



جامعة حائل
University of Ha'il

Program Handbook & Student Manual

Executive Master's in Facilities Engineering & Management Program

2023



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Overview



College

College of Engineering



Department

Department of Architectural Engineering



Location – male

College of Engineering – Building B14 – University Main Campus



Location – Female



Language of study

English language



Type of study

Regular (during the weekend)



Required grade

(good) at least, provided that the student's average is not less than (very good) in the specialization courses for the bachelor's stage.



Program Entry Requirements

Bachelor's degree in engineering, management, health administration, or related disciplines.

Pass the English Language Test (IELTS) with a minimum average of (5) or equivalent approved tests.

Any other conditions approved by the department.



Duration of study

Two Years - Four academic semesters



Fees

65.000 SR

Introduction

Facilities engineering and management is a recent, multidisciplinary field of study that oversees the coordination of activities among buildings, personnel, infrastructure, and energy services with the objective of optimizing facility operation and maintenance. This, in turn, enables the extension of the facilities' lifespan. As a result of the labor market's demand for specialized cadres capable of keeping up with the swift technological advancements in facilities engineering and management within the Kingdom of Saudi Arabia, the University of Hail has endeavored to establish an executive master's degree in the field of facilities engineering and management. The program has been developed with the explicit purpose of fulfilling these criteria through the development of specialized core competencies. As a result, the courses were developed in accordance with Saudi Vision 2030 and national and international standards.

Vision

Leadership and scientific excellence locally and regionally in the field of facilities engineering and management.

Mission

Qualify leaders in facilities engineering and management using cutting-edge technologies and practices; conduct related research activities to the highest possible standards; and use this knowledge to benefit the community while ensuring excellence in facilities.

Objectives

- Prepare qualified graduates with advanced skills in facility engineering and management applications.
- Provide research activities in the field of facility engineering that are in line with contemporary developments.
- Ensure excellence in managing facilities that serve the community.
- Commitment to ethical principles and values concerning national and international standards and regulations.

Graduate Attributes

The graduates of the program will have the following attributes:

- Utilize facility engineering-related technical expertise and competencies to identify and implement suitable solutions for challenges encountered in the professional field.
- Diagnose, formulate, and solve issues related to facility engineering.
- Work within the framework of a team that includes different specializations.
- Demonstrate knowledge of professional obligations and ethical standards.
- Realize the economic, environmental, and social significance of engineering solutions.
- Acquire knowledge of the most recent advancements in facility engineering and management.

Rules and Guidelines

Admission Requirement

The students must satisfy the undermentioned conditions to be admitted into the Master in Facilities Engineering and Management program:

- The applicant must be a Saudi or a regular resident if he is a non-Saudi.
- The applicant must have obtained a university degree from a Saudi university or another accredited university from the Higher Ministry of Education.
- The applicant must have good conduct and be medically fit.
- The applicant should present two scientific recommendations from his professors who previously taught him.
- The applicant has a grade of at least very good. The Council of the Deanship of Graduate Studies may accept those with a high good rating, provided that the student's average is not less than (very good) in the specialization courses for the bachelor's level.
- For admission to the master's degree, applicants must pass the General Ability Test with not less than 65 points.
- To pass the admission test prepared by the department.

- Studying supplementary courses for non-university graduates if the department deems them necessary for the applicant. This is a supplementary year, and the conditions are applied to it according to what is stated in the unified regulations for graduate studies.
- Any other conditions approved by the department.

Evaluating Student Performance

The evaluation and assessment processes differ according to the course objectives. Instructors are required to clearly explain the assessment and grading policy of their courses at the first meeting with students. During the first week of every term, instructors provide students with a syllabus for the course which serves as a work plan for the course. The syllabus includes how the instructor will compute the course grade. Courses culminate with a final exam which is held at the end of each term.

As per UOH academic rules and regulations, final exams should not count for more than 40% of the course grade and at least two other tests and/or graded projects should account for the remaining percentage of the course grade. Course projects, when applicable, are also a measurement of assessment that counts toward the final assessment.

Final examinations are usually arranged during the final week of each term. Students who fail to attend a minimum of 75% of their classes are automatically awarded a "DN" (Denial) grade and not allowed to take the final exam. This is subsequent upon two written warnings for their absences.

The student's performance is determined through the process of assignment of academic status. A student's academic status is determined at the end of each term and appears on the transcript that shows his achievements throughout his study.

The Grade Point Average (GPA) is computed based on a scale of 4.0. Table 1 shows the grading system that is used in all the programs of the College of Engineering.

