



BACHELOR OF INTERIOR DESIGN

SEMESTER IV

| IND2401 | SUSTAINABLE DESIGN | L | T | P | C |
|-------------------------|--|----------|----------|----------|----------|
| Version 1.1 | Date of Approval: July, 2021 | 2 | 1 | - | 3 |
| Pre-requisites/Exposure | Psychology of Living Environments | | | | |
| Co-requisites | Design Thinking & Creative Problem Solving | | | | |

Catalogue Description

The aim of this course is to familiarize the students with the theoretical and practical aspects of sustainable design and the various technologies involved in executing them. This course aims to equip the students with various tools of sustainable design such as design methodology, resource optimization and innovative approaches to eco-design.

Course Objectives

The objective of this course is:

- To familiarize the students with sustainability and its scope.
- To understand the need for sustainable design principles and approaches.
- To understand the complexities of the design of sustainable buildings
- To familiarize the students with the sustainable design strategies.

Course Outcomes

On completion of this course, the students will be able to:

- CO1: Define sustainability and its scope
- CO2: Describe the various faces and principles of sustainable design.
- CO3: Design according to the sustainable design considerations.
- CO4: Identify the low impact materials and techniques used as sustainable design strategies.

Course Content

| Modules | Blooms level* | Number of hours |
|----------------|----------------------|------------------------|
|----------------|----------------------|------------------------|

| | | |
|--|--------------|---|
| <p>MODULE 1: Introduction to Sustainability</p> <p>Scope of sustainability: Sustainable development; Brundtland Report; Ethics and Visions of sustainability, The principle of integrating environmental, social, economic and political dimensions; Eco system and food chain, Natural cycles, Carrying capacity, Ecological foot print; Carbon footprint, Climate change Sustainability.</p> | L1,L2 | 9 |
| <p>MODULE 2: Sustainability and the Design</p> <p>Faces of Sustainable Design: Design for Disassembly, Design for the Environment, Product stewardship, Cradle to Cradle, Bio-mimicry, Green chemistry, Green marketing; Principles of Sustainable Design: Economy of Resources, Life Cycle Design, Humane Design; Sustainable Design Approaches: Sustainable design, Trans-disciplinary collaboration in design, Life cycle design and life cycle assessment (LCA), Design for disassembly, Design for reuse, Design for sustainable manufacturing and construction, Design for remanufacturing.</p> | L1,L2 | 9 |
| <p>MODULE 3: Sustainable Design Considerations</p> <p>Design for environment, Land use planning; Smart growth and urban design; Transportation policy and design; Environmental site design; Site assessment and selection; Brownfield redevelopment strategies and infill development, Eco-design. Biophilia and Biophilic Design Socially responsible design, User-centered design, Design education and sustainability, Design ethics and sustainability.</p> | L3,L4, L5 | 9 |
| <p>MODULE 4: Sustainable Design Strategies</p> <p>Selection of low-impact materials; Reduction of materials usage; Optimization of production techniques; Optimization of distribution system; Reduction of impact during use; Optimization of initial lifetime; Optimization of end-of-life system.</p> | L1,L2 | 9 |

**Bloom's Level:*

L1-Knowledge; L2-Comprehension; L3-Application; L4:Analysis; L5:Synthesis, L6:Evaluation

Text & References:

1. Charles. J. Kibert, „Sustainable Construction“ John Wiley and sons Inc, USA.
2. N.D. Kaushika(2013). , Energy, Ecology and Environment, Capital Publishing Company,
3. New Delhi.

4. McDonough; The Upcycle: Beyond sustainability--designing for abundance. Macmillan.
5. Rodney Howes, Infrastructure for the built environment, Butterworth Heineman.
G.Tyler Miller JR, Living in the Environment, Wardsworth Publishing Company, USA
6. Marcus, Clare Cooper, and Marni Barnes. Healing gardens; John Wiley & Sons, 1999.
Rockwood, eds. Foundations of environmental sustainability:. Oxford University Press, 2008
. Crul, M. R. M., and J. C. Diehl; Design for sustainability. UNEP/Earthprint.
7. Wilson, E. O. Biophilia. Cambridge(1986), MA: Harvard University Press, .
Kellert, Stephen R., Biophilic design. John Wiley & Sons, 2011.

