



COURSE OUTLINE: ESA106 - INDOOR ENV. AIR QUAL

Prepared: Ben Oliver

Approved: Sherri Smith, Chair, Natural Environment, Business, Design and Culinary

Course Code: Title	ESA106: INDOOR ENVIRONMENTAL AIR QUALITY
Program Number: Name	5255: ENV. SUSTAINABILITY
Department:	NATURAL RESOURCES PRG
Academic Year:	2023-2024
Course Description:	This course provides students a practical approach to indoor air quality and its importance to occupant health and safety. Students will analyze and apply industry standards to real designs to determine what air circulation, temperature and humidity rates are required. Students will also learn how to maintain occupant comfort while balancing air quality and energy efficiency to create sustainable design solutions.
Total Credits:	3
Hours/Week:	3
Total Hours:	42
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Vocational Learning Outcomes (VLO's) addressed in this course:	<p>5255 - ENV. SUSTAINABILITY</p> <p>VLO 2 Design sampling and analysis of environmental data to implement resource surveys.</p> <p>VLO 4 Examine field samples using air, water and soil quality testing equipment to evaluate environmental conditions.</p> <p>VLO 5 Apply appropriate air and water pollution testing and abatement processes and technologies according to different segments of industrial and/or residential sectors.</p> <p>VLO 6 Interpret the effects of various environmental and climate impacts on plant, animal and human health.</p>
Essential Employability Skills (EES) addressed in this course:	<p>EES 3 Execute mathematical operations accurately.</p> <p>EES 4 Apply a systematic approach to solve problems.</p> <p>EES 5 Use a variety of thinking skills to anticipate and solve problems.</p> <p>EES 6 Locate, select, organize, and document information using appropriate technology and information systems.</p> <p>EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.</p> <p>EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.</p> <p>EES 10 Manage the use of time and other resources to complete projects.</p>
Course Evaluation:	<p>Passing Grade: 50%, D</p> <p>A minimum program GPA of 2.0 or higher where program specific standards exist is required</p>



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	for graduation.																
Other Course Evaluation & Assessment Requirements:	Academic success is directly linked to attendance. Missing more than 1/3 of the course hours in a semester shall result in a F Grade for this course.																
Books and Required Resources:	Open Education Resources Open Education Resources, links supplied by Professor																
Course Outcomes and Learning Objectives:	<table border="1"> <thead> <tr> <th>Course Outcome 1</th> <th>Learning Objectives for Course Outcome 1</th> </tr> </thead> <tbody> <tr> <td>Examine elements of indoor air quality and their importance for occupant health and safety.</td> <td> 1.1 Identify what indoor air quality means and the variables that impact occupant comfort, health and safety. 1.2 Review different volatile organic compounds (VOC's) and understand how different levels exist in different building spaces. 1.3 Using data obtained through field review, contrast the composition of outside air and indoor air. 1.4 Investigate why different levels of substances exist in indoor air vs. outdoor air. </td> </tr> <tr> <th>Course Outcome 2</th> <th>Learning Objectives for Course Outcome 2</th> </tr> <tr> <td>Evaluate industry standards for indoor air quality and apply them to real world examples.</td> <td> 2.1 Understand the different types of air classes and their pollutant levels 2.2 Calculate the outside air requirements for different space types using ASHRAE Standard 62.1. 2.3 Calculate exhaust air rates and understand different strategies for exhaust air collection and treatment. 2.4 Analyze how different occupant rates combined with different space types, affect the quality of indoor air and concentration of carbon dioxide (CO2). 2.5 Using data obtained through field review, analyze the effectiveness of different space layouts and develop strategies to improve indoor air quality. </td> </tr> <tr> <th>Course Outcome 3</th> <th>Learning Objectives for Course Outcome 3</th> </tr> <tr> <td>Analyze thermal comfort requirements and their relationship to indoor air quality.</td> <td> 3.1 Discover how outside air rates, temperature, humidity, and air circulation speeds affect occupant comfort levels 3.2 Calculate the optimum temperature, humidity and air speed required for different space types using ASHRAE Standard 55. 3.3 Apply air circulation calculations to real world building examples </td> </tr> <tr> <th>Course Outcome 4</th> <th>Learning Objectives for Course Outcome 4</th> </tr> <tr> <td>Understand how energy efficiency and indoor air quality work together to provide sustainable and effective designs.</td> <td> 4.1 Understand the requirements of ASHRAE Standard 90.1, including the minimum energy efficiency benchmarks. 4.2 Apply ASHRAE Standard 90.1 to real world building examples to understand how energy efficiency and indoor air quality balance. 4.3 Identify how different ventilation strategies, like demand control ventilation (DCV) can maintain proper ventilation and improve energy usage. </td> </tr> </tbody> </table>	Course Outcome 1	Learning Objectives for Course Outcome 1	Examine elements of indoor air quality and their importance for occupant health and safety.	1.1 Identify what indoor air quality means and the variables that impact occupant comfort, health and safety. 1.2 Review different volatile organic compounds (VOC's) and understand how different levels exist in different building spaces. 1.3 Using data obtained through field review, contrast the composition of outside air and indoor air. 1.4 Investigate why different levels of substances exist in indoor air vs. outdoor air.	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Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Assignments/Field Work Participation	30%
Case Studies and Quizzes	20%
Personal Reflection	10%
Test #1	20%
Test #2	20%

Date:

July 20, 2023

Addendum:

Please refer to the course outline addendum on the Learning Management System for further information.

