



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

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

COURSE OUTLINE

Course Title	Sustainable Environmental Studies
Course Code	ARCH-485
Credit Hours	2
Semester	7th Semester / Fall
Prerequisites	NA
Tutor	As per Timetable
Student Advising	As per Timetable
Contact	-

Teacher Signature

Chairman Signature

Course introduction

This course introduces the academic approach of Sustainability and explores how today's human societies can endure in the face of global change, ecosystem degradation and resource limitations. The course focuses on key knowledge areas of sustainability theory and practice, including population, ecosystems, global change, energy, agriculture, water, environmental economics and policy, ethics, and cultural history. This subject is of vital importance, seeking as it does to uncover the principles of the long-term welfare of all the peoples of the planet.

Learning Objective:

This course will critically examine concepts, theories and practices of sustainable design across multiple scales. "Low tech" and "High tech" strategies will be examined, and excellence in architectural design will be explored through a critical analysis of case studies that employed "state of the art" technologies. The goal is to understand how passive and active sustainable design strategies have not only been integrated into the design process but also drive the architectural and urban form

Outcome

- How to evaluate the sustainability performance of buildings from materials
- Ways to assess energy use
- How to account for use of urban infrastructure
- How to create a neighborhood model adequate for analysis and urban policy assessment

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

Content	
Unit 1	<p>Introduction to Sustainability</p> <p>Definition of Sustainability and Sustainable Development</p> <p>Current situation of Resources</p> <p>Importance of Sustainability</p> <p>Architecture and environmental impact</p> <p>Carbon Footprint</p> <p>Greenhouse gas emissions</p> <p>The three Rs</p> <p>Objectives of Sustainable design in Architecture</p> <p>Natural Processes and Impact on Earth's Surface</p> <p>Human Intervention and Impact on Earth's Surface</p>
Unit 2	<p>Global Endeavors to adopt Sustainable initiatives</p> <p>United Nations Commission on Sustainable Development</p> <p>Earth Summit</p> <p>Objectives and results</p> <p>Sustainable Development</p> <p>Construction Activity Pollution Prevention</p> <p>Environmental Site Assessment</p> <p>Site Assessment</p> <p>Site Development-Protect or Restore Habitat</p>

	Open Space
Unit 3	<p>Integrated Design Process</p> <p>Need and Importance</p> <p>Integrated design process for Sustainability</p> <p>Early Analysis of interrelationships</p> <p>Cost effectiveness</p> <p>Synergies across disciplines and building systems</p> <p>Life-cycle Costs and Management</p>
Unit 4	<p>Sustainable design strategies on micro level</p> <p>Passive systems</p> <p>Active systems</p>
Unit 5	<p>Cavity walls</p> <p>Use and importance</p> <p>Heat Insulation</p> <p>Sound insulation</p> <p>Windows</p> <p>Windows as sources of heat gain/loss</p> <p>Window placement</p> <p>Glass thickness</p> <p>Double glazed Windows</p>
Unit 6	<p>Green Roofs</p> <p>Roofs as heat Reflectors</p>

	Roof Gardens- Applicability and Possible Uses
Unit 7	<p>Insulation (wall/roof)</p> <p>Insulation to reduce carbon emissions</p> <p>Water Efficiency</p> <p>Outdoor Water Use Reduction</p> <p>Indoor Water Use Reduction</p> <p>Greywater Re-use</p> <p>Building level water Metering</p> <p>Cooling Tower Water Use</p> <p>Water Metering</p>
Unit 8	<p>Materials and Resources</p> <p>Material Sourcing</p> <p>Prerequisite Storage and Collection of Recyclables</p> <p>Prerequisite Construction and Demolition Waste Management Planning</p> <p>Source Reduction of harmful chemicals such as Mercury, Lead, Cadmium, and Copper</p> <p>Building Life-Cycle Impact Reduction</p>
Unit 9	<p>Climatic Impact on Architecture</p> <p>Type of climates</p> <p>Climate appropriate Architecture and Sustainability</p> <p>Sustainable Site Planning</p> <p>Site Masterplan</p>

