

SDG6

Water Management

Centre of excellence in water research in cooperation with 5 egyptian universities and 5 US universities funded from USAID

Beni-Suef university is the co-chair for the sustainability phase

<http://box5924.temp.domains/~egyptcoe/sustainabilty/>

كلية علوم الارض تفوز بمشروعين بحثيين بتمويل قدره 80 الف جنيه

http://www.bsu.edu.eg/News.aspx?NID=61019&cat_id=1

رئيس جامعة بني سويف: فوز الجامعة بتمويل مشروع قدره مليون وستمائة وخمسين ألف جنيه من وزارة التعليم العالي

http://www.bsu.edu.eg/News.aspx?NID=60037&cat_id=1

رئيس جامعة بنى سويف: تمويل مشروع بحثي فى مجال معالجة المياه من أكاديمية البحث العلمي والتكنولوجيا

http://www.bsu.edu.eg/News.aspx?NID=60088&cat_id=1

رئيس جامعة بنى سويف فى زيارة لمشروع معالجة مياه الصرف الصحي بقرية البساتين بصحة المحافظ والوفد الأمريكى

http://www.bsu.edu.eg/News.aspx?NID=59742&cat_id=1

جامعة بنى سويف تنفرد بتقديم مشروع بحثى متميز عن استخدام الخامات المصرية بدلاً من المستوردة فى مجال معالجة المياه

http://www.bsu.edu.eg/News.aspx?NID=56504&cat_id=1

رئيس جامعة بنى سويف : خطة لتوعية الطلاب بترشيد استهلاك المياه

http://www.bsu.edu.eg/News.aspx?NID=49313&cat_id=1

جامعة بنى سويف تطلق مبادرة " البيئة الخضراء" عن كيفية ترشيد المياه والمحافظة على البيئة

http://www.bsu.edu.eg/News.aspx?NID=60336&cat_id=1

رئيس جامعة بنى سويف: ورش عمل عن استخدام تحلية المياه فى
الاعراض الزراعية

http://www.bsu.edu.eg/News.aspx?NID=48763&cat_id=1

<https://www.elfagr.com/3095202>

<https://cutt.ly/Se4Xqzk>

<https://www.elbalad.news/3388882>

<https://www.elwatannews.com/news/details/3725821>

الأهداف الذهبية لقسم جيولوجيا المياه والبيئة – كلية علوم الارض

http://www.earthsc.bsu.edu.eg/Content.aspx?side_id=1612&cat_id=50

المشروعات الحالية لقسم جيولوجيا المياه والبيئة – كلية علوم الارض

http://www.earthsc.bsu.edu.eg/Content.aspx?side_id=1615&cat_id=50

مشروعات قسم علوم البيئة والتنمية الصناعية

http://www.psas.bsu.edu.eg/Content.aspx?section_id=420&cat_id=18

الابحاث لقسم علوم البيئة والتنمية الصناعية كلية الدراسات العليا للعلوم
المتقدمة

http://www.psas.bsu.edu.eg/Content.aspx?section_id=5780&cat_id=18

اللوائح الدراسية والمقررات الدراسية لقسم علوم البيئة والتنمية الصناعية

http://www.psas.bsu.edu.eg/Content.aspx?section_id=9278&cat_id=141



دبلوم كيمياء وتكنولوجيا صناعة الأسمنت Diploma of Cement Chemistry and Technology

تم تصميم برنامج دبلوم كيمياء وتكنولوجيا صناعة الأسمنت بشكل يفيد الطالب بوسائل المعرفة المتطورة ومهارات الابتكار و التصميم الفكري مما سيكون له عائد مباشر وغير مباشر على صناعة الأسمنت والبيئة في مصر والشرق الأوسط. كما يهدف البرنامج لدعم التحديث والخبرات المطلوبة لفرص عمل في مجالات واسعة بما فيها صناعة الأسمنت والتنمية البيئية.

