Daffodil Polytechnic Institute, Institute Code: 50238

Lesson Plan – Academic session: August 2023 to January 2024

Subject Teacher	: Lima Akter (Jr. Instructor)
Subject Name	: Air-Conditioning & Acoustics
Subject Code	: 68763
Technology	: Architecture & Interior Design Technology.
Semester	: 6th
BTEB Text Book Name	: Air-Conditioning & Acoustics (Publisher: Haque Prokashani)
Reference Book Name	: Concept in Architectural Acoustics - M. DAVID EGAN

Marks	Grade Point	Letter Grade	*Marks*	Grade Point	Letter Grade
80>	4.00	A+	55-59	2.75	B-
75-79	3.75	A	50-54	2.50	C+
70-74	3.50	A-	45-49	2.25	C
65-69	3.25	B+	40-44	2.00	D
60-64	3.00	B	0-39	0.00	F

Mark Distribution (for 150 Marks)			
Theory Marks		**Practical Marks**	
Midterm	20	PC	25
Class test	10	PF	25
Quiz test	10	-	-
Final	60	-	-
Total	**100**	**Total**	**50**

Class Timing Distribution	
Particulars	**Time**
Greeting with students	05 Minutes
Previous Class Review	10 Minutes
Present Class Topic Discussion and Lecture Delivery	60 Minutes
Present Class Topics Review	10 Minutes
Next Class Topic	5 Minutes

Subject Aims:

After completion of the course students will be able to:

- To be able to understand the fundamental of air condition.
- To be able to understand the construction procedure of air condition system.
- To be able to understand the fundamental of architectural acoustics.
- To be able to prepare materials schedule, cost and development process.

Subject Outcome:

- Student will know about Materials for air conditioning system.
- Will learn the list of Acoustics materials.
- Can Design false ceiling.
- Knowing About sound absorption.
- Can learn about auditorium acoustics etc.
- Can Estimate the Cooling & heating load after calculation. K, C, R & U factor.
- Will be able to design various types of lighting.

Lecture	Chapter/ Exam / Industrial Visit	Learning Area	Learning Outcome	Class/Lab Supporting Equipment's
01 (Theory class)	**Chapter-01** **Understand air conditioning in Building Design.**	1.1 Define air conditioning 1.2 Describe necessity of air conditioning in building 1.3 Explain conductivity, convection, radiation. 1.4 Discuss the convert of Fahrenheit temperature to Celsius.	After the Class, Students will be able to: • Learning about air conditioning.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link:

				https://www.youtube.com/watch?v=Otm1oQDx71Y
Assignment -01	**Lecture 1 & 2**	Duct Shape & pressure loss due to obstruction in Duct		
02 (Practical class)	**Chapter-02** Understand the air conditioning ducting system.	2.1 Define duct shape. 2.2 Mention duct size. 2.3 Describe pressure loses in air distribution system. 2.4 Define duct fittings & terminal units.	After the Class, Students will be able to: • Learn about duct shape and size.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/watch?v=jSA-2lefSeM
03 **(Practical Class)**	**Commercial sound absorbing materials**	3.1 Collect the commercial sound absorbing materials	After the Class, Students will be able to: Detail knowledge about the commercial sound absorbing materials.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/watch?v=6L3Y6UnWe6M
4	**Class Test - 1**	Chapter 1 (Theory Based) Examination Topic: Chapter 01 Examination mark: 10 Passing Mark: 08	After the Class, Students will be able to: • Implement the knowledge of air conditioning.	
5 **(Practical Class)**	**Sound isolation barriers.**	4.1 Sketch the sound isolation barriers	After the Class, Students will be able to: • Learn about the sound isolation barriers.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection.

				YouTube Link: https://www.youtube.com/watch?v=0BwSmG-Rr48
6 **(Practical Class)**	**Building Orientation in climate condition.**	4.2 Building Orientation in climate condition. .	After the Class, Students will be able to: • Learn about Building Orientation in climate condition.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/watch?v=-ZPtRLPYXCE
7	**Quiz Test - 1**	Examination Topic: Chapter 01 Examination mark: 10 Passing Mark: 08 Chapter 2 (Practical Based)	After the quiz test student will be able to justify himself\herself.	
8	**Understand the fundamental of air conditioning.**	5.1 Define air conditioning BTU heat transmission co efficient. 5.2 Describe the necessity of air conditioning in building. 5.3 Name different elements of air condition unit suitable for use in all weather. 5.4 Name the factors to be considered in designing air conditions in an office.	After the Class, Students will be able to: Learn the air conditioning BTU heat transmission.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/watch?v=JLes1-GcWjQ
9	**Understand the electrical heat.**	6.1 Define the general concept of electric heat. 6.2 List the electric heat equipment. 6.3 Mention the application of electric equipment. 6.4 Explain the term of diversity factor.	After the Class, Students will be able to: Become familiar with general concept of electric heat.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/watch?v=Bk_mzWoPXDo

