ماجستير في كيمياء وتكنولوجيا صناعة الأسمنت

Master of Science in Cement Chemistry and Technology

تـم تصميـم برنامـج الماجستير فى كيمياء وتكنولوجيا صناعة الأسمنت بشكل يهيأ المناج للدارس للتعرف على العلوم المختلفة الخاصة بصناعة الاسمنت والتنمية البيئية وهى الخطوة الاولى للدخول فى مجال البحث.

الأهداف ومخرجات التعلم المقصودة:

1. أن يقدم خريجا قادرا على التنافس في سوق العمل في المجالات الصناعية والبيئية بكفاءة عالية.
2. اثراء المجالات البحثية بالافكار العلمية المبتكرة ذات الصلة بصناعة الاسمنت والتنمية البيئية.
3. أن يؤهل طالبا ملماً بالمعلومات النظرية والعملية الخاصة بصناعة الاسمنت.
4. أن يفتح المجال للدارس للتعرف على المشاكل البيئية التى تنتج من الصناعات المختلفة.
5. اتاحة الفرصة للدارس للتواصل والمشاركة البحثية مع الجامعات المختلفة.
6. انماء الفضول الفكري للدارس والالتزام بالتعلم مدى الحياة.

تكون الدراسة علي مرحلتين

المرحله الاولي: دراسة نظرية لمده عام أكاديمي Pre-master courses

المرحله الثانية: تسجيل النقطة البحثية و إجراء الأبحاث المعملية و نشر بحث دولي واحد علي الأقل و كتابة الرسالة العلمية. و تمنح الدرجة بعد تحكيم الرسالة.

Pre-master Courses

1. Compulsory Courses:

First Semester							
Course code	Course title		Total Credit Hours	Lecture Credit Hours	Lab Credit Hours	Exam Duration (hour)	Final grades out of
	English	Arabic					
CT601	Chemistry and Production of Cement	كيمياء و إنتاج الأسمنت	2	2	0	2	100
CT602	Raw Material Used in Cement Industry	مواد خام صناعة الأسمنت	2	2	0	2	100
CT603	Kiln Process Operation and Types of Cement	التشغيل والتحكم فى الفرن	2	2	0	2	100
CT604	Dedusting Equipment	أجهزة إزالة الغبار	2	2	0	2	100
CT605	Cement Plant Quality Control	التحكم فى جودة مصنع الاسمنت	1	1	0	1	50
CT606	Cement Fuel and Oil Usage	استخدام الوقود والنفط فى الأسمنت	2	2	0	2	100
GC601	Scientific thinking and writing	التفكير والكتابة العلمية	1	1	0	1	50
Second Semester							
Course code	Course title		Total Credit Hours	Lecture Credit Hours	Lab Credit Hours	Exam Duration (hour)	Final grades out of
	English	Arabic					
CT611	Cement Plant Instrumentation and Control	أجهزة وتحكم مصنع الأسمنت	2	2	0	2	100
CT612	Cement and Environmental effect	الاسمنت و التأثير البيئي	2	2	0	2	100
CT613	Fundamentals of Air Pollution Control	أساسيات التحكم في تلوث الهواء	2	2	0	2	100
CT614	Cement final product standards types and their usage and impacts	أنواع معايير المنتج النهائى للاسمنت واستخداماتها وآثارها	2	2	0	2	100
CT615	Treatment and cement standards	معايير الأسمنت والمعالجة	1	1	0	1	50

CT616	Advances in Cement Technology	تكنولوجيا الأسمنت المتقدمه	1	1	0	1	50

2. Elective courses:

Elective Courses							
Course code	**Course title**		**Total Credit Hours**	**Lecture Credit Hours**	**Lab Credit Hours**	**Exam Duration (hour)**	**Final grades out of**
	English	**Arabic**					
CT608	Civil Liability in Relation to Environmental Pollution	المسؤولية المدنية الخاصة بالتلوث البيئي	2	2	0	2	100
CT609	Fundamental of Oil Field Processing	أساسيات تجهيز حقول البترول	2	2	0	2	100
CT610	Logistics	الخدمات اللوجستية	2	2	0	2	100
CT617	Environmental Chemical Analysis	التحليل الكيميائى البيئى	2	2	0	2	100
CT618	Energy conservation management	إدارة توفير الطاقة	2	2	0	2	100
CT619	Cement plant Layout and utilities	تخطيط مصنع الاسمنت والمرافق	2	2	0	2	100

To complete the pre-requisite courses (pre-master courses) you should finish total credit hours = 26

[Compulsory Courses (22 credit hours) + Elective Courses (4 credit hours)]

Course Specifications

CT601 Chemistry and Production of Cement

The production of cement takes place with several steps:

- Quarrying of limestone and shale
- Dredging the ocean floor for shells
- Digging for clay and marl
- Grinding, Blending of components
- Fine grinding, Burning
- Finish grinding
- Packaging and/or shipping

CT602 Raw Materials Used in Cement Industry

Phases after firing, setting and hardening of cement paste after hydration with water. Different quarries with simple geological basis knowledge and quarry managements