الأهداف ومخرجات التعلم المقصودة:

1. أن يصبح الخريج ملماً بالمعارف والمفاهيم العلمية والعملية الأساسية الخاصة بصناعة الأسمنت والتنمية البيئية.
2. أن يكون الخريج قادراً على التعامل مع تقنيات صناعة الأسمنت واستخدام الأجهزة الخاصة لهذا الغرض.
3. أن يقدم خريجاً قادراً على التميز في سوق العمل وبخاصة في مجال كيمياء وتكنولوجيا صناعة الأسمنت والمراكز المهتمه بذلك.
4. ترسيخ قواعد الممارسات الامنة داخل المعامل والإهتمام بالصحة والسلامة المهنية.
5. تأهيل كفاءات قيادية، فنية وأكاديمية، في مجال الصناعة تسهم في نشر الوعي البيئي بين أفراد المجتمع.
6. تطبيق أساليب ادارة الجودة الشاملة فى التصنيع والانتاج لصناعة الاسمنت.
7. تأهيل الدارسين المتميزين بالمضي قدما في مجال البحث العلمي والحصول على الشهادات العليا في هذا المجال.
8. أن يتمتع الخريج بالقيم والمعتقدات التي تتناسب مع أخلاقيات مجتمعنا العربى و متمشياً مع قوانينه النافذة.



Program 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					
CT501	Environmental Impact Assessment of Cement Industrial	تقييم الأثر البيئي لصناعة الاسمنت	2	2	0	2	100
CT502	Health, Safety & Environmental Management	الصحة والسلامة و الإدارة البيئية	2	2	0	2	100
CT503	Fundamentals of Air Pollution Control	أساسيات التحكم في تلوث الهواء	3	2	1	2	150
CT504	Instrumental Analysis	تحليل أجهزة	3	2	1	2	100
CT505	Kiln Process Operation and Control	التشغيل والتحكم فى الفرن	2	2	0	2	100
CT506	Chemistry and Production of Cement	كيمياء وانتاج الاسمنت	1	1	0	1	50
CT507	Industrial waste	مخلفات صناعية	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					
CT511	Cement Plant Instrumentation and control	أجهزة وتحكم مصنع الأسمنت	1	1	0	1	50
CT512	Cement and Environmental effect	الاسمنت و الأثر البيئي	3	2	1	2	1500
CT513	Dedusting Equipment and cement standards	أجهزة إزالة الغبار و معايير الاسمنت	1	1	0	1	50
CT514	Environmental Legislative Framework and Methods of Enforcement	الإطار التشريعي البيئي وطرق تنفيذ	1	1	0	1	50



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CT515	Mining, Mineral Processing and Cement	المعادن تعدين ومعالجة والاسمنت	2	2	0	2	100
CT516	Principles of Environmental Risk Management	اساسيات إدارة المخاطر البيئية	2	2	0	2	100

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					
CT508	Civil Liability in Relation to Environmental Pollution	المسؤولية المدنية الخاصة بالتلوث البيئي	2	2	0	2	100
CT509	Environmental civil engineering	الهندسة المدنية البيئية	2	2	0	2	100
CT510	Economic of cement	اقتصاد الاسمنت	2	2	0	2	100
CT517	Energy conservation management	إدارة توفير الطاقة	2	2	0	2	100
CT518	Monitoring and operation of wastewater treatment	رصد وعملية معالجة مياه الصرف	2	2	0	2	100

For graduation you should complete total credit hours = 28

[Compulsory Courses (24 credit hours) + Elective Courses (4 credit hours)]



Course Specifications

CT501 Environmental Impact Assessment of Cement Industrial

The EIA process should proceed through a number of steps:

- Description of the project: What type of projects, its size, components, and processes expected, all stages of implementation?
- Screening: is an EIA required?
- Scoping, or identification of potential environmental impacts: What has to be covered in the formal EIA and in what detail?
- Baseline: What are the existing environmental conditions? - Prediction: What environmental impacts will the project have? - Evaluation: How will these impacts affect people and resources, and how significant are the resulting effects?
- Mitigation: Can significant negative effects be avoided or made acceptable? Can benefits be enhanced?

CT502 Health, Safety & Environmental Management

Criteria for evaluating the significance of impacts, Health, Safety & Environmental Management, and their effects should be set in advance. They should be based on local standards wherever possible. Where these are not available, acceptable international standards should be used (e.g. WHO, US EPA, etc. guidelines).

CT503 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 better process design-After-treatment processes - Alternative approaches - Control mechanisms. Size distributions - Wall collection devices - Dividing collection



devices - 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.

CT504 Instrumental Analysis

Introduction to Instrumental analysis-Radiation and Bioradiation-IR, UV, NMR, MS, and electronic microscope (Scanning and transmittance) –electrophoresis –spectrophotometer and HPLC devices

CT505 Kiln Process Operation and Control

The Course contents: 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 NO_x and SO_x from cement kilns. New emission standards, Starting, and Stopping the kiln.