10	**Understand the lay-out plans of air conditioners.**	7.1 Name the different elements of an air conditioning unit suitable for use in all weathers. 7.2 Name the factors to be considered in designing air conditioners in an office/a living room /a library 7.3 Draw a diagram showing all the necessary elements of a weather air –conditioning unit for a library, hall room and auditorium.	After the Class, Students will be able to: Become familiar with different elements of an air conditioning.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/watch?v=YL80rx7Oxok
11	**Review Class**	Regarding student problem	Student can solve their respective topic problem.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection.
12	**Class Test - 2**	Examination Topic: Chapter 01 Examination mark: 10 Passing Mark: 08 Chapter 3 (Theory Based)	• Understanding the fundamental of air conditioning. .	
13 **(Practical Class)**	**Sound alteration closed and open plans.**	8.1 Sketch the sound alteration closed and open plans.	After the Class, Students will be able to: • Learn the sound alteration closed and open plans.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/watch?v=G3ek7gMBFZw
14 **(Practical Class)**	**Ray-Diagram of room Acoustics.**	9.1 Sketch Ray-Diagram of room Acoustics.	After the Class, Students will be able to: Can design Ray-Diagram of room Acoustics.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection.

				YouTube Link: https://www.youtube.com/watch?v=Xk-hEpUQZQY
15	**Quiz Test - 2**	Examination Topic: Chapter 01 Examination mark: 10 Passing Mark: 08 Chapter 4 (Practical Based)	• After the quiz test student will be able to justify himself\herself.	
16	**Understand the concept of architectural acoustics.**	10.1 Define sound propagation, frequency, velocity and wavelength. 10.2 Define Echo. 10.3 Describe between echo, reverberation and resonance. 10.4 Describe the different between sound absorption and sound insulation	After the Class, Students will be able to: Can learn sound propagation, frequency, velocity and wavelength.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/watch?v=TsQL-sXZOLc •
17 **(Practical Class)**	**Sound path in Auditorium, Library, Hall room.**	11.1 Draw sound path in Auditorium, Library, and Hall room.	After the Class, Students will be able to: • Able to draw sound path in Auditorium, Library, Hall room	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/watch?v=9Ur1GAkmoF0
Assignment -02	**Chapter 2 to 6**	Yearly Air Conditioner Plant		
18 **(Practical Class)**	**Basic cooling system.**	12.1 Draw the basic cooling system.	After the Class, Students will be able to: • 1. Able to draw basic cooling system.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/w

				atch?v=JQLkiErH9x4
19 **(Practical Class)**	**Site visit on shopping mall/hospital.**	13.1 Site visit and prepare report submission on shopping mall/hospital.	After the Class, Students will be able to: • Able to prepare report on shopping mall/hospital.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection.
Assignment -03	**Chapter 7 to 13**	Air Conditioning flow diagram and duct layout for a residential floor.		
20	**Review Class**	Chapter 1 to Chapter 6 (Regarding students problem)	1. Problem Solving	
Mid Term Exam				
Architectural site visit.		It will help the student to develop their design consideration.		
21	**Understand cooling load estimate.**	14.1 Building survey and load Estimate. 14.2 Design condition. 14.3 Heat storage, Diversity and stratification. 14.4 Solar heat gain thru glass.	After the Class, Students will be able to: Know the building survey and load Estimate.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/watch?v=0gv2tJf7nwo
22	**Understand the heat loads and cooling loads of a residence.**	15.1 Explain the heat load and cooling load of a residence. 15.2 Explain variable load and constant load of a building. 15.3 List the factors influence for summer and	After the Class, Students will be able to: Learn about the heat load and cooling load of a residence.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection.

