



### ME001- Applied Chiller System Design

#### **Contact**

- 98765392
- 24983523
- 24983474
- ™ tpd.occd@eng.ku.edu.kw

### Training course duration:

#### <u>Five Days</u>

#### **Timing:**

8 a.m. - 2 p.m. Daily

#### **Fees:**

<u>250 KD</u>

#### **Course objectives:**

 To provide participants with the knowledge needed to design an applied chilled water systems starting with making initial decisions, load estimates, zoning the building and equipment selection.

#### **Course outline:**

#### Day one topics:

Introduction and Fundamentals

#### Day two topics:

• Centrifugal Pumps and Expansion Tanks

#### Day three topics:

Compressors and Chiller Types

#### **Day Four topics:**

Air Handling Units and Fan Coil Units

#### Day Five topics:

Cooling Tower Design and Selection

#### **Instructor:**

Dr. Raed Bourisli
Dr.Ahmad Alsahhaf
Mechanical Engineering
College of Engineering & petroleum
Kuwait University





ME002- Design and Construction of A/C Systems

#### **Contact**

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### Training course duration:

#### <u>Five Days</u>

#### Timing:

#### <u>8 a.m. - 2 p.m. Daily</u>

#### **Course objectives:**

• The objective of this course is to guide participants through the required procedure of designing the main components of an air conditioning unit, namely, the compressor, condenser, evaporator, and the metering device. After presenting the basics of the vapor-compression/refrigeration cycle, and the basic properties of refrigerants, the major components of the AC system are studied, first individually and then as parts of a cycle. Participants are also exposed to the mechanism of assembling these parts together by welding, evacuating the air in the system, and charging it with refrigerant, in order to arrive at a functioning air conditioning unit.

#### **Course outline:**

#### Day one topics:

Vapor compression cycle. The p-h diagram.
 Refrigerants and their properties.

#### Day two topics:

Heat Exchanger Design (Evaporators and Condensers)

#### Day three topics:

 Compressor Design and Selection. Metering Device Design and Selection





## ME002- Design and Construction of A/C Systems

## **Fees:** 250 KD

#### **Day Four topics:**

Mechanical and Electrical Tools Used for Testing.
 Assembly of components. Testing the air conditioning unit.

#### **Day Five topics:**

• Field Trip to a Refrigeration Factory.

#### **Instructor:**

Dr. Raed Bourisli Dr. Ahmad Alsahhaf Mechanical Engineering College of Engineering & petroleum Kuwait University





### ME003- Calculation of Building Cooling Loads and HVAC System Design

#### **Contact**

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### Training course duration:

#### <u>Five Days</u>

#### **Timing:**

#### <u> 8 a.m. - 2 p.m. Daily</u>

#### **Course objectives:**

 This course presents to the participants the necessary steps of perform cooling load calculations, proper selection of HVAC equipment, and air distribution to arrive at energyefficient residential and commercial buildings. Manual, hand-calculation-based as well as numerical-based approaches will be presented to estimate the load. This is done in a way that guarantees the adherence to the MEW Code of Practice.

#### **Course outline:**

#### Day one topics:

- Introduction to HVAC
  - HVAC-related Engineering Fundamentals (Fluid mechanics, Thermodynamics, Heat transfer)
  - The Vapor Compression Cycle and the P-h Diagram
  - Types and Ranges of Air Conditioning Equipment
  - Psychometrics

#### Day two topics:

- Building Envelope
  - External, Internal, and System Loads
  - Thermal Comfort
  - Load Estimating Methods

#### Day three topics:

- Cooling Load Calculations Using MEW Code of Practice (For a Villa)
  - Requirements of MEW Code of Practice
  - HVAC Design for a Villa
  - Air Conditioning Unit Selection

#### Fees:

**Day Four topics:** 



## College of Engineering and Petroleum

250 KD

#### Kuwait University- College of Engineering & Petroleum - Mechanical Engineering -**OCT**



#### ME003- Calculation of Building Cooling Loads and HVAC System Design

- -Cooling Load Calculations Using a Computer Software (For an Office Building)
  - Introduction to HAP, E-QUEST, Energy Plus, etc.
  - -Defining the Problem, Gathering and Entering Data
  - Generating System Design Reports

#### **Day Five topics:**

- -Air Distribution
  - Fan Laws and Types
  - Duct Design Using the Equal Friction Method and the ductulator
  - -Air Filters
  - Air Supply and Return Openings (Diffusers, grilles, registers, etc.)