CT506 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.



CT507 Industrial waste

The aim of the course is to study wastes from industries, characterization of waste stream, management of industrial wastewater, source reduction, treatment and disposal of solid wastes, methods for treating air discharges and the technologies for waste treatment. Provide the student with the skills required for management of industrial waste.

CT508 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.

CT509 Environmental civil engineering

Structural: Bridges roads towers power pylons-Transportation: Roads traffic control airports-Water: Dams pipelines purification works reservoirs-Geotechnical: Foundations excavations and fills-Urban: Municipal services development and maintenance of towns - recreational facilities-Construction: Construction management-Environmental: Impact studies social and natural environments harmonising affected elements and resources.

CT510 Economic of Cement

Feasibility studies, cash flow, balance sheet, return on investment, decision making, opportunity cost, interest rate to review the future money value, currency exchange

CT511 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



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electronic microscope (Scanning and transmittance) –electrophoresis –spectrophotometer and HPLC devices. Software control, control room operation, auto pilot (expert optimizer, other simulation programs) flow meters, weight feeders calibration, belt scales.

CT512 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.

CT513Dedusting Equipment and Cement Standards

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. Cement standards according to (Egyptian standards 1-4756/2007).

CT514 Environmental Legislative Framework and Methods of Enforcement

Principles of health and safety management. Loss causation and incident investigation. Identifying hazards. Assessing and evaluating risk. Risk control and emergency planning. Organizational factors. Human factors. Principles of health and safety law. Criminal law. Civil law. Measuring health and safety performance. General aspects of occupational health and hygiene. Principles of toxicology and epidemiology. Evaluating risk from chemical agents. Preventive and protective measures concerning hazardous substances.



CT515 Mining, Mineral Processing and Cement

Mine-Wide Optimization: Extraction ,Transportation and Conveyance, -Crushing and grinding, -Different quarries with simple geological basis knowledge and quarry managements

CT516 Principles of Environmental Risk Management

Concepts and principles underpinning Environmental Risk Assessment and Management, including aspects such as Hazard, Harm, Risk, Pollution, etc., in the context of the principles of Sustainability.-Understanding what ‘a risk-averse and cautious approach’ entails-Tools and Guidelines for Risk Assessment-Multi-Criteria Decision Making and Risk Management Planning-Practical Case Study – Risk Assessment for Mine Closure-Risk assessment provides a systematic procedure for predicting potential risks to human health or the environment.

CT517 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.

CT518 Monitoring and Operation of Wastewater Treatment

Wastewater treatment techniques, monitoring and operation of wastewater treatment systems, and the code of practice relevant to sewerage and sewage treatment. The design of sewer collection systems will also be covered in detail. Emerging technologies in water reclamation and water recycling will be emphasized in this module.



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دبلوم العلوم البيئية والتنمية الصناعية
Diploma of Environmental Science and Industrial Development

دبلومة الدراسات البيئية والتنمية الصناعية هي دبلومة مصممة لتحقيق المعرفه البيئية المطلوبه للعاملين بمجالات مختلفه. الدبلومه تتكون من عدة محتويات مختلفه لتغطية المعرفة المطلوبه فى مجال البيئه. الدبلومه تمنح الدارسين البيئه التنافسيه العاليه ما بين محتويات دراسيه متنوعه و مهارات عمليه مختلفه لتخريج دارس ذو خلفيه جيده فى مجال البيئه وتطبيقاتها سواء الطبيعيه او التكنولوجيه فى مجال الصناعه.

الأهداف ومخرجات التعلم المقصودة:

1. جذب أصحاب التخصصات المختلفه الى تنميه المعرفه البيئيه.
2. تأهيل الدارسين بالمعلومات الاساسيه والمهارات المطلوبه فى مجال علوم البيئه وتطبيقاتها.
3. تغطيه عدة جوانب مختلفه لتتطابق مع الخلفيه العلميه للدارسين.
4. تأهيل الدارس لتطبيق ما تعلمه من علوم البيئه فى مجال عمله.
5. تأهيل الدارسين الى دراسات أكثر تخصصا فى مجالات علوم البيئه المختلفه.