		winter air conditioning		YouTube Link: https://www.youtube.com/watch?v=9-K9Y5b8M5c
23 **(Practical Class)**	**Cooling load calculation.**	16.1 Calculate the cooling load calculation of a room.	After the Class, Students will be able to: • Can calculate the cooling load calculation of a room.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/watch?v=aszvtO_qUug
Assignment-04	**Chapter 13 to 16**			
24	**Class Test - 3**	Chapter 7 (Theory Based) Examination Topic: Chapter 01 Examination mark: 10 Passing Mark: 08	Can implement cooling load estimate.	
25 **(Practical Class)**	**Installation of air conditioner.**	17.1 Installation a split type /window type air conditioner.	After the Class, Students will be able to: Can Install a split type /window type air conditioner .	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/watch?v=E7_1M5J_tf0
26 **(Practical Class)**	**Study the thermal conductivity and thermal conductance chart.**	18.1 Find out the value of K of common brick, wood, cellular. 18.2 Find out the C value of sand aggregate cinder aggregate, tiles, plywood and glass of different Thickness.	After the Class, Students will be able to: • Can find out the value of K of common brick, wood, cellular.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection.

				YouTube Link: https://www.youtube.com/watch?v=hDP6egLrsdM
Assignment -05	**Chapter 17 &18**	**Ray Diagram of Room Acoustics**		
27	**Quiz Test - 3**	Examination Topic: Chapter 01 Examination mark: 10 Passing Mark: 08 Chapter 8 (Practical Based)	• After the quiz test student will be able to justify himself\herself. • Can use the knowledge of heat loads and cooling loads of a residence.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/watch?v=w8VYXXTeXOI
28 **(Practical Class)**	**Study the peoples load.**	19.1 Calculate the peoples load for a general office.	After the Class, Students will be able to: • Can calculate the peoples load for a general office.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/watch?v=EuoR2I02to8
Assignment -05	**Chapter 19 & 20**	**Sound Path in Auditorium, Library, Hall Room**		
29	**Understand the different sources of Noise.**	20.1 Define Noise. 20.2 State the sources of Noise. 20.3 List the different types of Noise. 20.4 List the different types of materials use for noise control.	After the Class, Students will be able to: • Learning about noise and the sources of noise.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection.

				YouTube Link: https://www.youtube.com/watch?v=Yr5t1LiW8YE
30	**Understand the fundamentals of architectural acoustics.**	21.1 Define sound propagation velocity and wavelength. 21.2 Explain acoustic power, pressure intensity and sound pressure level. 21.3 Explain sound reflection absorption and transmission. 21.4 Describe the behavior of sound in end closed.	After the Class, Students will be able to: • Learning about sound propagation velocity and wavelength.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/watch?v=oCO5lj7ZPmM
31	**Class Test - 4**	Examination Topic: Chapter 01 Examination mark: 10 Passing Mark: 08 Chapter 9 (Theory Based)	• Can identify different sources of noise.	
32 **(Practical Class)**	**Study infiltration and ventilation load.**	22.1 Calculate the amount of fresh air/ventilated air for a comfort air conditioning.	After the Class, Students will be able to: Learning about the fresh air/ventilated air for a comfort air conditioning.	Drafting Board, Pencil, Set Square, Triangular Scale, Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/watch?v=N77HaKUyRGM
33	**Quiz Test -4**	Chapter 10 (Practical Based) Examination Topic: Chapter 01 Examination mark: 10 Passing Mark: 08	After the quiz test student will be able to justify himself\herself. Can understand the fundamentals of architectural acoustics.	
34	**Understand the**	24.1 Explain room volume and shaping. 24.2 Describe the construction of reflective	After the Class, Students will be able to:	Drafting Board, Pencil, Set Square, Triangular Scale,

	auditorium acoustics.	and absorptive panels. 24.3 Describe sound control in different types of room. 24.4 Describe the selection of reverberation time for a design. 24.5 Describe the acoustics materials.	• Learning about the volume and shaping.	Steel Scale, French Curve, PC, Sound System, Mobile with internet connection. YouTube Link: https://www.youtube.com/watch?v=9Ur1GAkmoF0
35	**Presentation**	1. Slide presentation on the 2nd architectural site visit.	• Make the students believe that they can be a great professional in their field and give them confidence.	
36	**Review Class**	Regarding student problem	Student can solve their respective topic problem.	
37	**Model Test**	Total Suggestion	After the Model Test , Students will be able to: Prepare themselves for the final exam & be confident.	• Exam khata