



University of Bahrain

Deanship of Graduate Studies & Scientific Research

Postgraduate Studies **Programs**



College of Science

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Master of Science in Physics

Program Objectives

The graduates of the Master of Science in Physics programs will be prepared to:

1. Pursue a successful career in a physics related field.
2. Qualify for PhD studies and be engaged in life-long learning.
3. Exhibit ethical and scientific conduct and contribute positively to society through advanced knowledge and skills in Physics.

Program Intended Learning Outcomes

Students of the Master of Science in Physics program will be able to:

1. Demonstrate a broad knowledge in advanced theoretical, experimental and computational physics and related disciplinary skills.
2. Solve advanced physics problems.
3. Design a project that ethically tackles contemporary problems contributing significantly to physics discipline.
4. Discuss advanced physics issues and relate research results to contemporary international research.
5. Communicate effectively (both written and orally) with a broad audience, across a range of professional and personal contexts.
6. Develop self-learning and research skills to ensure life-long learning.

Required Specialization for Program Admission

- Bachelor degree in in Physics or related fields in science and engineering.

Study Plan

First Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
PHYCS601	Research Methods in Physics	4	0	4
PHYCS602	Methods of theoretical and computational Physics	4	0	4
PHYCS603	Experimental Techniques in Physics	2	3	4

Second Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
PHYCS6xx	Elective 1	4	0	4
PHYCS6xx	Elective 2	4	0	4
PHYCS6xx	Elective 3	4	0	4

Third Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
PHYCS 699	Thesis	0	36	12

Details of Elective Courses

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
PHYCS622	Particle Physics	4	0	4
PHYCS623	Detectors Technology	4	0	4
PHYCS624	accelerator principles and techniques	4	0	4
PHYCS651	Solid State Physics	4	0	4
PHYCS652	Computational Material Science	4	0	4
PHYCS653	Semiconductor Physics	4	0	4
PHYCS656	Nanoscience and Nanomaterials	4	0	4
PHYCS633	Nonlinear Optics	4	0	4
PHYCS632	Quantum Optics	4	0	4
PHYCS636	Laser Physics	4	0	4
PHYCS661	Environmental Physics	4	0	4
PHYCS665	Global warming and Climate change	4	0	4
PHYCS692	Advanced Selected Topics in Physics	4	0	4

Master in Environment and Sustainable Development Program

Program Objectives

1. Pursue a successful career in environment and sustainable development related fields.
2. Qualify for graduate studies in environment and sustainable development.
3. Serve the community in protecting the environment and achieving principles of sustainable development.

Program Intended Learning Outcomes

Students who are graduating from the Master in ESD program should be able to:

- a. Implement advanced knowledge in the field of environment and sustainable development.
- b. Analyze complex environmental and development problems.
- c. Compare alternative solutions to environmental problems using appropriate tools and methods.
- d. Synthesize contemporary emerging issues of sustainable environment using interdisciplinary approaches.
- e. Acquire advanced and effective oral and written communication skills in accordance to academic standards and ethics.
- f. Execute original research that address issues related to environmental sustainability.
- g. Develop intellectual independence and autonomy required for continuing professional development and life-long learning.

Required Specialization for Program Admission

- Bachelor degree in all specializations.

Study Plan

First Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ESD 601	Environmental Science	3	0	3
ESD 603	Environmental Economic	3	0	3
ESD 647	Research Methods	3	0	3

Second Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ESD 602	Environmental Law	3	0	3
ESD 651	ResourceWaste Management	3	0	3
ESD 611	Energy and the Environment	3	0	3

Third Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ESD XXX	Elective Course 1	3	0	3
ESD XXX	Elective Course 2	3	0	3
ESD XXX	Elective Course 3	3	0	3

Fourth Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ESD 649	Thesis	0	27	9

Details of Elective Courses

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ESD 653	Biodiversity And Conservation	3	0	3
ESD 614	Desert Ecology And Desertification	3	0	3
ESD 652	Climate Change And Air Quality	3	0	3
ESD 626	Environmental Impact Assessment	3	0	3
ESD 634	Marine Pollution	3	0	3
ESD 654	Environmental Radiology And Radiation Protection	3	0	3
ESD 646	Special Topics In Environmental Sceince	3	0	3
ESD 656	Water Resources Managment	3	0	3

Master of Science in Biological Sciences Program

Program Objectives

1. Hold professional research positions in the educational, medical, pharmaceutical or biotechnological fields, as well as other industries with biological research and development
2. Continue graduate studies in Biological Sciences.
3. Hold educational or teaching positions in life sciences technology and application.