Modes of Evaluation: Quiz/Assignment/ Seminar/Written Examination

Examination Scheme:

| Components | A | H | CT | EE |
|---------------|----|----|----|----|
| Weightage (%) | 05 | 10 | 15 | 70 |

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Relationship between the Course Outcomes (COs) , Programme Outcomes (POs) and Learning Outcomes (LOs) AHEP3

1: strongly related, 2: moderately related and 3: weakly relate

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO1 0 | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PSO 5 | PSO 6 | PSO 7 |
|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| CO 1 | -- | -- | 1 | -- | 2 | -- | -- | -- | -- | -- | -- | 1 | 1 | -- | 2 | -- | -- |
| CO 2 | -- | -- | 1 | -- | 2 | 1 | -- | -- | -- | -- | 1 | 1 | 1 | -- | 2 | -- | -- |
| CO 3 | -- | 1 | -- | -- | -- | -- | -- | -- | -- | -- | 2 | -- | 1 | -- | -- | -- | -- |
| CO 4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | -- | -- | -- | 1 | 1 | -- | -- |

CONCENTRATION ELECTIVE 2

| IND2610 | SUSTAINABLE INTERIOR DESIGN & MATERIALS | L | T | P | C |
|-------------------------|--|----------|----------|----------|----------|
| Version 1.1 | Date of Approval: July,2021 | 3 | 0 | 0 | 3 |
| Pre-requisites/Exposure | | | | | |
| Co-requisites | | | | | |

Catalog Description

On the successful completion of the course student will be able to:

- Analyze Environmental Impacts and Sustainable Design Strategies.
- Understand Phases of Building Materials, Life-cycle Assessment; Life-cycle Inventory.
- Analyze and Execute Sustainable Interior Materials in construction

Course Objectives

- Careful selection of environmentally sustainable building materials is the easiest way for architects to begin incorporating sustainable design principles in buildings. This course helps the students to understand the sustainable interior materials and methods.

Course Outcomes

On completion of this course, the students will be able to

- **CO1:** Bio Climatic Design Concepts
- **CO2:** Sustainable Interior Materials Selection
- **CO3:** Key Sustainable Interior Materials and Methods

Course Content

| Modules | Blooms level* | Number of hours |
|--|----------------------|------------------------|
| <p>Module I: Bio Climatic Design Concepts Environmental Impacts and Sustainable Design Strategies: Natural Resource Depletion, Energy use, Pollution. The Designer's role beyond design and construction. The principles of Life Cycle Design; Phases of Building Materials, Life-cycle Assessment (LCA); Life-cycle Inventory (LCI);</p> | L1, L2 | 12 |