	<p>Design and Construction Guidelines to promote Sustainability</p> <p>Places of Respite</p> <p>Direct Exterior Access</p> <p>Joint Use of Facilities</p> <p>Rainwater Management</p> <p>Heat Island Reduction</p>
Unit 10	<p>Indoor Environmental Quality</p> <p>Minimum Indoor Air Quality Performance</p> <p>Initiatives to control indoor pollutants such as Environmental Tobacco</p> <p>Smoke Control</p> <p>Acoustic Performance</p> <p>Enhanced Indoor Air Quality Strategies</p> <p>Emitting Materials</p> <p>Construction Indoor Air Quality Management</p> <p>Indoor Air Quality Assessment</p>
Unit 11	<p>Indoor Environmental Quality</p> <p>Thermal Comfort</p> <p>Interior Lighting</p> <p>Use of Daylight and minimum reliance of Artificial Lighting</p> <p>Quality Views</p> <p>Acoustic Performance</p> <p>Solar Panels for Generation of Electricity</p>

<p>Unit 12</p>	<p>Regional Priority</p> <p>Indigenous Architecture</p> <p>Regional Architecture</p> <p>Vernacular VS Regional Architecture</p> <p>Critical Regionalism and Sustainability</p>
<p>Unit 13</p>	<p>Energy and Atmosphere</p> <p>Prerequisite Minimum Energy Performance</p> <p>Prerequisite Building-Level Energy Metering</p> <p>Prerequisite Fundamental Refrigerant Management</p> <p>Enhanced Commissioning</p> <p>Optimize Energy Performance</p> <p>Advanced Energy Metering</p> <p>Demand Response</p> <p>Renewable Energy Production</p> <p>Enhanced Refrigerant Management</p> <p>Green Power and Carbon Offsets</p>
<p>Unit 14</p>	<p>Green Buildings</p> <p>Building Rating Systems</p> <p>RIBA</p> <p>Location and Transportation</p> <p>Neighborhood Development</p> <p>Sensitive Land Protection</p>

	<p>High Priority Site</p> <p>Surrounding Density and Diverse Uses</p> <p>Access to Quality Transit</p> <p>Bicycle facilities</p> <p>Reduced Parking Footprint</p> <p>Green Vehicles</p>
<p>Books</p>	<ol style="list-style-type: none"> 1. Francis D.K. Ching, Ian M. Shapiro-Green Building Illustrated 2. Allan Weintraub-Frank Lloyd Wright: Natural Design, Organic Architecture: Lessons for Building Green from an American Original 3. Charles J. Kibert-Sustainable Construction: Green Building Design and Delivery 4. Kathryn Rogers Merlino- Building Reuse: Sustainability, Preservation, and the Value of Design (Sustainable Design Solutions from the Pacific Northwest) 5. Helen Bennetts, Antony Radford, Terry Williamson- Understanding Sustainable Architecture 6. David Bergman-Sustainable Design: A Critical Guide (Architecture Briefs) 7. Steven V. Szokolay -The Basis of Sustainable Design 8. Julia Watson. Lo—TEK. Design by Radical Indigenism

	<p>9. Paola Sassi- Strategies for Sustainable Architecture</p> <p>10. Stuart Walker- The Handbook of Design for Sustainability</p> <p>11. John Tillman Lyle- Regenerative Design for Sustainable Development</p> <p>12. Carl J. Stein-Greening Modernism: Preservation, Sustainability, and the Modern Movement</p> <p>13. David Sim- Soft City: Building Density for Everyday Life</p> <p>14. Huw Heywood- 101 Rules of Thumb for Low Energy Architecture</p> <p>15. Philip Jodidio-Green Architecture</p>
--	---