BANGLADESH TECHNICAL EDUCATION BOARD
Agargaon, Dhaka-1207

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM
SYLLABUS (PROBIDHAN-2016)

ARCHITECTURE & INTERIOR DESIGN

TECHNOLOGY CODE: 687

6th SEMESTER

SUBJECT NAME: Air-Conditioning & Acoustics
SUBJECT CODE: 68764

AIMS

- 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.

SHORT DESCRIPTION

Materials for air conditioning system, acoustics materials, false ceiling, sound absorption, auditorium acoustics etc. Cooling & heating load calculation. K, C, R & U factor, various types of lighting.

THEORY:

1. 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.

2. 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 the supply & return duct system.
2.5 Define duct fittings & terminal units.
2.6 Mention duct construction & reinforcement.

3. Understand the fundamental of air conditioning.

3.1 Define air conditioning **BTU** heat transmission co efficient.
3.2 Describe the necessity of air conditioning in building.
3.3 Name different elements of air condition unit suitable for use in all weather.

3.4 Name the factors to be considered in designing air conditions in an office.
3.5 Explain the heat load and cooling load of a building.
3.6 Describe how to calculate the heat for air conditioning system.

4. Understand the electrical heat.

4.1 Define the general concept of electric heat.
4.2 List the electric heat equipment.
4.3 Mention the application of electric equipment.
4.4 Explain the term of diversity factor.

5. Understand the lay-out plans of air conditioners.

5.1 Name the different elements of an air conditioning unit suitable for use in all weathers.
5.2 Name the factors to be considered in designing air conditioners in an office/a living room /a library
5.3 Draw a diagram showing all the necessary elements of a weather air – conditioning unit for a library, hall room and auditorium.

6. Understand the concept of architectural acoustics.

6.1 Define sound propagation, frequency, velocity and wavelength.
6.2 Define Echo.
6.3 Describe between echo, reverberation and resonance.
6.4 Describe the different between sound absorption and sound insulation.
6.5 State what are the assumptions on which the reverberation time formula in based.

6.6 List the different types of acoustical Materials and their uses.

7. Understand cooling load estimate.

7.1 Building survey and load Estimate.

7.2 Design condition.

7.3 Heat storage, Diversity and stratification.

7.4 Solar heat gain thru glass.

7.5 Heat and water vapour flow thru structures.

7.6 Infiltration and Ventilation.

7.7 Internal and system heat gain.

7.8 Applied psychometrics.

7.9 Air handling apparatus.

7.10 Air duct design.

7.11 Room air distribution.

8. Understand the heat loads and cooling loads of a residence.

8.1 Explain the heat =load and cooling load of a residence.

8.2 Explain variable load and constant load of a building.

8.3 List the factors influence for summer and winter air conditioning.

8.4 Describe how to calculate the heat for air-conditioning system.

8.5 Explain the methods of controlling the temperature.

8.6 Explain how maintain comfortable condition of efficient working.

9. Understand the different sources of Noise.

9.1 Define Noise.

9.2 State the sources of Noise.

9.3 List the different types of Noise.

9.4 List the different types of materials use for noise control.

10. Understand the fundamentals of architectural acoustics.

10.1 Define sound propagation velocity and wavelength.

10.2 Explain acoustic power, pressure intensity and sound pressure level.

10.3 Explain sound reflection absorption and transmission.

10.4 Describe the behaviour of sound in en closed.

10.5 Mention the characteristics of acoustical absorption materials other than their absorptivity which are important to material selection.

11. Understand the auditorium acoustics.

11.1 Explain room volume and shaping.
11.2 Describe the construction of reflective and absorptive panels.
11.3 Describe sound control in different types of room.
11.4 Describe the selection of reverberation time for a design.
11.5 Describe the acoustics materials.

12. Understand the Vision, Reflection, Brightness, Colour of surface upon vision, characteristics of in candescent, fluorescent, neon, sodium and mercury lamps.

12.1 Define vision, reflection and brightness.
12.2 Explain the influence of colour of a surface upon the quantity of vision.
12.3 Identify factors that influence the brightness of light on a surface.
12.4 Name different types of lamps.
12.5 Identify the distinguishing features of different types of lamps.
12.6 Distinguish among the characteristics of different types of

13.2 Name different types of luminaries.
13.3 Define glare and brightness of luminaries.
13.4 Explain the factors that determine the glare and brightness of different 12.7 Explain the advantages of fluorescent over in candescent lamps, mercury over sodium lamps.
12.8 Name the uses of different types of lamps.

13. Understand absorption, reflection, transmission, different types of luminaries, and their glare and brightness, influence of light in office. Commercial, Industrial and domestic buildings.

13.1 Explain absorption, reflection and transmission of light.
lamps.

PRACTICAL:

1. Collect the commercial sound absorbing materials

2. **Sketch the sound isolation barriers.**

3. **Building Orientation in climate condition.**

4. Sketch the sound alteration closed and open plans.

5. Sketch Ray-Diagram of room Acoustics. 11.1 Find out the value of K of common brick, wood, cellular.

6. Find out the C value of sand aggregate cinder aggregate, tiles, plywood and glass of different thickness.

7. Solve problems relating to conductance.

8. Draw sound path in Auditorium, Library, Hall room

9. **Draw the basic cooling system.**

10. Site visit and prepare report submission on shopping mall/hospital.

11. Calculate the cooling load calculation of a room.

12. Installation a split type /window type air conditioner.

13. Study the thermal conductivity and thermal conductance chart.

14. Study the peoples load.
14.1 Calculate the peoples load for a general office.
14.2 Calculate the peoples load for a Gymnasium/Auditorium/Restaurant

15. Study infiltration and ventilation load.

15.1 Calculate the amount of fresh air/ventilated air for a comfort air conditioning.
15.2 Solve problems related to infiltration and ventilation load.

REFERENCE BOOKS

1.Concept in Architectural Acoustics
M. DAVID EGAN
2. Handbook of Air Conditioning system Design
Carrier Air Conducting Company
3. A course in Refrigeration and Air conditioning
Arora, Domkundwar
4. Principles of Refrigerator
Roy J, Dossat