| | | |
|---|--------|----|
| <p>LCA in Practice: EIE, BEES; Assessments tools: BREEAM, SB Tool, LEED, Eco Profile, Promise, Green Mark of Buildings, Green Star, CASBEE. Certification Systems: First party, Second party and Third party ;</p> <p>Third-party Certification Organizations: The Forest Stewardship Council (FSC), Green guard Environmental Institute (GEI), Green Seal, Inc., and Scientific Certification Systems (SCS); The Carpet and Rug Institute (CRI); Resilient Floor Covering Institute (RFCI)</p> | | |
| <p>Module II: Sustainable Interior Materials Selection</p> <p>Criteria: Indoor Air Quality (IAQ); Reusable or Renewable Resources Energy Efficiency; Water Conservation. Features: Pollution prevention; waste reduction; recycled content; embodied energy; Natural materials; Minimal construction waste; Locally produced materials; Non- or less-toxic materials; Durable materials; Rapidly Renewable Materials; Low Maintenance; Reusability; Recyclability; Biodegradability; Harmful Chemical that can affect air quality in interior spaces: Volatile Organic Compounds (VOCs); Brominated flame retardants, Halogenated plastics, Bisphenol A, Heavy metals, Toxic solvents in finishes and sealants, Formaldehyde.</p> | L1, L2 | 12 |
| <p>Module III: Key Sustainable Interior Materials and Methods</p> <p>Bricks & Blocks: Recycled concrete bricks, Adobe bricks, Stabilized earth blocks, Compressed sand bricks, Hydra form bricks, Fly Ash Bricks, Wool Bricks; Wood Materials: Engineered wood: Plywood, Oriented strand board, Glued laminated timber (glulam), Laminated veneer lumber, Cross Laminated Timber, Parallel strand lumber, Finger jointed lumber, I-joists and wood I-beams, Roof trusses and floor trusses, Certified Wood; Site and Landscaping: Landscape pavers made from recycled plastic, Recycled asphalt and bitumen, Expanded polystyrene foam. Foundations: rigid plastic foam, Concrete blocks with foam inserts; Flooring: Bamboo flooring, Cork flooring, Eco-friendly linoleum flooring; Structural Framing: Wood and steel open web joist; Roofing: Solar Tiles Roofing, Sustainable Concrete, Fiber-resin composition roofing tiles, integrated sheathing and insulation, pre-tapered for flat roofs, Weatherproof shingles manufactured from recycled aluminum alloys; Structural Envelopes: Super-insulated stress-skin panels; Earth bag construction; Insulation: Homasote fiberboard, Cotton insulation, Hemp based products, Blown insulation; Interior Finishes: wallpapers, recycled gypsum board or wallboard, Natural Fiber Reinforced Plastics, Casein paint, Sisal wall coverings, recycled burlap or virgin jute fiber carpet, recycled wool carpet, recycled ground up tire rubber. Plumbing: Low flow shower heads, Solar hot water, Vacuum-assisted toilets; Ventilation: Heat-recovery ventilator, Triple-</p> | L1, L2 | 12 |

| | | |
|---|--|--|
| Glazed [(low-emissivity (low-E) glass] Windows. | | |
|---|--|--|

*Bloom's Level:

L1-Knowledge; L2-Comprehension; L3-Application; L4- Analysis; L5- Synthesis; L6- Evaluation

Text/Reference Books

1. Kim, Jonglin; Qualities, Use, and Examples of Sustainable Building Materials, CSS,University of Michigan, 1998.
2. Binggeli, Corky. Materials for interior environments. John Wiley & Sons, 2008.
3. American Institute of Architects; Environmental Resource Guide Subscription. Washington: AIA; 1992.
4. Sassi, P Strategies for Sustainable Architecture; New York, Taylor and Francis, 2006.
5. Spiegel, Ross; Green building materials: a guide to product selection and specification. John Wiley & Sons, 2010.
6. Yudelson, Jerry. The green building revolution. Island Press, 2010.
7. Martha Maeda, The Complete Guide to Green Building & Remodeling Your Home, Atlantic Publishing Co. 2011.
8. Giudice, Fabio, Product design for the environment: a life cycle approach. CRC press, 2006.

Modes of Evaluation: Quiz/Assignment/ Seminar/Written Examination

Examination Scheme:

| Components | A | H | CT | EE |
|---------------|----|----|----|----|
| Weightage (%) | 05 | 10 | 15 | 70 |

CT: Class Test, HA: Home Assignment, SVQ: Seminar/Video/Quiz, EE: End Semester Examination; At: Attendance

Relationship between the Course Outcomes (COs) , Programme Outcomes (POs) and Program Specific Outcomes

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PSO 5 | PSO 6 | PSO 7 |
|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| CO 1 | 1 | 3 | 1 | - | 3 | 3 | - | - | - | - | 2 | 3 | - | - | - | - | - |
| CO 2 | 1 | 3 | 1 | - | 3 | 3 | - | - | - | - | 2 | 3 | - | - | - | - | - |
| CO 3 | 1 | 3 | 1 | - | 3 | 3 | - | - | - | - | 2 | 3 | - | - | - | - | - |

1: strongly related, 2: moderately related and 3: weakly relate

| IND2611 | SUSTAINABLE INTERIOR RENOVATION | L | T | P | C |
|-------------------------|--|----------|----------|----------|----------|
| Version 1.1 | Date of Approval: July,2021 | 3 | 0 | 0 | 3 |
| Pre-requisites/Exposure | | | | | |
| Co-requisites | | | | | |

Catalog Description

On the successful completion of the course student will be able to:

1. Typology of the existing housing, Constructive mode and materials, Renovation strategies.
2. Execute Principles of acoustic insulation and correction, optimizing the Acoustic comfort.
3. Optimize the lighting system, Renewable energies for generating electricity, Heat recovery on ventilation system, Air pre-heating by air ground exchanger.