Program Intended Learning Outcomes

1. Demonstrate critical thinking through effective literature search, results evaluation, and conclusion formulation in biological sciences.
2. Express acquired discipline-specific knowledge in relevant situations.
3. Design original experiments, or conduct observations following the scientific method in biological sciences.
4. Collect experimental data using appropriate theoretical, laboratory or field techniques and/or instrumentation.
5. Communicate science through oral, visual, and written communications.
6. Develop new and emerging skills, to progress in research and professional environment in biological sciences.

Required Specialization for Program Admission

- Students with B.Sc. in fields closely related to Biology, B.Sc. in Chemistry/minor Biology, B.Sc. in Medical Laboratories, B.Sc. in Pharmacy, and B.Sc. in Ecology.

Study Plan

First Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
BIOLS 610	Biostatistics	4	0	4
BIOLS 611	Bioinformatics	4	0	4
BIOLS 612	Advanced Techniques in Biology	4	0	4

Second Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
BIOLS 600	Seminar	3	0	3
BIOLS 601	Research Methodology and Ethics	3	0	3
BIOLS 6xx	Elective 1	3	0	3

Third Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
BIOLS 6xx	Elective 2	3	0	3

Fourth Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
BIOLS 699	Thesis	0	36	12

Electives Course List

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
BIOLS 606	Advances in Biotechnology	3	0	3
BIOLS 607	Advances in Cell and Molecular Biology	3	0	3
BIOLS 608	Advances in Marine Biology	3	0	3
BIOLS 609	Artificial Intelligence in Biology	3	0	3
BIOLS 613	Special Topics in Biological Sciences	3	0	3

Master of Science in Big Data Science and Analytics Program

Program Objectives

1. Work successfully as big data scientists or analysts in a variety of related career fields.
2. Pursue research activities in several related areas involving big data science and analytics.
3. Pursue professional development to be recognized as professional big data scientists or analysts.
4. Enhance society's development through the effective use of the knowledge and skills specific to big data science and analytics.

Program Intended Learning Outcomes

1. Demonstrate broad and deep knowledge of the concepts, terminologies, techniques in the context of big data science and analytics.
2. Identify and formulate practical problems in a variety of big data applications.
3. Design and conduct effective data-driven experiments in a variety of professions to meet specific needs within the available resources and the existing constraints.
4. Use advanced statistical tools, specialist software and computing technology effectively for big data acquisition, quality evaluation, management and manipulation that involves storing, cleaning, exploring, visualizing, and analyzing big data.
5. Provide a critical evaluation of the existing techniques in terms of applicability, effectiveness and efficiency and develop creative techniques to handle big data issues.
6. Extract valuable information from structured and unstructured big data and transform this information into actionable decisions.
7. Communicate important information in relation to big data appropriately to suit the target audience.
8. Demonstrate the ability to work individually and collaboratively to handle the complexity and diversity of big data problems.

9. Demonstrate awareness of ethics, responsibility and consequences in relation to collecting and using big data.
10. Pursue life-long learning through continuous professional development in the field of big data science and analytics.

