.VĒRITAS
UNIVERSIDAD

CENTER FOR INTERNATIONAL PROGRAMS
Course name: Tropical Design and Architecture
Course code: ARCH 3200
Total contact hours: 60 hours

COURSE DESCRIPTION
This course teaches students to develop the skill to analyze a particular architectural situation and be able to offer adequate design solutions that will guarantee a good quality environment. It is offered to all students with no previous knowledge of design projection and means of graphic expression, who want to learn about tropical design.

Instructional objective
Exercise the analysis capacity in order to draw conclusions and create design solutions that will respond to specific conditions such as climate. To broaden the experience of learning and challenge the creative process through exposure, investigation, observation, experimentation, group analysis and general discussions.

Specific Objectives:
- To understand the need for adequate climatic design.
- To enjoy the form and shape of architecture as a response to climate.
- To study the interesting diversity that we find in the world due to the fact that every place, as each person, presents different characteristics and destinies.
- Find the balance between globalization and local identity.
- To learn from the richest treasure of the poor: their ingenuity. Restricted resources, knowledge of land and climate as well as a rural tradition where domestic construction is passed on from one generation to another, resulted in vernacular architecture that has a lot of useful application and meaning.
- Familiarize the student with the various contemporary climate-related design currents around the world.

METHODOLOGY

Theory presented with plenty of visual images and examples.
Practice based on active participation of students in class discussions and various exercises.
Individual and group presentation of theoretical analysis or a short design project.
Two field trips: volcano site and Caribbean beach site.

CONTENTS
Week 1

Class 1:
- Global climatic factors: Earth rotation, axis inclination, thermal equilibrium of the globe, winds.
- Classification of climatic zones. Classification of tropical and warm climates.

Class 2:

- Geographic belt between the Tropic of Cancer and the Tropic of Capricorn.
- The land: geography, topographical influence, forestry, presence of water.
- The climatic conditions: general and local climates, differences and similarities.
- The people: social and racial background, cultural behavior, tradition and identity.

Class 3:

- Climatic conditions. Elements of Climate: Temperature, relative humidity, precipitation, wind speed and direction, sky conditions: presence of clouds and solar radiation.
- Climatic factors and how they affect design.

Class 4:

- Design with climate. How to read and produce charts. The use of various design tools.
- Charts assignment.

Week 2

Class 5: Bioclimatic diagram. Bioclimatic design. Checking of charts.

Class 6:

- Concept of Comfort Zone. Comfort factors. Heat production and loss in the human body.
- Thermal factors, heat-fatigue index and long exposure. Air movement. Temperature effectiveness and regulators. How to meet the comfort zone. Comfort scale and design. Class exercise: comfort zone chart.

Class 7:

- Design criteria to improve local climatic conditions. Shape and orientation of group and individual buildings. Class exercises on specific design solutions.

Class 8

- Microclimate. Thermal design and control. Heat exchange in buildings. Ventilation improvement. Mechanic and structural controls. Special conditions. Urban climate.

Week 3

Class 9:

- Natural and artificial lighting. Nature of light. Daylight and climate. Shade. Munsell principle.
- Acoustics. Sound principles. Noise control in the tropics.

Class 10:

- Application of climatic analysis. Site analysis and microclimate. Topography and vegetation.
- Underground water. Building orientation and shape. Views.

Class 11: Class exercises: general use of charts and applied analysis.

Class 12: Theory exam

Week 4

Class 13:

- Environmental Design. Landscape architecture. Learning from vernacular experience.
- Regionalist approach to design. Contemporary technology for climate control. Low budget construction in the tropics. Examples of "gardens in the air" in high-rise buildings.
- Ecological architecture. Relationship between Nature and built form. Out-doors spaces.

Class 14:

- Energy saving. Low-energy design. Solar energy. Hot water. Principles of thermal design.
- Passive solar energy housing. Eolic energy, other sources and options. Earth-sheltered architecture and the underground space. Architecture on trees. Design with water.

Class 15:

- Architecture for tropical and warm climates. Contemporary Architecture in the tropics and Desert climate. Subtropical regions. Examples of climatic design in various tropical countries.
- Tropical climate of altitude.

Class 16: Field trip to a volcano. On-site analysis of tropical mountain climate. Observation of gradual change in vegetation and climatic conditions along the route. Design tips.

Week 5

Class 17:

- Equatorial climate. Compound climates. Mild or moderate humid climate. Insular climates.
- Revision of first design or theoretical project.

Class 18:

- Tropical dry climate. Climatic characteristics and physiological needs. Traditional protection.
- Design recommendations and examples. Revision of projects and theoretical investigations.

Class 19:

- Tropical humid climate. Climatic conditions and analysis. External and internal spaces.
- Design treatment of construction elements. Exercise in class.

Class 20:

- Field trip to the hot-humid tropical area of the Caribbean. Climate analysis through observation.

- Study of vernacular influence and local architecture as response to climatic conditions.
- Conclusions. Final results.

Electronic devices:

The use of cell phones, smart phones, or other mobile communication devices is disruptive, and is therefore prohibited during class. **Please turn all devices OFF and put them away when class begins.** Devices may be used ONLY when the professor assigns a specific activity and allows the use of devices for internet search or recording. Those who fail to comply with the rule must leave the classroom for the remainder of the class period.

EVALUATION SYSTEM

Class assistance, participation, individual and group class work……..	25%
Field trips……..	10%
Theory exam…….....	10%
Design assignments:	
Design project #1: mountain restaurant or theoretical proposal (tropical climate of altitude)	15%
Design project #2: sea-front house or theoretical proposal (tropical dry climate)	15%
Design project #3: small beach hotel or theoretical proposal (tropical humid climate)	25%

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