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Program 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					
EN501	Environmental chemistry and analysis	التحليل الكيمياءى والبيئى	3	2	1	2	150
EN502	Ecology	علم البيئة	3	2	1	2	150
EN503	Fundamentals of Air Pollution Control	أساسيات التحكم فى تلوث الهواء	3	2	1	2	150
EN504	Environmental Economics	اقتصاد بيئى	1	1	0	1	50
EN505	Clean Water Technology	تكنولوجيا المياه النظيفة	1	1	0	1	50
EN506	Solid and Hazardous Waste Management	ادارة المخلفات الصلبة والخطرة	2	2	0	2	100
EN507	Plant design	تصميم مصنع	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					
EN511	Water Reclamation Technology	تكنولوجيا تجميع المياه	1	1	0	1	50
EN512	Environmental Legislative Framework and Methods of Enforcement	أساسيات التشريعات البيئية وطرق العقوبات	1	1	0	1	50
EN513	Workplace safety and health	السلامة و الصحة المهنية	1	1	0	1	50
EN514	Fundamentals of Oilfield Processing	أساسيات تجهيز حقول النفط	2	2	0	2	100
EN515	Environmental management system	نظام الادارة البيئية	1	1	0	1	50
EN516	Industrial wastewater technology	تكنولوجيا مياه الصرف الصناعى	1	1	0	1	50



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EN517	Practical environmental analysis	مقرر عملى تحليل بيئى	3	2	1	2	150
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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					
EN508	Membrane science and technology	علوم وتكنولوجيا الأغشية	2	2	0	2	100
EN509	Basic hydraulic	الهيدروليكية الأساسية	2	2	0	2	100
EN510	Risk Management	ادارة المخاطر	2	2	0	2	100
EN518	Basics of Nano technology	أساسيات علم النانو	2	2	0	2	100
EN519	Energy conservation management	ادارة الحفاظ على الطاقة	2	2	0	2	100
EN520	Process instrumentation and control	الاجهزة العملية والتحكم	2	2	0	2	100

For graduation you should complete total credit hours = 28

[Compulsory Courses (24 credit hours) + Elective Courses (4 credit hours)]



Course Specifications

EN501 Environmental Chemistry and 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.

EN502 Ecology

Ecology is the study of living things in their natural environment. This module focuses on the significance and function of natural ecosystems, and how humans have affected these systems over time. It concentrates on the interaction between human activities, resources, and the environment. As the human population grows and technology advances, pressures on earth's natural systems are becoming increasingly intense and complex. This module aims to promote greater environmental awareness and nurture social responsibility towards the environment.

EN503 Fundamentals of Air Pollution Control

Introduction to air pollution. Chemistry of air pollution. Effects of air pollution. Air pollutants from industrial processes. Transport of air pollutants. Indoor air pollution. Air pollution measurements and analytical techniques. Air pollution laws and regulations, and the emission standards. Air pollutant concentration models. Air pollution control. Future of air pollution.

EN504 Environmental Economics

This course aims at equipping students with economic methods and tools to analyze basic environmental issues while strengthening group work skills. This course combines theoretical analysis with discussions on specific environmental policies as applied to water,



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air pollution, energy, climate change, and human health issues. Within these examples, particular topics that will be covered are the concepts of sustainability, microeconomic analysis of environmental regulation, the problem of social cost, policy instrument choice, and estimating costs and benefits of environmental improvements via revealed preferences (hedonic analysis, travel cost method, household production) or stated preferences.

EN505 Clean Water Technology

This module introduces the processes for treating raw water from various surface water sources to produce potable water. Graduates will study raw water quality parameters, treatment techniques, and the monitoring and operation of water treatment systems. The focus is on conventional water treatment technologies emphasizing on chemical coagulation and flocculation processes for removal of suspended and colloidal solids in raw water. Topics covered include pre-treatment of raw water, sedimentation, coagulation, flocculation, filtration, and disinfection techniques.

EN506 Solid and Hazardous Waste Management

Graduates will examine how solid and hazardous waste is generated; the pollution problems related to waste disposal; and methods of collection, handling, treatment, and disposal of waste. Concepts of waste minimization such as recycling, reusing, reducing, and waste exchange will be highlighted as effective tools in waste management. Issues in biomedical waste generation, collection, and treatment will be addressed. Local legislation for solid and hazardous waste will be explained in relation to the overall waste management practice.