#### **Instructor:**

Dr.Raed Bourisli Dr. Adnan Alanzi Mechanical Engineering College of Engineering & petroleum **Kuwait University** 





### ME004- Pumps Fundamentals, Operation and Maintenance

#### **Contact**

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- ™ tpd.occd@eng.ku.edu.kw

### Training course duration:

#### <u>Five Days</u>

#### **Timing:**

#### <u>8 a.m. - 2 p.m. Daily</u>

#### **Course objectives:**

 This short course gives attendees a basic overview of pumps, their design, proper operation, and maintenance. It goes into some fundamental theory, and all the necessary definitions, types of pumps commonly used in residential, commercial and industrial settings. Ways to size pumps and calculate their efficiency, with numerical examples. Basics of electricity and power. Selection process for pumps for a specific task. Network of pumps and pumping stations. Other types of industrial pumps, like multiphase. Troubleshooting and basic repair.

#### **Course outline:**

#### Day one topics:

• Introduction, Basic theory, Classification of pumps.

#### Day two topics:

 Flow rates, Capacity and viscosity, Heads, Cavitation, Sizing, Numerical examples.

#### Day three topics:

 Electricity/Power basics, Running on the right end of the pump curve, Efficiency, Specifications, Pump selection, Case studies.

#### **Day Four topics:**

 Pumping stations, piping networks, Pumping heavy fluids and slurries, Multiphase pumps, Pump life extension, Current state-of-the-art.





## ME004- Pumps Fundamentals, Operation and Maintenance

#### **Fees:**

250 KD

#### **Day Five topics:**

 Testing, Maintenance, Repair, Trouble shooting, Life demonstration: Kuwait Towers, Arabi Co., field trip to Kuwait Towers, Problems & solutions.

#### **Instructor:**

Dr.Raed Bourisli Mechanical Engineering College of Engineering & petroleum Kuwait University





## ME005- Refrigeration Equipment in Supermarkets

#### **Contact**

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### Training course duration:

#### <u>Five Days</u>

#### Timing:

#### 8 a.m. - 2 p.m. Daily

#### **Course objectives:**

 The objective of this course is to introduce to the participants the different refrigeration equipment used in supermarkets, their components, and the methods used for their operation and maintenance for optimum efficiency and efficacy, which will preserve refrigerated foods and prevent premature expiration.

#### **Course outline:**

#### Day one topics:

- Principles:
  - Refrigeration principles
  - Evaporators
  - Condensers

#### Day two topics:

- Equipment:
  - Compressors
  - Metering Devices

#### Day three topics:

- Control and troubleshooting:
  - Controls and Accessories
  - Refrigeration System Troubleshooting

#### **Day Four topics:**

- Machines and health
  - Supermarket Refrigeration
  - Cold Stores and Freezers
  - Product Temperature for Preservation and Health





## ME005- Refrigeration Equipment in Supermarkets

### Fees:

### 250 KD

#### Day Five topics:

- Fieldtrip
  - Field Trip to a Supermarket

#### **Instructor:**

Dr. Raed Bourisli
Dr.Ahmad Alsahhaf
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## ME006- Building Your-Professional-Self and Managing Relations in the Real World

#### **Contact**

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### Training course duration:

#### Five Days

#### **Timing:**

8 a.m. - 2 p.m. Daily

#### **Course objectives:**

• This course aims to help participants discover the keys to successful relationships in the workplace, and perhaps in life in general. It starts with the inner core of the person and moves outward to explain the dynamics of human-to-human relationships, ways they can break down, and ways of fixing them. It also explains the basics of anger-management and flexibility in the workplace. It gives a brief introduction to the topic: "The Art of Conflict", which is an original contribution of the instructors.

#### **Course outline:**

#### Day one topics:

- Knowing:
  - Know yourself
  - Dealing with imperfections
  - Whom should you trust?
  - Look your best, be your best

#### Day two topics:

- Connecting:
  - Instantly connect with anyone
  - Do your homework
  - Laws of attractions
  - The art of listening
  - Commanding respect
  - Have a lasting impression





### ME006- Building Your-Professional-Self and Managing Relations in the Real World

### Fees:

#### 250 KD

#### Day three topics:

- Living:
  - Life in the professional world
  - Pick your battles wisely
  - Keep true to principles

#### **Day Four topics:**

- Fighting:
  - The art of conflict
  - Listening to the arguments
  - Short-term gains, long-term victory
  - Steady as she goes