Table 1: Grades earned by students in each course

Range of Marks	Grade	Grade code	GPA (out of 4.0)
95 – 100	Exceptional	A+	4.00
90 – 94	Excellent	A	3.75
85 – 89	Superior	B+	3.50
80 – 84	Very Good	B	3.00
75 – 79	Above Average	C+	2.50
70 – 74	Good	C	2.00
65 – 69	High Pass	D+	1.50
60 – 64	Pass	D	1.00
Less than 60	Fail	F	0.00

Upon the instructor's recommendation, the council of the department, which teach the course, may allow the student to complete the requirements of any courses during the next term. The grade "IC" will be recorded for the student in the academic record. "IC" grades are not included in the calculation of the term and cumulative GPA until the student obtains his final grade in the course by completing all the requirements. If no change has been made in the "IC" grade after the lapse of one term, the "IC" will be changed to an "F" grade.

If any course of a research nature requires more than one term for its completion, the student will be assigned an "IP" grade, and after the completion of the course, the student will be given the grade he has earned. However, if he fails to complete the course on time, the Department Council offering the course may approve the assignment of an "IC" grade for this course in his record.

"F" grade if the student fails the Cooperative Program.

The banner system automatically checks status and guides the student's registration according to his program's curriculum. By the end of each term, the student's transcript is automatically updated by the banner system. Before the beginning of each term, the banner system allows students to register courses via the internet on the University website.

Study Plan

Core Courses

Code	Term 1	Credits	Contacts
FEM 511	Building Engineering Systems	3	3
FEM 512	Risk Analysis & Management	3	3
FEM 513	Project Quality Management	3	3
FEM 514	Energy Efficiency & Sustainable Systems	3	3
	Term 2		
FEM 521	Smart Building Materials & Technologies	3	3
FEM 522	Building Defects & Maintenance	3	3
FEM 523	Real Estate Development	3	3
FEM 524	Facilities Planning & Design	3	3
	Term 3		
FEM 531	Facilities Operations & Maintenance	3	3
FEM 532	Computer Application to Facility Management	3	3
FEM 533	Research Methods & Statistics	3	3
FEM 53X	Elective Course	3	3
	Term 4		
FEM 600	Research Project	6	6
TOTAL CREDITS		42	

Academic Terms: 04

Total Credits: 42

Courses: 36

Research Project: 6

Elective Courses

Code	Course Name	Credits	Contacts
FEM 534	Healthcare Facilities Management	3	3
FEM 535	Transportation Asset Management	3	3
FEM 536	Industrial Facilities Management	3	3
FEM 537	Tourism Facilities Management	3	3
FEM 538	Real Estate Economics	3	3
FEM 539	Sustainable Development Goals	3	3

Program Learning Outcomes

Knowledge and Understanding:

K1	Identify challenges using the fundamentals and principles of facilities engineering and management to validate the operation, maintenance, and facility asset outcomes.
K2	Recognize facility designs that meet the specified needs and demands of stakeholders while considering public health, safety, welfare, social responsibility, environment, sustainability, climate change, and budget, as well as other realistic constraints related to facilities, while complying with relevant standards and codes.

Skills:

S1	Apply critical thinking, analytical techniques, and problem-solving skills to different facility engineering challenges by analyzing and interpreting data to achieve innovative solutions.
S2	Utilize appropriate communication techniques, digital tools, and resources to collaborate effectively in a multidisciplinary setting on all facilities' engineering activities with various stakeholders.
S3	Evaluate the issues and constraints of sustainability, environment, climate change, health, and safety that are relevant to the analysis and design of structures, building systems, and facility components.

S4	Apply project management practices and evaluate legal, contractual, and regulatory requirements to ensure efficient and effective professional service throughout the lifespan of the project.
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Values, Autonomy, and Responsibility:

V1	Demonstrate ethical, professional responsibilities, and commitment to facilities engineering and management practices, following the realistic constraints related to facilities, while complying with relevant standards and codes.
V2	Engage in life-long learning to acquire and implement knowledge and evaluate engineering solutions in societal contexts using collaborative work and suitable learning strategies.

Courses Description

FEM 511: Building Engineering Systems

(3-0-3)

This course provides students with the knowledge of the operating principles of different building engineering and building services systems, such as those found in public buildings, healthcare complexes, commercial and industrial structures, sports, and leisure centers. The course focuses on the function of major building components and systems, including the structure, building envelope, mechanical and electrical systems, thermal and sanitation systems, luminous and acoustic behavior of buildings, fire life safety systems, building automation systems; principles of communication systems; information technology and building internet of things (B-IoT). The course will prepare students to understand how different components and systems work and to be aware of the maintenance issues related to these systems with the adoption of new technology.