EN507 Plant Design

A study of the engineering aspects involved in the development of an industrial plant. Capital and manufacturing cost estimates. Safety in design. Feasibility survey. Equipment design and specification. Plant layout and location. Students will work in small groups to produce a process design and economic evaluation of a complete industrial plant. The



students will learn:

- Plant layout fundamentals and work flow procedures
- Terminology and symbols used in plant layout
- Fundamental principles of chemical process technology
- Process flow diagrams (PFDs)
- Equipment used in process plants
- Instrument symbols and abbreviations
- Piping and instrumentation diagrams (P&IDs)
- Piping design and engineering principles
- Terminology, symbols and abbreviations used in piping design
- Piping specifications and piping codes
- Components of piping systems - fittings, flanges and valves
- Piping isometrics and bill of materials.

EN508 Membrane Science and Technology

This module aims to equip graduates with fundamental knowledge of membrane science and membrane applications in environmental engineering. Topics covered in this module include the types of membranes and membrane modules, the basic principles of membrane fabrication, general theory of membrane transport, membrane separation process, membrane fouling, liquid membranes, and facilitated transport. Membrane applications in water reclamation recycling and reuse will also be covered.

EN509 Basic Hydraulic

Graduates will examine the basic hydraulic principles and fundamental concepts that are essential for the study of water and wastewater technologies. Topics covered include the properties of fluid, manometry, hydrostatics, and fundamental principles of fluid flow. Head loss in pipeline, design of pipeline, flow measurements, and pipe network analysis will also be covered. Graduates will also learn about open channel flow and the design of surface water drainage system.



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EN510 Risk Management

What is risk management? Why accidents occur. How to avoid accidents. The consequences. Personnel health and safety. Process safety analysis. Loss prevention. Process safety in design and operations. Defining and quantifying risk. Checklists. Hazard and operability analysis (HAZOP) studies. Hazard analysis (HAZAN) techniques. Human factors. Linking HAZOP, process control, instrumentation and alarm systems. Cost of plant safety. Environmental impact. Case studies of serious plant accidents.

EN511 Water Reclamation Technology

Graduates will explore the fundamentals of collection systems for wastewater from domestic premises, wastewater treatment techniques, monitoring and operation of wastewater treatment systems, and the code of practice relevant to sewerage and sewage treatment. The design of sewer collection systems will also be covered in detail. Emerging technologies in water reclamation and water recycling will be emphasized in this module

EN512 Environmental Legislative Framework and Methods of Enforcement

Structural: Bridges roads towers power pylons -Transportation: Roads traffic control airports -Water: Dams pipelines purification works reservoirs -Geotechnical: Foundations excavations and fills-Urban: Municipal services development and maintenance of towns -recreational facilities -Construction: Construction management-Environmental: Impact studies social and natural environments harmonising affected elements and resources.

EN513 Workplace Safety and Health

This module focuses on the study of various aspects that are critical to the provision of a safe working environment. Topics covered include toxicology, clean air and ventilation, control of temperature and humidity, industrial hygiene and industrial diseases.



EN514 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 drive. Hydrocarbon Recovery. Utilities in upstream processing. Dehydration and hydrocarbon treating. Compressors, Expanders and Refrigerators. Utilities in upstream processing. Dehydration and hydrocarbon treating.

EN515 Environmental Management System

In this course, graduates will learn the application of concepts and principles in environmental management. Topics covered include the fundamentals of environmental impact assessment (EIA), environmental baseline studies (EBS), risk assessment, environmental management systems (EMS), ISO 14001, OSHA 18001 and environmental auditing.

EN516 Industrial Wastewater Technology

Different industrial processes result in unique type and characteristics of industrial wastewater. Considering specific pollutants and toxic substances, treatment methodology applicable for conventional domestic wastewater is not all together applicable for industrial wastewater. This module introduces graduates to specific industrial wastewater problems and addresses possible unit processes applicable to industrial wastewater treatment. These unit processes, along with conventional water pollution treatment techniques, can then be applied as a complete treatment flow for different industrial wastewater types. The module will cover basic physical, chemical, and biological treatment technologies and also highlight specific industrial wastewater treatment methods and anaerobic treatment applications.

