



**DEPARTMENT OF ARCHITECTURE
UNIVERSITY OF THE PUNJAB, LAHORE.**

**BACHELORS OF ARCHITECTURE (B. ARCH)
5 YEARS PROGRAM**

COURSE OUTLINE

Course Title	Environmental Control Systems III
Course Code	ARCH-343
Credit Hours	2
Semester	6th Semester / Spring
Prerequisites	NA
Tutor	As per Timetable
Student Advising	As per Timetable
Contact	-

Teacher Signature
Course introduction

Chairman Signature

It is the last course in the series of Environmental Control Systems. It takes into consideration the advanced systems to achieve user comfort such as HVAC. In addition to this, it focuses on efficient use of energy, renewability/sustainability and effective management of land, water and energy resources.

Learning Objective:

In this course, Students will learn about basic environmental controls systems including

1. Air conditioning Systems
2. Heating Systems
3. Ventilation Systems
4. Renewable Systems

Outcome

Upon the successful completion of the course, the students will be able to:

- Devise mechanical control systems using estimated methods for sizing of ducts and other components.
- Manage major mechanical system components in relation to other systems involving structure, enclosure, lighting, and fire safety.
- Apply the principles of ventilation (including natural ventilation, heat recovery, etc.)
- Practice understanding of concerns associated to energy efficiency and renewable energy applications for hot climate buildings.
- Create architectural designs that incorporate mechanical systems with other building systems (e.g., building envelop, lighting, structures) at the same time.
- Employ tools for the better management of land, water and energy resources.

Learning Methodology:

- Lectures as provided in the schedule of the semester activities
- Study of Archival Material and recommended books
- Guest Lectures as per requirement
- Presentation on allocated topics

Grade Evaluation Criteria

Following, is the criteria for the distribution of marks to evaluate final grade in a semester.

Marks Evaluation

Marks in percentage

Sessional (Assignments, Quizzes, Presentations)	30
Mid Term	30
Final examination	40

Total	100
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Content	
Unit 1	Introduction to Course
Unit 2	Concepts of Air Conditioning
Unit 3	Types of Air conditioners
Unit 4	
Unit 5	Student Presentation
Unit 6	Heating System
Unit 7	
Unit 8	Site Visit
Unit 9	Mid Term Exam
Unit 10	Renewable Energy and Sustainability
Unit 11	
Unit 12	
Unit 13	Student Presentation
Unit 14	Site Visit
Unit 15	Resources Management (Land)
Unit 16	Resources Management (Energy)
Unit 17	Resources Management (Water)
Unit 18	Final Exam
Recommended Books/References	<ol style="list-style-type: none"> 1. Designing Spaces for Natural Ventilation- An Architect's Guide Ulrike Passe and Francine Battaglia, 2015, Routledge- Taylor & Francis 2. Heating, Cooling, Lighting-<i>Sustainable design Methods for</i>

	<p><i>Architects</i> by Norbert Lechner, 4th Edition, 2015, Published by John Wiley & Sons, Inc., Hoboken, New Jersey,</p> <ol style="list-style-type: none"> 3. Introduction to Architectural Science- The basis of Sustainable Design by Steven V Szokolay, 2nd Edition 2008, Elsevier 4. Design - Tech: Building Science for Architects by Jason Alread & Thomas Leslie, 1st edition , 2007, Elsevier 5. The Architectural Expression of Environmental Control Systems by George Baird Edition 2004, Taylor and Francis Group 6. Sustainability in Architecture and Urban Design by Carl Bovill 7. Sun, Wind & Light. Architectural Design Strategies by G.Z.Brown, Mark DeKay,, 2nd Edition, 2001, John Wiley & Sons. 8. Climate Responsive Architecture by Arvind Krishan 9. Time Saver Standard for Architecture Design data-The Reference of Architectural Fundamentals by Donald Watson, Michael J. Crosbie & John Hancock Callender, 1999 McGraw-Hill 10. Building with Earth Design and Technology of A Sustainable Architecture by Minke, Gernot, 2006 Switzerland 11. Contemporary Design in Detail Sustainable Environments by Chan, Yenna, 2007 USA 12. Mainstream Green Sustainable Design by –LPA, 2005 Victoria, Australia
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	<p>13. The Whole Buildin Handbook- How to design Healthy, Efficient and Sustainable Buildings by Bokalders, Varis, 2010, London, UK</p> <p>14. Fundamentals of integrated design for sustainable building by Keeler, Marian; Burke, Bill., 2016</p> <p>15. Energy manual sustainable architecture by Hegger, Manfred, 2008</p> <p>16. A practical guide to Sustainable fashion by Gwilt, Alison, 2014 London UK</p> <p>17. Green Wall Green Roofs: Designing Sustainable Architecture, 2014 Victoria Publisher</p> <p>18. Introduction to Architectural Science and the basis of Sustainable Design by Szokolay, Steven V, 2014, London, UK</p>
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