Required Specialization for Program Admission

- Bachelor Degree in any field/ any specialization with a good standard (minimum grade C) statistical/mathematical background in the areas of Calculus, Linear Algebra, Probability and Statistics and a good standard (minimum grade C) IT background in the areas of Computer Programming (Java, C++, Python, R), Data Structure & Algorithms

Study Plan

First Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
BDSA 601	Research Methods	4	0	4
BDSA 602	Statistical Data Analysis	4	0	4
BDSA 603	Big Data Analytics	4	0	4

Second Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
BDSA 604	Machine Learning	4	0	4
BDSA 605	Data Mining	4	0	4
BDSA 610	Data Visualization	4	0	4

Third Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
BDSA 609	Thesis	0	36	12

Master of Science in Environmental Chemistry Program

Program Objectives

1. Hold professional research positions in the educational, petrochemical, environmental, medical, pharmaceutical fields, as well as other industries with chemical research and development.
2. Continue graduate studies in chemical sciences.
3. Debate on the importance of chemical research for achieving sustainable economic and welfare.
4. Build internship with Bahrain society through collaborative research.

Program Intended Learning Outcomes

1. Critically analyze the underlying science behind the chemistry of the environment.
2. Analytically evaluate recent advances in the environmental chemistry.
3. Construct arguments and present scientific ideas to their peers.
4. Examine their level of attainment in defined attributes and skills through the use of reflective practice.
5. Devise solutions to unfamiliar types of problems through the adaptation of existing methodologies.
6. Critically examine and categorize an area of the scientific literature.

Required Specialization for Program Admission

- Bachelor degree in Chemistry, Chemical Engineering, Biochemistry, Biology, Physics or Equivalent.

Study Plan

First Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
CHEMY 610	Research Methodology and Seminars	3	0	3
CHEMY 611	Introduction to Environmental Chemistry	3	0	3
CHEMY 612	Environmentally Benign Technology	3	0	3

Second Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
CHEMY 613	Environmental Analytical Techniques	3	2	3
CHEMY xxx	Elective 1	3	0	3
CHEMY xxx	Elective 2	3	0	3

Third Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
CHEMY xxx	Elective 3	3	0	3
CHEMY xxx	Elective 4	3	0	3

Fourth Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
CHEMY 622	Thesis	0	27	9

Electives Course List

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
CHEMY614	Solid Waste Management	3	0	3
CHEMY615	Physicochemical Wastewater Treatment	3	0	3
CHEMY616	Atmospheric Chemistry	3	0	3
CHEMY617	Organic Contaminants in the Environment	3	0	3
CHEMY618	Corrosion and Environment	3	2	3
CHEMY619	Environmental Impacts Of Energy	3	0	3
CHEMY620	Nanomaterials for Environmental Remediation	3	0	3
CHEMY621	Industrial Effluents And Emission Analysis	3	0	3

Doctor of Philosophy in Environment and Sustainable Development

Program Objectives

1. Qualify for decision makers, academics, and environmental managers in the fields of environment and sustainable development.
2. Advance knowledge and research aspects in sustainable development, nationally and internationally.
3. Contribute effectively to social, economic and environmental well-being.

Program Intended Learning Outcomes

1. Implement advanced and recent knowledge in the fields of environment and sustainable development.
2. Critically analyze complex environmental and development problems and propose alternative solutions.
3. Conduct integrated assessments for national, regional, or international environmental challenges.
4. Analyze contemporary developments associated with 2030 Agenda for Sustainable Development.
5. Apply advanced qualitative and quantitative research methods in fields of environment and sustainable development.
6. Conduct original research in the fields of environment and sustainable development
7. Effectively disseminate research results both orally and in writing in accordance to academic standards and ethics..

Required Specialization for Program Admission

- M.Sc Degree in any specializations.

Study Plan

First Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ESD 701	Environment and Sustainability	3	0	3
ESD 704	Advanced Environmental Research Skills	3	0	3
ESD 703	Sustainable Development Goals	3	0	3

Second Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ESD 702	Environment and Sustainability Assessment	3	0	3
ESD 705	Sustainable Resources Management	3	0	3
ESD 706	Environmental policies and governance	3	0	3

Third Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ESD 707	Global Environmental Issues	3	0	3
ESD 719	Thesis I	0	27	9

Fourth Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ESD 729	Thesis II	0	27	9

Fifth Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ESD 739	Thesis III	0	27	9

Sixth Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ESD 749	Thesis IV	0	27	9

Seventh Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ESD 759	Thesis V	0	27	9

Eighth Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ESD 769	Thesis VI	0	27	9

For more information, please contact the following address:

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