EN517 Practical environmental analysis



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قسم علوم البيئة و التنمية الصناعية

- Classical analysis
- Water analysis
- Cement analysis
- Instrumental analysis

EN518 Basics of Nano technology

Introduction to nanoscience – definition of nanomaterials and nanoscale – preparation methods – characterization and application.

EN519 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.

EN520 Process instrumentation and control

Graduates will study the principles and applications of process instruments and the fundamentals of automatic process 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.



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ماجستير العلوم في العلوم البيئية والتنمية الصناعية Master of Science in Environmental Science and Industrial Development

ماجستير الدراسات البيئية والتنمية الصناعية هو برنامج يتكون من محتويات دراسية متعددة ومختلفة بالإضافة الى بحث متخصص فى احدى مجالات البيئه. الماجستير يقوم على التناغم بين العلوم البيئية المختلفه لتخدم الدراسين فى تقديم حلول مبتكرة لمشاكل البيئه وعلاقتها بالمجتمع, الصناعه, الاقتصاد والتنمية الشامله .

الأهداف ومخرجات التعلم المقصودة:

1. إمداد الباحث بمعرفه متخصصه فى مجالات البيئه
2. تجهيز الباحثين بالمهارات البحثيه والتطبيقيه والتحليليه المختلفه لإجراء البحوث فى مجالات البيئه
3. جذب المتخصصين فى مجالات البيئه الى تقديم أبحاث نافعه للمجتمع
4. تقديم رسالات بحثيه عاليه الجوده من خلال اشراف دقيق وعملى على أعلى المستويات
5. خدمة المجتمعات الصناعيه خاصه و الحضريه وغيرها من خلال تقديم حلول للمشاكل اللتى تضر البيئه بها
6. خدمة المجتمعات والحكومات والجهات المختلفه بالمشاركه فى تحقيق التنمية الشامله
7. جذب أصحاب التخصصات المختلفه الى تنميه المعرفة.

تكون الدراسة علي مرحلتين

المرحلة الاولى: دراسة نظرية لمدته عام أكاديمي Pre-master courses
المرحلة 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					
EN601	Principles of Environmental Risk Management	أساسيات ادارة المخاطر البيئية	2	2	0	2	100
EN602	Environmental law and legislatives	القوانين والتشريعات البيئية	1	1	0	1	50
EN603	Fundamentals of Air Pollution Control	أساسيات التحكم فى تلوث الهواء	2	2	0	2	100
EN604	Ecology	علم البيئة	2	2	0	2	100
EN605	Instrumental Analysis	التحليل الآلى	1	1	0	1	50
EN606	Environmental civil engineering	الهندسة المدنية البيئية	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					
EN611	Monitoring and operation of wastewater treatment	رصد وتشغيل عملية معالجة مياه الصرف	1	1	0	1	50
EN612	Cement and Environmental effect	الاسمنت والتأثير البيئى	2	2	0	2	100
EN613	Fundamentals of Oilfield Processing	أساسيات تجهيز حقول البترول	2	2	0	2	100
EN614	Environmental Chemical Analysis	التحليل الكيمياءى البيئى	1	1	0	1	50
EN615	Environmental management system	نظام الادارة البيئية	1	1	0	1	50
EN616	Industrial biotechnology	علم التقنيه الحيويه الصناعية	2	2	0	2	100



EN617	Solids and hazardous waste management	ادارة المخلفات الصلبة والخطرة	2	2	0	2	100
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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					
EN608	Membrane science and technology	علوم وتكنولوجيا الاغشية	2	2	0	2	100
EN609	Basic hydraulic	الهيدروليكا الاساسية	2	2	0	2	100
EN610	Petroleum Processing	تكرير البترول	2	2	0	2	100
EN618	Fundamental of Nano science	أساسيات علم النانو	2	2	0	2	100
EN619	Environmental statistics	الاحصاءات البيئية	2	2	0	2	100
EN620	Energy conservation management	ادارة الحفاظ على الطاقة	2	2	0	2	100
EN621	Process instrumentation and control	الاجهزة العملية و التحكم	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

EN601 Principles of Environmental Risk Management

Concepts and principles underpinning Environmental Risk Assessment and Management, including aspects such as Hazard, Harm, Risk, Pollution, etc., in the context of the principles of Sustainability.-Understanding what ‘a risk-averse and cautious approach’ entails-Tools and Guidelines for Risk Assessment-Multi-Criteria Decision Making and Risk Management Planning-Practical Case Study – Risk Assessment for Mine Closure-Risk assessment provides a systematic procedure for predicting potential risks to human health or the environment. The aim of a chemical risk assessment is to investigate if a chemical is being used or can be used as intended without causing detrimental effects to human health.