#### Day Five topics:

- Winning:
  - Anger management basics
  - The dangers of over-reaction
  - Containment
  - Have perspective
  - Flexibility tools and skills

#### **Instructor:**

Dr. Raed Bourisli
Mechanical Engineering
College of Engineering & petroleum
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ME007- Elements of Technical Report Writing, Data Analysis and Presentation

#### **Contact**

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### Training course duration:

#### Five Days

#### **Timing:**

#### <u> 8 a.m. - 2 p.m. Daily</u>

#### **Course objectives:**

• The objective of this course is twofold: first, it is to get participants familiar with the many different data analysis techniques available in MS-Office suite. Secondly, the course aims to provide participants with the skills needed to present their data analysis results and/or technical material in a professional, understandable way. Also, a comprehensive overview of word-processing using MS Word and most common tips and tricks regarding professional production of documents. Additionally, attendees will be exposed to elements of technical report writing such as identifying the audience, deciding on the type of report required, eliminating redundancy, conveying the message clearly and efficiently, and keeping readers focused by using correct punctuation, sentence length and structure.

#### **Course outline:**

#### Day one topics:

- Deciding who your audience will be
- Type and purpose of report
- Report structure: starting with a report skeleton
- Writing techniques
- How to turn an F report into an A report
- Incorporate appropriate visual aids (what constitutes an acceptable visual aid)

#### Day two topics:

- Basic writing principles (writing in the third person, etc.)
- Punctuations and common style mistakes
- Common misspelled words
- Avoiding amplification and redundancy





#### ME007- Elements of Technical Report Writing, Data Analysis and Presentation

 When to report only, and when to report and interpret, and how deep?

### 250 KD

Fees:

#### Day three topics:

- MS Word basics, formatting, shortcuts, pagination, and styles
- Tasks automate tasks with Visual Basic macros
- Edit pictures in Office
- Access and edit your files from anywhere
- Collaborate with online documents
- Protecting your files

#### **Day Four topics:**

- Basic introduction to Excel Data Analysis toolbox
- Linking different Excel worksheets
- Introduction to Excel built-in toolboxes
- Preparing charts and graphs in Excel
- Advanced data analysis tools
- Integrating Excel results with other applications
- Analyzing real-world problems using Excel

#### **Day Five topics:**

- Introduction to MS PowerPoint
- Clip arts, SmartArt, shapes, special effects, and animation in PP
- Slide layout, navigation, and printing
- Elements of a successful technical presentation

#### **Instructor:**

Dr. Raed Bourisli
Dr. Majed Majeed
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## ME008- Introduction to, and Mathematical Programming using MATLAB

#### **Contact**

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### Training course duration:

#### Five Days

#### **Timing:**

#### 8 a.m. - 2 p.m. Daily

#### **Course objectives:**

 Introduction to MATLAB syntax, main functions, and some important applications in various sectors

#### **Course outline:**

#### Day one topics:

- Entering MATLAB commands, importing and saving data, and using the MATLAB documentation.
  - Create plots of vector data. Modify, annotate, and export plots.
  - Create, use, format, and share live scripts.
  - Create, combine, and reshape arrays.

#### Day two topics:

- Extract subsets of arrays and modify elements in an array.
  - Use arrays as mathematical objects or as collections of (vector) data. Understand the appropriate use of MATLAB to distinguish between these applications.
  - Identify and use plot types for 2D and 3D visualization.
     Modify plot properties.

#### Day three topics:

- Extract and analyze subsets of data that satisfy given criteria.
  - Import data as a MATLAB table. Work with data stored as table
  - Store data in relevant data types. Operate on the data types.





## ME008- Introduction to, and Mathematical Programming using MATLAB

#### **Fees:**

#### 250 KD

#### **Day Four topics:**

- Perform typical data preprocessing tasks in MATLAB, including normalizing data and dealing with missing data.
  - Perform common data analysis tasks in MATLAB, including smoothing data and fitting polynomials

#### Day Five topics:

- Create flexible code that can interact with the user, make decisions, and adapt to different situations.
  - Increase automation by encapsulating modular tasks as user-defined functions. Understand how MATLAB resolves references to files and variables.
  - Explore MATLAB tools for debugging and measuring code performance.

#### **Instructor:**

Dr. Abdullah Alshaye Mechanical Engineering College of Engineering & petroleum Kuwait University





#### ME009- Statistical Programming

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### Training course duration:

#### <u>Five Days</u>

#### **Timing:**

#### 8 a.m. - 2 p.m. Daily

#### **Course objectives:**

 Using Minitab to produce statistical analysis from data, use a number of tools to establish current performance, determine the most appropriate tool for the data and area of analysis and interpret results.