FEM 512: Risk Analysis & Management

(3-0-3)

This course is designed to train students to assess, quantify and analyze risk and its elements, and develop plans to manage and reduce it. The course discusses the qualitative risk identification methods and the quantitative risk assessment methods and techniques and introduces the principles of risk modeling. It also explains in a detailed approach the risk management strategy and the process of managing risks, starting by the identification stage, and followed by the initial assessment and the response and mitigation stage. The risk management tools and techniques are

clarified through considering the risk and value management by different implemented case studies related to different Engineering fields. The concept of hazards and how hazards are identified, quantified, and analyzed and the methods of developing safeguards to mitigate them are also examined. By the end of this course, the students will be able to identify areas of potential safety concerns and develop action plans appropriate for augmenting, promoting, and maintaining risk management programs in both new and existing facilities.

FEM 513: Project Quality Management (3-0-3)

This course provides students with the framework, tools, and approaches to meet the quality requirements throughout their project's life cycle. The course examines the development of quality plans, quality techniques and quality outputs and the role that they play in continuous improvement activities. Students will be exposed to qualitative and quantitative management methods to develop a well-reasoned Quality Management Plan as well as Quality Assurance and Quality Control strategies that can be incorporated into projects. Upon completion of this course students will be able to identify and address quality issues in all phases of project management life cycle. The course will be delivered through lectures, case reviews and team projects.

FEM 514: Energy Efficiency & Sustainable Systems (3-0-3)

This course offers a holistic overview of the energy efficiency landscape and the economics of this field. It provides a graduate-

level understanding of the conversion principles and technology behind different sustainable energy systems including passive and active systems. It also examines the issues involved in the integration of various renewable energy sources and their economics for heat, power, and transportation needs. Over the course, students will explore the latest developments and regulations in the energy industry, and investigate energy use in commercial, industrial, and large-scale residential contexts. The class will become familiar with the breadth of energy technology-policy discussion and challenges through development of assessment tools, methods, and perspectives to analyze them. On completion of this course, the students will develop skills with hands-on training on alternative energy technology and have enhanced understanding of opportunities and policy challenges of large-scale adoption and implementation of the sustainable energy technologies.

FEM 521: Smart Building Materials & Technologies (3-0-3)

This course is designed to provide students with a broad knowledge on the smart and innovative materials used in building and construction applications. The range of topics to be covered in this course will include principles of intelligent architecture and structure; smart building technologies; properties and behavior of smart and intelligent materials; green building materials; smart concrete; biomaterials; nanomaterials; nanotechnology for the building envelope; carbon fiber and composite materials; magnetic materials; piezoelectric materials; sensors. Upon completion of

this course, students will acquire a comprehensive understanding of the characteristics and behavior of the various smart materials used in intelligent and sustainable buildings.

FEM 522: Building Defects & Maintenance (3-0-3)

This course provides guidelines for diagnosing building defects and selecting the methods and materials for repair, maintenance, and protection. The aim of the course is to enable students to: evaluate existing buildings with strategies appropriate for maintenance, refurbishment, alterations and additions, conservation, and revitalization according to legal and stakeholders' requirements; examine building obsolescence, diagnose building defects and manage maintenance works; describe the characteristics of buildings repair materials and assess the inter-relationship between design and maintenance with relevant cost studies. After completion of this course, students will be able to diagnose and analyze the causes of building defects and apply appropriate remedial maintenance actions.

FEM 523: Real Estate Development (3-0-3)

The objective of the course is to introduce the concepts and principles of real estate development in the context of sustainable development and to explain the regulatory and legislative aspects and the key processes and strategies involved in facilities development and management. The range of topics to be covered in this course includes an introduction that outlines the concept relating to the real estate sector; the policies and laws of real

estate and related sectors with a focus on the aspects of transactions and investment; the critical aspects related to the development of real estate projects; urban land markets and location theory; exercises and modeling techniques for measuring and predicting property demand; and finally, the asset management. On completion of this course, students will be able to: critically evaluate the property development process and how it is increasingly being shaped by the concept of sustainable development; be able to identify, select and apply appropriate financial appraisal techniques in relation to property development; demonstrate knowledge of and be able to apply a range of funding sources and structures which may be used to support property development; appreciate and understand the context of the different roles, motivations and perspectives of different stakeholders in the development process.