EN602 Environmental law and legislative

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.

EN603 Fundamentals of Air Pollution Control

Air pollutants. - Effects on human’s 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 better process design- After-treatment processes- Alternative approaches- Control mechanisms. Size Distributions -Wall collection devices- Dividing collection devices- Gas control – Incineration- Regional and Global Issues- Global



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warming- Stratospheric ozone depletion. Acid rain. - Long-range transport- Hazardous air pollution- Urban smog- Indoor air pollution.

EN604 Ecology

This module introduces graduates to the field of environmental microbiology, parasitology and epidemiology, and provides a foundation for further studies and applications in water & wastewater treatment, environmental health and environmental management. Graduates will also be taught selected topics on human biology and food-borne diseases.

EN605 Instrumental Analysis

Introduction to Instrumental analysis-Radiation and Bioradiation-IR, UV, NMR, MS, and electronic microscope (Scanning and transmittance) –electrophoresis –spectrophotometer and HPLC devices.

EN606 Environmental Civil Engineering

Structural: Bridges roads towers power pylons -Transportation: Roads traffic control airports -Water: Dams pipelines purification works reservoirs -Geotechnical: Foundations excavations and fills-Urban: Municipal services development and maintenance of towns - recreational facilities -Construction: Construction management-Environmental: Impact studies social and natural environments harmonising affected elements and resources.

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.

EN608 Membrane Science and Technology

This module aims to equip graduates with fundamental knowledge of membrane science and membrane applications in environmental engineering. Topics covered in this module



include the types of membranes and membrane modules, the basic principles of membrane fabrication, general theory of membrane transport, membrane separation process, membrane fouling, liquid membranes, and facilitated transport. Membrane applications in water reclamation recycling and reuse will also be covered.

EN609 Basic Hydraulic

Graduates will examine the basic hydraulic principles and fundamental concepts that are essential for the study of water and wastewater technologies. Topics covered include the properties of fluid, manometry, hydrostatics and fundamental principles of fluid flow. Head loss in pipeline, design of pipeline, flow measurements and pipe network analysis will also be covered. Graduates will also learn about open channel flow and the design of surface water drainage system.

EN610 Petroleum Processing

Formation of petroleum. Exploration and identification of petroleum-bearing structures and their evaluation. Drilling operations and their control. Design, operation and control of production wells. Technologies for enhancing oil production from existing wells. Testing and evaluation of reservoirs. Reservoir management.

EN611 Monitoring and Operation of Wastewater Treatment

Wastewater treatment techniques, monitoring and operation of wastewater treatment systems, and the code of practice relevant to sewerage and sewage treatment. The design of sewer collection systems will also be covered in detail. Emerging technologies in water reclamation and water recycling will be emphasized in this module

EN612 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.

EN613 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 drive. Hydrocarbon Recovery. Utilities in upstream processing. Dehydration and hydrocarbon treating. Compressors, Expanders and Refrigerators. Utilities in upstream processing. Dehydration and hydrocarbon treating.

EN614 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.

EN615 Environmental Management System

In this course, graduates will learn the application of concepts and principles in environmental management. Topics covered include the fundamentals of environmental impact assessment (EIA), environmental baseline studies (EBS), risk assessment, environmental management systems (EMS), ISO 14001, OSHA 18001 and environmental auditing.

EN616 Industrial Biotechnology

The influence and application of biotechnology in aspects relating to the environment. Graduates will study five major areas: treatment of waste, treatment of already polluted sites and waterways, prevention of pollution, monitoring of pollution, and



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biotechnological innovations in environmental management.

EN618 Basics of Nanoscience

Introduction to nanoscience – definition of nanomaterials and nanoscale – preparation methods – characterization and application

EN619 Environmental Statistics

Applications of statistics in environmental pollution studies involving air, water, or soil monitoring; sampling designs; trend analysis; censored data. Proper sampling design and collection, analysis, and presentation of environmental data will lead to defensible interpretation and conclusions for any environmentally-based problem.

EN620 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.

EN621 Process Instrumentation and Control

Graduates will study the principles and applications of process instruments and the fundamentals of automatic process 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.