Course Objectives

- Sustainable renovation needs special skills for diagnosis, conception, for using intelligent or new techniques, and then ensuring maintenance. This course provides an insight to the students about the need and importance as well as various concepts of sustainable renovation.

Course Outcomes

On completion of this course, the students will be able to

- CO1: Introduction to Sustainable Renovation
- CO2: The Comfort of Life
- CO3: Energy Consumption
- CO4: Water Consumption
- CO5: Reduce production of waste & consumption of Territory Resources.

Course Content

| Modules | Blooms level* | Number of hours |
|---|----------------------|------------------------|
| <p>Module I: Introduction to Sustainable Renovation Sustainable Renovation: Need, Meaning & Definition, Priorities for the renovation of housing, Definition of sustainable architecture, The inception of bioclimatic architecture. Typology of the existing housing, Constructive mode and materials, Renovation strategies.</p> | L1, L2 | 6 |
| <p>Module II: The Comfort of Life Increase the quality of the outdoor spaces: Favour social interactions, Favour Soft mobility, Favour and reintroduce biodiversity; Increase the quality of indoor air, limiting sources of indoor pollution, Optimizing the ventilation system. Acoustic comfort. Basic notions, principles of acoustic insulation and correction, optimizing the acoustic comfort.</p> | L1, L2 | 6 |
| <p>Module III: Energy Consumption Increase the thermal performances of housing: Optimizing the External walls performances, Optimizing the shape, : Additional insulation in housing renovation. Improving the air tightness, Reducing the thermal bridge Thermal inertia in housing renovation, Optimizing the solar protections, Natural night cooling, Optimizing the window conception. Reduce fossil energies consumption: Optimizing the heating system, Optimizing domestic hot water, Heat pump for heating production, Hot Water production by solar energy, Optimizing the lighting system, Renewable energies for generating electricity, Heat recovery on ventilation system, Air pre-heating by air ground exchanger.</p> | L1, L2 | 8 |
| <p>Module IV: Water Consumption Reduce the tap water consumption: Rational use of tap water, Recovery and use of Rainwater, increase the water resources. Water management on the parcel, Water recycling by plants, Water recycling in urban area.</p> | L1, L2 | 8 |
| <p>Module V: Reduce production of waste & consumption of territory resources Reduce construction and demolition waste: Preventive measures to reduce Waste Waste management on building site, Reduce domestic waste: Preventive measures to reduce domestic waste; Reduce consumption of territory and resources, Embodied energy consumption, Construction materials.</p> | L1, L2 | 8 |

*Bloom's Level: L1-Knowledge; L2-Comprehension; L3-Application; L4: Analysis; L5: Synthesis, L6: Evaluation

Text & References:

1. Trachte, Sophie: Advanced and Sustainable Housing Renovation. A guide for Designers and Planners. UCL, 2010.

3. George Baxter, Tim Pullen; *The Sustainable Building Bible*; Oxelo Publishing, Limited, 2012.
4. Sung, WenPei; eds. *Environment, Energy and Sustainable Development*. CRC Press, 2013.
5. Maroni, Marco, Bernd Seifert; eds. *Indoor air quality: a comprehensive reference book*. Elsevier, 1995.
6. Fuchs, Helmut V. *Applied Acoustics*; Springer Science & Business Media, 2013.
7. Brooker, Graeme, and Lois Weinthal, (Eds.) *The handbook of interior architecture and design*. A & C Black, 2013.
8. Fuchs, Matthias, et al. *Energy manual: sustainable architecture*. Walter de Gruyter, 2008.
9. GeyerAllély, Elaine. *Water consumption and sustainable water resources management*. OECD, 1998.