FEM 524: Facilities Planning & Design

(3-0-3)

This course will introduce students to the fundamental principles and methodologies relevant to the strategic planning and design to accommodate change in facilities. The student will acquire knowledge of the following: fundamentals of facilities planning; facilities design; flow, space, and activity relationships; material handling systems; layout planning models; warehouse operations; quantitative facilities planning models; preparing, presenting, implementing, and maintaining facilities plan; managing large scale moves and relocation. Through this course, the student will

develop the skills and knowledge critical to the successful planning and implementing of efficient and effective facilities.

FEM 531: Facilities Operations & Maintenance (3-0-3)

This course covers the principles and techniques of planning, maintaining, and operating different types of facilities to assure the built environment will perform the functions for which the facilities were designed and constructed. Operations and maintenance typically include the day-to-day activities necessary for the built structure, its systems and equipment, and occupants/users to perform their intended functions. Topics include work control methods, facility management plans, building system and equipment maintenance, energy conservation and sustainable practices.

FEM 532: Computer App. to Facility Management (3-0-3)

This course aims to familiarize students with computer methods and tools that help them to better plan, execute, and monitor all activities and systems involved in space and workplace management, asset management, reactive and planned preventative maintenance and operational facility services. On completion of this course, students will be able to deal with the recent advances in Information Communication Technology (ICT) tools and software for planning, developing, maintaining, and managing facilities using the latest computer software.

FEM 533: Research Methods & Statistics (3-0-3)

This course is designed to help graduate students understand what research is, how it is conducted and its place in academic

disciplines. It is primarily oriented towards beginning graduate students working on a master's degree in Facilities Engineering & Management but will provide the tools necessary for students in other disciplines to perform and communicate research effectively. The focus will be on helping students to understand the basic concepts of research as well as the different research paradigms and their implications for doing research. Another focus will be on assisting students in developing the ability to effectively prepare a research proposal and write a research thesis. The course will address the process of defining appropriate research problems, formulating research questions and objectives, techniques for reviewing literature, methods of data collection and analysis, methods for assessing and improving the validity and reliability of data and measures, applying statistical techniques for analyzing research data, guidelines for writing and defending a thesis, and the ethics of scientific research. Delivery methods used in this course will integrate active and experiential activities in the teaching and learning process.

FEM 600: Master's Project

(6-0-6)

The module aims to enable students to develop a capacity to research and report in depth on a subject of relevance to their academic or professional career. This research project develops their problem solving, communication, teamwork, and project management skills in preparation for their work environment.

FEM 534: Healthcare Facilities Management**(3-0-3)**

This course provides foundation in health services management to provide students with the managerial knowledge and skills to organize and operate high performance healthcare facilities. It will prepare students to understand, manage and lead multi-disciplinary teams through the challenging processes of operating, maintaining, and upgrading health facilities, while meeting the high standards and expectations of the health care industry. The course is based on the knowledge of regulations, laws, requirements, and compliance issue involved with different types of health care facilities. The range of topics to be covered in this course includes planning process for healthcare facilities; strategic planning; program planning; equipment planning; facility circulation models; emergency management and sustainability; and master facility planning. Furthermore, students will explore various concepts and theories of leadership and how these might be applied to management functions in health care settings.

FEM 535: Transportation Assets Management**(3-0-3)**

This course introduces students to the strategic and systematic process of operating, maintaining, upgrading, and expanding transportation physical assets effectively throughout their lifecycle. It focuses on business and engineering practices for resource allocation and utilization, with the objective of better and cost-effective investment decisions making to deliver efficient to support transportation infrastructure and system usage

performance measured in economic, social, health, and environmental terms. Through this course, students will be exposed to the recent advances for planning, developing, maintaining, and managing transportation assets, including performance management, prioritization of maintenance strategies, funding & lifecycle planning, information and data analysis, sustainability and asset preservation, network, and project level optimization.

FEM 536: Industrial Facilities Management (3-0-3)

This course focus on the managerial aspects of the following topics for industrial facilities: compliance and standards; fire prevention, protection, and occupational safety; pollution prevention; heating; ventilation; air conditioning; electrical; lighting; plumbing; vertical transportation; raw material storage and waste disposal.

FEM 537: Tourism Facilities Management (3-0-3)

This course provides knowledge and skills in design and management of tourism facilities in relation to their existence, associated costs and environmental concerns. It covers the following: the nature of tourism facilities, types and characteristics of major building systems, architectural heritage, available technology, space allocation, tourism service design, safety and security systems of tourism facilities, application of energy management principles in tourism properties, the responsibilities of the engineering maintenance department, renovation needs of tourism facilities, principles of tourism sustainable applications,

and key managerial aspects of renovations. On completion of this course, the students will be able to apply the basic principles of tourism service design, maintenance, safety, and renovation of tourism facilities.

