courses depending on the major field of specialization.

Proposed Elective courses can be chosen from the following list (3 Cr. Each):

CMPS 701 Advanced Digital Signal Processing, CMPS 702 Quantum Circuits and Algorithms, CMPS 703 Emerging Topics in AI, CMPS 704 Advanced Topics in Knowledge Representation and Non-Monotonic Reasoning, CMPS 705 Database Bioinformatics, CMPS 706 Data Mining and Knowledge Discovery, CMPS 707 Special Topics, CMPS 708 Research Seminar.

PhD IN INFORMATION SYSTEMS

Curriculum

(40 Credit Hours)

Courses	Credit
Mandatory / Elective Courses ¹	12

	12
ISYS 799 Thesis	28

	18

¹ Selected from Mandatory or Elective courses depending on the major field of specialization.

Proposed Elective courses can be chosen from the following list (3 Cr. Each):

ISYS 701 Data and Information System, ISYS 702 Enterprise and Systems Integration, ISYS 703 Models and Technologies, ISYS 704 Project Information System, ISYS 705 Contemporary Issues in Information Systems Development, ISYS 780 Information Systems Seminar, ISYS 798 Special Topics.

PhD IN PHYSICS

Curriculum

(40 Credit Hours)

Courses	Credit
Mandatory / Elective Courses ¹	12

	12
PHYS 799 Thesis	28

	18

¹ Selected from Mandatory or Elective courses depending on the major field of specialization.

Proposed Elective courses can be chosen from the following list (3 Cr. Each):

PHYS 701 Many Body Physics, PHYS 702 Advanced Condensed Matter Physics (2 Cr.), PHYS 703 Heavy Ion Reactions, PHYS 704 Bose-Einstein Condensation and Ultra-Cold Quantum Gases, PHYS 705 Quantum Optics, PHYS 706 Advanced Quantum Field Theory, PHYS 707 Advanced Statistical Physics, PHYS 708 Radiation Physics: High Resolution Gamma Spectroscopy, PHYS 709 Molecular Structure, PHYS 710 Applications of the Molecular Spectroscopy.

PhD IN CHEMISTRY

Curriculum

(40 Credit Hours)

Courses	Credit
Mandatory / Elective Courses ¹	12

	12
CHEM 799 Thesis	28

	18

¹ Selected from Mandatory or Elective courses depending on the major field of specialization.

Proposed Elective courses can be chosen from the following list (3 Cr. Each):

CHEM 701 Advanced Inorganic Chemistry II, CHEM 702 Advanced Organic Chemistry II, CHEM 703 Organic Synthesis and Structure, CHEM 704 Tactics of Organic Synthesis, CHEM 705 Advanced Quantum Chemistry, CHEM 706 Electrolytic Conductance and Ion Association, CHEM 707 Special Topics, CHEM 708 Heterogeneous Catalysis, CHEM 709 Computational Physical Chemistry, CHEM 710 Advanced Characterization Techniques, CHEM 711 Research Seminar.

PhD IN BIOLOGY

Curriculum

(40 Credit Hours)

Courses	Credit
Mandatory / Elective Courses ¹	12

	12
BIOL 799 Thesis	28

	18

¹ Selected from Mandatory or Elective courses depending on the major field of specialization.

Proposed Elective courses can be chosen from the following list (3 Cr. Each):

BIOL 710 Phytoremediation, BIOL 711 Plant Biotechnology, BIOL 712 Advanced Histology, BIOL 713 The Genetic Basis of Plant Physiological Processes, BIOL 714 Histopathology, BIOL 715 Algal Biotechnology, BIOL 716 Traditional Use of Medicinal Plants, BIOL 717 Plant Propagation Programs, BIOL 718 Conservation and Rehabilitation in Ecology, BIOL 730 Topics in Soil Microbiology, BIOL 731 Marine Microbiology, BIOL 732 Bioremediation, BIOL 733 Microbial Degradation of Pollutants, BIOL 734 Biotechnology of Specific Bacterial Groups, BIOL 735 Advanced Yeast Technology, BIOL 736 Clinical Microbiology, BIOL 737 Bioinformatics, BIOL 738 Advanced Topics in Virology, BIOL 750 Special Topics in Applied and Forensic Entomology, BIOL 751 Advanced Cellular and Molecular Biology, and Genetics, BIOL 752 Ecological Effects of Pollutants, BIOL 753 Cellular Pharmaco-Toxicology, BIOL 754 Cancer, Angiogenesis and Cell Invasion, BIOL 755 Immunology, BIOL 756 Mammalian Physiology, BIOL 757 Tissue Culture Techniques, BIOL 758 Stem Cell Technology.

PhD IN BIOCHEMISTRY

Curriculum

(40 Credit Hours)

Courses	Credit
Mandatory / Elective Courses ¹	12

	12
<u>Research Thesis</u>	
BCHM 799 Thesis	28

	18

¹ Selected from Mandatory or Elective courses depending on the major field of specialization.

Proposed Elective courses can be chosen from the following list (3 Cr. Each):

BCHM 780 Oncogenes and Cancer, BCHM 781 Signal Transduction, BCHM 782 Gene Therapy, BCHM 783 Advanced Biotechnology, BCHM 784 Protein Engineering, BCHM 785 Protein Targeting and Trafficking, BCHM 786 Cell Cycle and Growth Regulation, BCHM 787 Bioinformatics, BCHM 788 Gene Transcription, BCHM 789 Special Topics in Biochemistry & Seminar (Directed Individual Study).

PhD IN ENVIRONMENTAL SCIENCE

Curriculum

(40 Credit Hours)

Courses	Credit
Mandatory / Elective Courses ¹	12

	12
ENVI 799 Thesis	28

	18

¹ Selected from Mandatory or Elective courses depending on the major field of specialization.

Proposed Elective courses can be chosen from the following list (3 Cr. Each):

ENVI 770 Landscape Ecology, ENVI 771 Chemistry and Toxicology of Pesticides, ENVI 772 The Geology of Pollution, ENVI 773 Environmental Isotope Geochemistry, ENVI 774 Industrial Waste-Water Treatment, ENVI 775 Aquatic Ecosystem Pollution, ENVI 776 Environmental Economics and Sustainable Development, ENVI 777 Genetically Modified Organisms (GMOs) and their Impact on the Environment, ENVI 778 Desert Ecology, ENVI 779 Environmental Auditing, ENVI 780 Special Topic & Seminar (Directed Individual Study).