Theoretical and practical courses

Ilam University of Medical Sciences

Introduction of the course: Basics of sampling of air pollutants 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: Tuesday 8-10 10 grade 1

Number and type of unit (theoretical): 2 theoretical units 1 practical unit

Name of course manager (course instructor): Dr. Shiva Souri

Prerequisite courses: Dynamics of gases and aerosols Office address: School of Health

Phone and contact days: Saturday to Wednesday 32237517

General Objective of the lesson: Familiarity with air pollutant sampling methods and equipment in order to assess the risks associated with air pollutants

Course description: In this course, students are introduced to a variety of methods and equipment for sampling air pollutants in the workplace in a theoretical and practical way.

Specific or partial objectives of the course:

1. Familiarize students with the principles and importance of air sampling

2- Learners' familiarity with aerial sampling strategies including sampling time, number of samples, sample size, accuracy, accuracy of sampling

3. Familiarization of learners with the role of sampling in risk assessment and management

4- Familiarization of learners with the types of permissible threshold limits and assessment of exposure

5- Familiarity of learners with various methods of air sampling, sampling circuit and its components

6- Familiarity of learners with the principles, methods and tools of volume volumetric calibration

7. Familiarity of learners with different types of air sampling pumps

8-Familiarity of learners of aerosol classification (breathable, thoracic and inhalable)

9. Familiarization of learners with aerosol sampling equipment such as filtration methods, cyclones, impactor caskets, gas bottle washers, etc.

10. Familiarization of learners with sampling of gases and vapors by passive method and their mechanism

11. Familiarization of learners with sampling of gases and vapors by active method including adsorption, adsorption and direct reading

12. Familiarization of learners with active sampling devices of gases and vapors, including gas washing bottles, simple and impregnated surface absorption tubes, simple and impregnated filters

13. Familiarization of learners with methods and equipment for sampling of acid gases and gases

14. Familiarization of learners with methods and equipment for bio aerosol sampling

Student duties (student homework during the semester):

1- The student is obliged to have the necessary preparation 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. A.L.Linch "Evaluation of Ambient Air Quality by Personnel Monitoring

2. Henry J. McDermott, Air Monitoring for Toxic Exposures.

3. Martha J. Boss & Dennis W. Day, Air Sampling and Industrial Hygiene Engineering.

4. Gregory D. Weight, Fundamentals of Air Sampling.

5- Dr. Abdul Rahman Bahrami. "Sampling and decomposition of air pollutants". Babataher Publications. 1999

6 - Dr. Alireza Choobineh. "Methods and equipment for sampling of air pollutants in the workplace". Fanavaran Publications.

7- Occupational contact booklet, technical committee of occupational health of the country

Teaching methods + teaching aids used:

In this course, teacher-centered teaching methods (such as lecturing) and inclusive-oriented teaching methods (such as group discussion) and especially participatory and interactive teaching methods will be used.

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 ۲ grade, midterm ٦ grade, final exam ام grade, total ۲۰ grade

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	Presenting lesson plans, getting to know students, common definitions of harmful chemical agents in the workplace	Active attendance at class
2	General air sampling	Review the contents of the previous session and prepare for questions and answers
3	Types of permissible threshold limits and assessment of exposure and risk assessment	Review the contents of the previous session and prepare for questions and answers
4	Sampling time, number of samples, sample size, sampling accuracy	Review the contents of the previous session and prepare for questions and answers
5	Types of air sampling methods, sampling circuit	Review the contents of the previous session and prepare for questions and answers
6	Familiarity with air sampling pumps	Review the contents of the previous session and prepare for questions and answers
7	Volumetric and flow calibration	Review the contents of the previous session and prepare for questions and answers
8	---------- **Midterm exam** ----------	
9	Methods and equipment for aerosol sampling (filtration and cyclone)	Review the contents of the previous session and prepare for questions and answers
10	Methods of direct reading of gas and vapors	Review the contents of the previous session and prepare for questions and answers
11	Passive sampling methods	Review the contents of the previous session and prepare for questions and answers
12	Absorbent tubes and adsorption mechanism	Review the contents of the previous session and prepare for questions and answers
13	Gas washers, impregnated filters and impregnated absorbent tubes	Review the contents of the previous session and prepare for

		questions and answers
14	Sampling of bio aerosols	Review the contents of the previous session and prepare for questions and answers
15	Sampling of acid vapors and alkalis	Review the contents of the previous session and prepare for questions and answers
16	Familiarity with the section of chemical agents in the booklet of occupational exposure limits	Review the contents of the previous session and prepare for questions and answers
17	---------- **End of year exam** ----------	

Practical work programs in the laboratory:

1. Introduction of basic standards and calibration of wet and dry gas meters using marriott bottles

2. Calibration of pumps

3. Introduction of rotameter and its calibration

4. Introduction of ores and their use in volumetric calibrations

5. Introduction of close face, open face, IOM and...

6. Introduction of filters (stress cellulose, PVC, etc. 9)

7. Sampling of particles using cyclones and sedimentation corridors

8. Particle sampling using impactors

9. Particle sampling by impinger

10. Sampling with direct particle reading devices

11. Sampling of gases using impingers

12. Sampling of gases using surface adsorbent tubes

13. Sampling of gases using direct reading devices

14. Introducing sampling badges and bags and teaching them how to sample

15. Sampling of surfaces and skin including: gas pad, hand rinse, swap, wipe sample, bulk sample and....

16. Calibration of direct reading devices

17. Sampling of bio aerosols

18. Gas sampling by passive sampler

19. Sampling by the student based on the standard method