#### **Course outline:**

#### Day one topics:

- Introduction
  - The Minitab user interface
  - Projects and worksheets
  - Data types
  - Open and examine a worksheet
  - Graphing Data
  - Examine relationships between two variables
  - Arrange multiple graphs on one page
  - Save a Minitab project

#### Day two topics:

- Analyzing Data
  - Summarize the data
  - Compare two or more means
  - Use Minitab's Project Manager
  - Assessing Quality
  - Assess process stability
  - Assess process capability

#### Day three topics:

- Designing an Experiment
  - Create a designed experiment
  - View the design
  - Enter data into the worksheet
  - Analyze the design
  - Use the stored model for additional analyses





#### ME009- Statistical Programming

#### **Fees:**

#### 250 KD

#### **Day Four topics:**

- Using Session Commands
  - Enable and enter session commands
  - Re-execute a series of commands
  - Repeat analyses with exec files
  - Generating a Report
  - Use the Report Pad
  - Save the report
  - Copy the report to a word processor
  - Send output to Microsoft PowerPoint

#### Day Five topics:

- Preparing a Worksheet
  - Get data from different sources
  - Prepare the worksheet for analysis
  - Customizing Minitab
  - Set options
  - Create a custom toolbar
  - Assign a shortcut key
  - Restore Minitab's default options

#### **Instructor:**

Dr. Abdullah Alshaye

Mechanical Engineering

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ME010- Modeling of plate, membrane, and shell structures

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### Training course duration:

#### <u>Five Days</u>

#### **Timing:**

#### <u>8 a.m. - 2 p.m. Daily</u>

#### **Course objectives:**

 Understanding and modeling of membranes, plates, shell structures.

#### **Course outline:**

#### Day one topics:

- General Information
  - Equations of Theory of Elasticity for 3D Problems
  - Equations of Thin Shells According to the Three-Parameter Kirchhoff-Love Theory
  - General Information about Models and Computational Aspects
  - Description of Finite Elements for Analysis of Plates and shells

#### Day two topics:

- Flat Rectangular membranes
  - Circular and Annular Membranes
  - Rectangular plates under Bending
  - Circular and Annular Plats under Bending

#### Day three topics:

- Shells in the Membrane State
  - Shells in the Membrane-Bending State
  - Shallow Shells
  - Thermal Loading of Selected Membranes, Plates and Shells

#### Day Four topics:

- Stability of Plates and Shells
  - Free Vibrations of Plates and Shells





ME010- Modeling of plate, membrane, and shell structures

## Fees: 250 KD

#### Day Five topics:

- Modelling Process
  - Quality of Fes and Accuracy of Solutions in Linear Analysis
  - Advanced FE Formulations

#### **Instructor:**

Dr. Abdullah Alshaye

Mechanical Engineering

College of Engineering & petroleum

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#### ME011- Mastering the Research Journey

#### **Contact**

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### Training course duration:

#### Three Days

#### Timing:

<u>8 a.m. - 2 p.m. Daily</u>

#### **Course objectives:**

 Objective 1: Understand the research process at a major research university, including problem identification, literature review, data collection and analysis, and drawing conclusions.

Objective 2: Develop effective research skills by teaching participants how to effectively search and critically evaluate scholarly literature.

Objective 3: Formulate a strong thesis proposal by helping master's students understand the purpose and structure of a thesis proposal. Also assisting them in developing a comprehensive literature review that supports the proposed research.

Objective 4: Enhance research communication by enhancing their knowledge in oral and written communication skills for conveying research concepts and findings.

Objective 5: Foster research productivity and time management by providing strategies for effective time management and organization during the research process.

Objective 6: Cultivate research ethics and responsible conduct by raising awareness of ethical considerations and responsible conduct in research.

Objective 7: Foster a supportive research community by creating a collaborative environment that encourages knowledge sharing and peer feedback.

#### **Course outline:**

#### Day one topics:

Understand the research process.
 -Develop effective research.





### ME011- Mastering the Research Journey

Fees: 250 KD

- -Formulate a strong thesis proposal.
- -Enhance research communication.

#### Day two topics:

- Foster research productivity and time management.
  - -Cultivate research ethics.
  - -Foster a supportive research community.

#### Day three topics:

• Applied case studies of the research process steps.