CT603 Kiln Process Operation and Types of Cement

- Blended and pozzolanic cements for aggressive water containing sulphates, chlorides, sea water. Improvement of cement to resist the aggressive attack.
- Process and kiln system
- Basic principles of operation
- Chemical Reactions in the Kiln
- Kiln Zones, Raw Material characteristics
- Liquid Phase and importance of Iron and Aluminum content
- Fuel types and their characteristics
- Combustion Theory, Calciner Operation
- Calciner Fuels, Heat Balances

- Heat Balance work session
- Optimization of heat consumption
- Behavior of volatile matter
- Volatile matter work session
- Clinker coolers
- Operations and optimization of clinker coolers
- Emissions of NOx and SOX from cement kilns
- New emission standards
- Starting and Stopping the kiln

CT604 Dedusting Equipment

The main sources of dust emissions in the cement industry. Sources of emissions in particular disorganized emissions also include all sorts of feeding devices, packaging installations and silos. Type of technological installation, types of equipment used for dedusting in the cement industry. Electro filters and, Bag (fabric) filters.

CT605 Cement Plant Quality Control

Graduates will study the principles and applications of process quality control systems, which include the basic concepts of analogue and digital control, principles of feedback and loop stability. The module includes a site visit to a control plant to enhance student learning

CT606 Cement Fuel and Oil Usage

Different fuel types used (heavy oil, diesel, natural gas, coal, waste material) Different hydraulic system used, lubrication oil types and usage

GC601 Scientific Thinking and Writing

Scientific Planning – How to use a research engine - How to write a proposal – How to

write a paper – Research ethics – Publication – social media.

CT608 Civil Liability in Relation to Environmental Pollution

Civil liability resulting from environmental damage: an international and comparative law overview- Technical and scientific co-operation. National substantive law: overview of the principal judicial means for obtaining reparation for damage resulting from environmental pollution in common law and in civil law. The conflict of laws in the field of environmental liability- Legislative cooperation. The environmental disaster: a mass tort litigation

CT609 Fundamentals of Oilfield Processing

Introduction to Oilfield Processing. Measurement. Instrumentation. Relief systems. Storage. Multiphase flow calculations in pipe lines. Separator design and sizing of flow lines. Pumps and Hydraulic Turbines. Hydrate formation and remedial options. Prime mover for mechanical derive. Hydrocarbon Recovery. Utilities in upstream processing. Dehydration and hydrocarbon treating. Compressors, Expanders and Refrigerators. Utilities in upstream processing. Dehydration and hydrocarbon treating.

CT610 Logistics

Sea/Nile Ship trading for importing /exporting, harbor, trains, trucks, roads network, fleet management, customs relation

CT611 Cement Plant Instrumentation and Control

Graduates will study the principles and applications of process instruments and introduction to Instrumental analysis-Radiation and Bioradiation-IR, UV, NMR, MS, and electronic microscope (Scanning and transmittance) –electrophoresis –spectrophotometer and HPLC devices

CT612 Cement and Environmental Effect

Description of the cement industry- Pressures on the environment- Resource use- Emissions to air- Discharges to water- Waste production and management- Transport- Pollution incidents and prosecutions- Noise, vibration, odor and aesthetics- Standards of environmental management- Environmental Impacts.

CT613 Fundamentals of Air Pollution Control

Air pollutants. -Effects on human beings and environ. Sources of air Pollutants. Pollutant concentration and emission. Measurements-Chemistry in the atmosphere. Dispersion of pollutants in the atmosphere. Regulations and laws. General Ideas in Air Pollution Control-A Gas control –Incineration-Regional and Global Issues-Global warming. Stratospheric ozone depletion. Acid rain. Long-range transport. Hazardous air pollution. Urban smog-Indoor air pollution.

CT614 Cement Final Product Standards Types and their Usage And Impacts

Cement different types (ASTM, EU and difference in applications considering the ready mix techniques.

CT615 Treatment and Cement Standards

Cement different types (ASTM, EU and difference in applications considering the ready mix techniques ASTM, EU, and ES .Cement final product standards types and their usage and impacts

CT616 Advances in Cement Technology

This course focusing on most important and useful aspects of science and technology of cement. Cement chemistry including mathematical 7modeling, manufacture showing geology of limestone and other raw materials, concrete and other blends, instrumental analysis showing thermoanalytical techniques, and x-rays.

- Kiln and cooler control application
- Multi fuel control application
- Ball mill application
- Roller vertical mill application

CT617 Environmental Chemical Analysis

This course introduces graduates to the field of environmental chemistry and provides a foundation for applications in pollution control and water & wastewater technology. Graduates will study the practical aspects of environmental chemistry, quantitative measurements and analysis of air, water and wastewater. Principles of measurement, instrumentation and analysis are emphasized using an application-oriented approach.

CT618 Energy Conservation Management

Energy consumption is at an all-time high, and it is uncertain how high energy costs will go. This module will teach graduates energy conservation efforts and innovative programs to help people, including businesses, get in the habit of using energy more efficiently, thereby saving money, energy and the environment.

CT619 Cement Plant Layout and Utilities

Full review of the plant layout (machinery, handling, wind direction,…) and considering the utilities Compressed air, water system, water quality, mechanical cooling systems, water conditioning towers.