

Theoretical and practical courses

Ilam University of Medical Sciences

Introduction of the course: Basics of air pollution control in the second semester of the academic year 2020-2021

School: Health Department: Occupational Health Engineering

Course and degree: Bachelor of Occupational Health Day

Time and place: Monday 10-12

Number and type of unit (theoretical): 2 theoretical units

Name of the person in charge of the course (course teacher): Dr. Shiva Souri

Prerequisite courses: Dynamics of gases and aerosols

Office address: School of Health

Phone and contact days: Saturday to Wednesday – 32235717

General purpose of the course: - Familiarity of students with different methods of controlling air pollutants, source of production, emission and exposure to pollutants

Lesson description: Different methods of controlling air pollutants, sources of production, emission and exposure to pollutants

Specific or partial objectives of the course:

- 1- Comprehensive familiarity with air pollutant control methods
- 2- Comprehensive familiarity with the control hierarchy in workplace air pollution
- 3- Comprehensive familiarity with management and implementation methods of air pollution control
- 4- Comprehensive familiarity with all cleaning products

Student duties (student homework during the semester):

- 1- The student is obliged to be prepared in each session to answer the questions related to the previous sessions in written and oral form.

2- Active participation in the class

The main sources of the lesson:

1- Air Pollution Control Equipment Calculations Louis Theodore. ISBN: 978-0-470- 20967-7, 2008

2- Air Pollution Control Equipment Selection Guide, Kenneth C. Schiffner. CRC Press 2002

3- Industrial Ventilation, ACGIH. Last version.

4- Maroni M, Seifert B, Lindvall T. Indoor air quality: a comprehensive reference book: Elsevier; 1995

5-Kolahy, Heydari, Ava. Principles of Air Pollution: Agricultural Education and Natural Resources Research Publications; 2019.

Teaching methods + teaching aids used:

Lectures, discussions, questions and answers, PowerPoint, use of magic and whiteboard

Methods and time of assessment and evaluation of the student and the bar related to each evaluation:

- Homework, class activities, evaluation during the semester and conference ¼ score, midterm ¼ score, end-of-term exam ¼ score, total ¾ score

Lesson rules and expectations from students:

Schedule and predicted contents of each theory session

session	topic	Necessary preparation of students before the start of the class
1	Announcement of the semester curriculum and introductory statement on the concepts of air pollution control	Familiarity of students with the definitions of air pollution and air pollutants, criteria for classification of air pollutants, naming chemical pollutants based on the physical state of matter, aerosols and their types, gases and vapors and their differences with aerosols
2	Principles and differences of air pollution control in closed and open environments	Familiarity of students with topics related to indoor and outdoor air quality, history of outdoor air pollution, sources of outdoor air pollution production (natural and artificial), important aspects of outdoor air pollution, history of indoor and industrial air pollution, indoor air pollutants, building syndrome Patient
3	Air pollution control strategies and tactics	Familiarity of students with topics related to air pollution control management, including strategies and tactics, types of outdoor air pollution control strategies, proposed strategies for controlling outdoor air pollution with a fixed and mobile source
4	Familiarity with the control scale in workplace air pollution	Familiarity of students with topics related to employee exposure control strategies, general principles of chemical agent control, types of chemical agent control methods, profit cost criteria, feasibility criteria, effectiveness criteria, multivariate techniques in selecting strategies
5	Technical methods of air pollution control (change of process and technology and	Familiarity of students with the topics related to elimination, Elimination, replacement of less hazardous materials, Proper design and placement of tools, equipment and devices, (Layout) Modification or change of

	replacement of materials and their role in pollution control)	production process and equipment, (Changing process) Isolation, (Isolation) enclosing processes Work 3 mixer device (Enclosing), industrial ventilation (Industrial ventilation)
6	Technical methods of air pollution control (familiarity with advanced ventilation and local ventilation and introduction of local ventilation system components, introduction of parameters, criteria)	Familiarization of students with the topics related to the principles governing advanced ventilation and industrial ventilation, (Ventilation, identification of emission sources, (Sources Emission), air movement, Air movement, Worker behavior (Worker behavior)
7	Familiarity with management and implementation methods of air pollution control	Familiarity of students with topics related to management, Production planning or tasks, Scheduling Assignment, Communication Hazard, Medical Surveillance, Health, Recording and Housekeeping, Repair And maintenance
8	Respiratory and chemical protection devices	Familiarity of students with topics related to personal protective equipment (PPE), work wear, aprons, eye protection - glasses, hand and arm protection equipment, foot protection (gaiter - shoes - boots), breathing masks
9		midterm exam
10	General information about air purifiers	Familiarity of students with topics related to different parts of industrial ventilation, the importance of cleaners in the ventilation system, types of particle and gas and vapor cleaners, cleaning selection criteria
11	Collection and control of gaseous pollutants	Familiarity of students with topics related to air purifiers (surface absorbers, absorbers-scrubbers)
12	Collection and control of gaseous pollutants	Familiarity of students with topics related to air purifiers (condensers, thermal and catalytic oxidation)
13	Collection and control of particulate pollutants	Familiarity of students with topics related to air purifiers (sedimentation chambers and cyclones)
14	Collection and control of particulate pollutants	Familiarity of students with topics related to air purifiers (bag houses and electrostatic precipitators)
15	Clean rooms and the rules that govern them	Familiarity of students with topics related to the definition and concepts of clean rooms, classification of rooms based on relevant organizations, use of clean rooms, pollutants in clean room air and pollution control methods
16	Economic aspects of air purification systems	Engineering economics (optimization of fixed capital and operating costs - depreciation - rate of return on investment - payment period), estimating the cost of control equipment, estimating the fixed costs of control projects, estimating the annual operating cost
17	Chemical risk assessment	Definition of chemical risk, types of risk assessment methods, detailed study of chemical risk assessment by EPA method
18		Semester exam