German-Jordanian University

School of Engineering and Management of Natural Resources

Study Plan

Program Objectives:

The program objectives are as follows:

1) Understanding the limitations of ecosystem stability and the consequences of ignoring them.

2) Understanding system approaches and viewing future engineering challenges in a larger context.

3) The ability to find solutions merging renewable energy resources in place of conventional energy sources (fossil fuel) in various environmental engineering practices.

4) The ability to engage in environmental engineering research and careers in various areas such as sustainability, air quality engineering, wastewater treatment, impact on climate, etc...

5) To raise the awareness among environmental engineers of the practices of the profession and its impact on the climate.

6) To be involved in a wide range of community concerns, such as regulatory, economic, ethical, and global issues.

7) The ability to pursue a Ph.D. Degree in Renewable energy and environmental engineering

8) Knowledge of regulatory considerations in pollution control related to model selection and use to avoid adverse effects on the environment.

Learning Outcomes:

The program learning outcomes for our graduating students are:

1) Appreciation of the problems ahead and how best to tackle them on local and regional levels.

2) Ability to understand short and longer range implications of engineering solutions and the best ways to mitigate them.

3) Competency in using renewable energy solutions in place of fossil fuel energy sources.

4) Competency in environmental engineering and renewable energy research.

5) Ability to discuss and defend ideas constructively, effective oral communication, and to write technical reports skillfully.

6) Teamwork skills in multidisciplinary projects and identification of problems and proposal of solutions, including rigorous analysis and design of a process, component or system.

7) Appreciation of the ethical and societal responsibilities entailed in environmental engineering profession and the need for continuous education in the field and commitment to life-long learning.

8) Active participation in professional environmental organizations and involvement in NGOs for the benefit of the local community and the society at large.

Learning Outcomes Assessment:

During the course of study, students will be assessed through examinations, home works, reports and presentations. At graduation, the student will face a thesis defense which will be the basis for the graduation decision. Competency is measured by the ability to use and apply fundamental principles and knowledge in solving problems in each of the mentioned areas. To measure the ability of the students and their perception of the program effectiveness the following will be done: In addition to students evaluation forms and the instructors evaluation forms which are done every semester, a continuous monitoring of the graduates whereabouts, professions they are involved in and their satisfaction and the employers' satisfaction, with what they learned will be checked against the above mentioned sources of evaluation, in order to determine the most probable positive or negative outcomes of the program. Research papers published in internationally refereed journals written by the students, which are the result of the master thesis projects, are the main indicators of the effectiveness of the program. The positive outcomes will be reaffirmed in the program and the negative outcomes will be avoided by redesigning the program.

Curriculum for Masters of Science Degree in Environmental and Renewable Energy Engineering

Classification Credit Hours	*Classification Credit Hours*
Compulsory Requirements 19	**Compulsory Requirements 19**
Elective Requirements 6	**Elective Requirements 6**
Master's Thesis 9	**Master's Thesis 9**
Total 34	**Total 34**

1. **Compulsory Requirements (19 Credit Hours):**

Course No.	Course Title	Cr. hrs.	Lecture	Lab*	Prerequisite
ERE 721	**Applied Mathematics for Engineers**	**3**	**3**	**0**	**-**
ERE 722	**Modeling, Simulation and Optimization of Energy and Environmental Systems**	**3**	**3**	**0**	**-**
ERE 731	**Advanced Renewable Energy Systems**	**3**	**2**	**1**	**-**
ERE 732	**Advanced Energy Conversion**	**3**	**3**	**0**	**-**
ERE 741	**Meteorology and Climate Phenomenology**	**3**	**3**	**0**	**-**
ERE742	**Sustainability**	**3**	**3**	**0**	**-**
ERE 781	**Seminar**	**1**	**1**	**0**	
	Total	**19**			

2. Elective Requirements (6 Credit Hours) to be chosen from:

Course No.	Course Title	Cr. hrs.	Lecture	Lab*	Prerequisite
ERE723	Advanced Numerical Methods	3	3	0	
ERE 733	Energy Efficiency	3	3	0	-
ERE 734	Techno Economical Feasibility	3	2	0	
ERE 735	PV – PhotoVoltaics	3	2	1	ERE 731
ERE 736	Wind Energy Systems	3	3	1	ERE 731
ERE 737	Concentrated Solar Power (CSP)	3	3	0	ERE 731
ERE743	Environmental Biotechnology and Bioenergy	3	3	0	
ERE 744	Climate change and Predictability	3	3	0	
ERE 751	Advanced water and Wastewater Treatment	3	3	0	
ERE 752	Water, Energy, and Environment Management	3	3	0	
ERE 761	Air pollution Control	3	3	0	-
ERE 771	Energy, Environmental and Water Laws and Policies	3	3	0	
ERE 791	Special topics in renewable energy				
ERE 792	Special topics in environmental engineering				
	Total Taken	6			

3. Thesis Requirements (9 Credit Hours):

Course No.	Course Title	Cr. hrs.	Lecture	Lab*	Prerequisite
ERE799A	Master Thesis	9	-	-	
ERE799 B	Master Thesis	6	-	-	
ERE799 C	Master Thesis	3	-	-	
ERE799D	Master Thesis	0	-	-	
	Total Taken	9			

Study Plan Guide

First year

First Semester				
Course No.	**Course Title**	**Cr. hrs.**	**Prerequisite**	**Co-requisite**
ERE 721	**Applied Mathematics for Engineers**	**3**		
ERE 731	**Advanced Renewable Energy Systems**	**3**	**-**	**-**
ERE 000	**Elective (1)**	**3**	**-**	**-**
	Total	**9**		

Second Semester				
Course No.	**Course Title**	**Cr. hrs.**	**Prerequisite**	**Co-requisite**
ERE 722	**Modeling, Simulation and Optimization of Energy and Environmental Systems**	**3**	**-**	**-**
ERE 741	**Meteorology and Climate Phenomenology**	**3**		
ERE 742	**Sustainability**	**3**	**-**	**-**
	Total	**9**		

Second Year

First Semester				
Course No.	**Course Title**	**Cr. hrs.**	**Prerequisite**	**Co-requisite**
ERE 732	**Advanced Energy Conversion**	**3**		
ERE781	**Seminar**	**1**		
ERE 000	**Elective (2)**	**3**		
ERE 799 C	**Master Thesis**	**3**	**Dept. Consent**	
	Total	**10**		

Second Semester				
Course No.	**Course Title**	**Cr. hrs.**	**Prerequisite**	**Co-requisite**
ERE 799 B	**Master Thesis**	**6**	**Dept. Consent**	**-**
	Total	**6**		

Course Code:

The digits have the following representation:

The left digit represents the course level.

The middle digit represents the specialized field of knowledge of the course as follows:

2. Mathematics and modeling

3. Energy/Renewable Energy/Energy Economics

4. Environment /Meteorology

5. Water and Wastewater

6. Air quality

7. Environmental and Water Laws and Policies

8. Seminar

9. Master Thesis

The right digit represents the sequence of the course within the field.