#### **Instructor:**

Dr.Shikha Ebrahim Mechanical Engineering College of Engineering & petroleum Kuwait University





#### ME012-Basics of Preventive Maintenance

#### **Contact**

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### Training course duration:

#### Five Days

#### **Timing:**

#### 8 a.m. - 2 p.m. Daily

#### **Course objectives:**

- To learn basic principles and methods of preventive maintenance.
- To introduce implementation of preventive maintenance programs in industrial institutions.
- To be familiar with a proper materials selection for failure prevention of engineering structures.
   To present lubrication techniques used in preventive maintenance.

#### **Course outline:**

#### Day one topics:

- Principals and Methods of Preventive Maintenance
- Setting Up a Preventive Maintenance Program
- Scheduling a Preventive Maintenance Program

#### Day two topics:

- Modes of Equipment Failure
- Damage-Tolerant Inspection and Maintenance.
- Materials Selection & Failure Prevention.

#### Day three topics:

- Living:
  - Life in the professional world
  - Pick your battles wisely
  - Keep true to principles

#### **Day Four topics:**

- Root Cause Failure Analysis (RCFA)
- Case Study of RCFA
- Overview of NDT methods





#### ME012-Basics of Preventive Maintenance

## Fees: <u>250 KD</u>

#### Day Five topics:

- Quality Control of Preventive Maintenance Work
- Preventive vs. Predictive
- Discussion and closing remarks

#### **Instructor:**

Prof. Khaled Al-Fadhalah
Dr. Abdullah Alazemi
Mechanical Engineering
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#### ME013-Failure Analysis

#### Contact

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- tpd.occd@eng.ku.edu.kw

#### **Course objectives**

1) Establish a sense of practical engineering practice through examination of case studies

related to equipment analysis and system design failures and accidents caused by errors

and omissions of engineering process.

2) Introduce a systematic failure analysis methodology from the initial onsite investigation

to final report and possible testimony as an expert witness.

3) Introduce the modern tools and analysis methods used recently in the failure analysis process.

### Training course duration:

#### Five Days

#### **Timing:**

<u>8 a.m. - 2 p.m. Daily</u>

#### **Course outline:**

#### Day one topics:

Introduction to failure analysis

#### Day two topics:

Tools for preliminary and microscopic analysis of a mechanical failure

#### Day three topics:

Mechanisms of damage and failure

#### Day four topics:

Modeling tools applied to the analysis of mechanical failure





### ME013-Failure Analysis

	Day five topics:  Root cause analysis and consquences of failure analysis
Fees: 250 KD	Instructor:  Mohammad Alabdullah  Mechanical engineering  College of engineering & petroleum  Kuwait university





### ME014 - Computer Aided Design and Analysis

#### **Contact**

- 98765392
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#### **Course objectives**

- 1) Establish competence in the use of computation tools for practical problem solving and analysis.
- 2) Introduce a practical framework for numerical methods used in computer aided design and analysis.

### Training course duration:

Five Days

Timing:

<u>8 a.m. - 2 p.m. Daily</u>

#### **Course outline:**

Day one topics:

Introduction to CAD and FEM

Day two topics:

CAD modeling

Day three topics:

Finite element analysis

Day four topics:

Optimization techniques





## ME014 - Computer Aided Design and Analysis

	Day five topics:  Applications in analysis and simulation of fluid, thermal and structural systems
Fees: 250 KD	Instructor:  Mohammad Alabdullah  Mechanical engineering  College of engineering & petroleum  Kuwait university
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#### ME015 - Heat Exchanger Analysis

#### **Contact**

- 98765392
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- tpd.occd@eng.ku.edu.kw

#### **Course objectives**

- 1) Establish a sense of practical engineering practice through examination of case studies related to equipment analysis and system design failures and accidents caused by errors and omissions of engineering process.
- 2) Introduce a systematic failure analysis methodology from the initial onsite investigation to final report and possible testimony as an expert witness
- 3) Introduce the modern tools and analysis methods used recently in the failure analysis process.

### Training course duration:

Five Days

#### **Timing:**

8 a.m. - 2 p.m. Daily

#### **Course outline:**

Day one topics:

Introduction to heat exchangers classification

Day two topics:

Modes of heat transfer

Day three topics:

Compact heat exchangers

#### Day four topics:

Shell and tube heat exchangers





### ME015 - Heat Exchanger Analysis

	Day five topics:  Plate type heat exchangers
Fees: 250 KD	Instructor:  Mohammad Alabdullah Mechanical engineering College of engineering & petroleum Kuwait university
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