FEM 538: Real Estate Economics

(3-0-3)

This course applies the latest economic thinking and research to the task of analyzing real estate market fundamentals, forecasting supply and demand, and choosing locations. Building upon the concepts and tools of economic analysis, this course introduces appropriate data sources and techniques useful in analyzing and forecasting real estate demand and supply in different markets for specific property types at specific locations. The course delves into the economies of the real estate market, investment in real property, the construction industry, land use and property values, the growth of urban areas, housing finance & housing policy, models of the housing market, property price indices, real estate crisis management. Upon completion of this course, students will acquire a comprehensive understanding of the economic factors and policies which influence real estate markets.

FEM 539: Sustainable Development Goals

(3-0-3)

This course explores the multi-dimensional concepts and key theories of sustainable development at different geographical scales (local, national, and international). It examines the applications, indicators, measurement tools of sustainable development, as well as pragmatic and practical strategies for

promoting a more sustainable future. The course will also examine the 17 newly minted UN Sustainable Development Goals (SDGs) and their alignment with the Saudi Arabia Vision 2030 and strategies. The course will attempt to provide students with key content knowledge to bridge the science and the practice of the application and enhancement of sustainable development. Case studies and problem-solving exercises will be used to stimulate learning and provide practical experience in addressing sustainable development issues. Upon successful completion of the course, students will be familiar with current and emerging global issues related to Sustainable Development Goals and be cognizant of the key spatial and temporal connections and their integration for successful policy and practice of sustainable development.

Program Faculty

#	Name	Academic Rank	Nationality
1	Prof. Khaled Elkhayat	Professor	Egypt
2	Prof. Mabrouk Touahmia	Professor	Algeria
3	Dr. Ahmed Othman	Associate Prof.	Sudan
4	Dr. Belkacem Achour	Associate Prof.	Algeria
5	Dr. Mustapha Boukendakdji	Associate Prof.	Algeria
6	Dr. Mohamed Ahmed Said	Associate Prof.	Sudan
7	Dr. Emad Noaimi	Associate Prof.	France
8	Dr. Mohamed Abdelhafez	Associate Prof.	Egypt
9	Dr. Abdelhakim Mesloub	Associate Prof.	Algeria
10	Dr. Mohamed Alshenaifi	Assistant Prof.	Saudi Arabia

Learning Resources, Facilities, and Equipment

College of Engineering is in a purpose-built modern building (Building # B14) in the main campus of University of Ha'il. The building is equipped with modern Building Management System for environment control. The new building provides much more space for offices, classrooms, laboratories, and facilities.

Classrooms

All classes are held in the Postgraduate Section located on the second floor of the College of Engineering building. There are six classrooms ranging from a capacity of 25 to 40 students. All classrooms are equipped with a smart projector, screen, whiteboard, and internet connection. All classrooms have control for air-conditioning system.

Computer Laboratory

One computer lab with 25 workstations in the Postgraduate section. The computer lab is equipped with all necessary software applications required by the students like Microsoft Office suite. The lab is also equipped with smart multimedia projector and white board.

Library Services

The central library of UoH is maintained by the Deanship of Library Affairs and is available to all faculty members and students. The central library has wide range of books. In addition to main

University library, College of Engineering has a small library of its own.

Library material in main University Library is shelved in open stacks using the Dewey Decimal Classification Scheme. The library collection is accessible to all faculty members and students during the weekday work hours. Professional librarians are available during the working hours to provide any assistance.

All essential books required by the program are available in the library

Access to Saudi Digital Library (SDL)

All faculty members and students also have access to Saudi Digital Library (SDL) where it provides access to all the major databases like, IFFE Xplore, ACM Digital Library, Science Direct, Springer, Taylor & Francis, Wiley, Oxford etc. and numerous more.

All library digital services are accessible through the personal account of the faculty members as well as the students.

Financial Information

The Master in Facilities Engineering and Management program is a paid Executive program offered over the weekend.

The student is obligated to pay the full program fee (SAR 65,000) to obtain the graduation certificate.

To register a student in the semester, it is required to pay the tuition fees for each semester before its start, as follows:

- First semester: SAR 20,000
- Second semester: SAR 15,000
- Third Semester: SAR 15,000
- Fourth Semester. SAR 15,000

The student must pay additional fees if he does not pass the registered hours or withdraws from a semester.



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