Modes of Evaluation: Quiz/Assignment/ Seminar/Written Examination

Examination Scheme:

| Components | A | H | CT | EE |
|---------------|----|----|----|----|
| Weightage (%) | 05 | 10 | 15 | 70 |

CT: Class Test, HA: Home Assignment, SVQ: Seminar/Prez/Quiz, EE: End Semester Examination; At: Attendance

Relationship between the Course Outcomes (COs) , Programme Outcomes (POs) and Program Specific Outcomes

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PSO 5 | PSO 6 | PSO 7 |
|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| CO 1 | 1 | 3 | 1 | - | 3 | 3 | - | - | - | - | 2 | 3 | - | - | - | - | - |
| CO 2 | 1 | 3 | 1 | - | 3 | 3 | - | - | - | - | 2 | 3 | - | - | - | - | - |
| CO 3 | 1 | 3 | 1 | - | 3 | 3 | - | - | - | - | 2 | 3 | - | - | - | - | - |
| CO 4 | 1 | 3 | 1 | - | 3 | 3 | - | - | - | - | 2 | 3 | - | - | - | - | - |
| CO 5 | 1 | 3 | 1 | - | 3 | 3 | - | - | - | - | 2 | 3 | - | - | - | - | - |

1: strongly related, 2: moderately related and 3: weakly related

| | | | | | |
|-------------------------|------------------------------------|----------|----------|----------|----------|
| IND2612 | ADAPTIVE REUSE AND RETROFIT | L | T | P | C |
| Version 1.1 | Date of Approval: July,2021 | 3 | 0 | 0 | 3 |
| Pre-requisites/Exposure | | | | | |
| Co-requisites | | | | | |

Catalog Description

On the successful completion of the course student will be able to: Analyse the building's performance, Able to use sustainable conservation techniques and to Improve the energy performance of heritage structures.

Course Objectives

- The objective of this course is to give a comprehensive overview on how existing buildings can be adapted and retrofitted to function sustainably.

Course Outcomes

On completion of this course, the students will be able to

- **CO1:** Sustainable Retrofit for existing building
- **CO2:** Adaptive Reuse of old building
- **CO3:** Technologies for energy efficiency in existing buildings
- **CO4:** Sustainable conservation of heritage structures

Course Content

| Modules | Blooms level* | Number of hours |
|---|----------------------|------------------------|
| Module I: Sustainable Retrofit for existing building Retrofitting options for existing buildings; Structural retrofit; Façade; Services; Interior retrofit; Performance analysis of existing buildings ;Physical audits; Building simulation , metering and tracking options, analysis the building's current performance, decision influencers for retro fit, economic, social and environmental issues. | L1, L2 | 10 |
| Module II: Adaptive Reuse of old building Need for adaptive reuse; Issues to be explored in building adaption; Economic, social environmental, and assessment models for adaptive reuse; Case studies of buildings with adaptive reuse. | L1, L2 | 8 |

| | | |
|--|--------|----|
| Module II: Technologies for Energy Efficiency in Existing Buildings Improving energy efficiency in existing buildings, Facade improvements;HVACimprovements; Indoor Environment Improvements; Monitoring the performance of retrofits; Case studies on energy efficiency improvements in existing buildings. | L1, L2 | 10 |
| Module II: Sustainable Conservation of Heritage Structures Conservation of heritage structures; Sustainability in heritage structures; Adaptive reuse of heritage structures; Issues in adapting a heritage structure; Use of sustainable conservation techniques; Improving the energy performance of heritage structures; Case studies of sustainable conservation in heritage structures. | L1, L2 | 8 |

Bloom's Level:

L1-Knowledge; L2-Comprehension; L3-Application; L4- Analysis; L5- Synthesis; L6- Evaluation

Text/Reference Books

1. Harimohan Pillai – Heritage conservation and cultural continuity – Sarawatham publishers, 2002.
2. Sustainable building design manual – TERI publication, 2004.
3. Sandra F Mender: The HOK Guide book for sustainable design
John Wiley and Sons, Canada, 2002
4. Sara J. Wilkinson; Sustainable Building Adaptation: Innovations in Decisionmaking, John Wiley and sons, 2014
5. John Krigger, Residential Energy: Cost Savings and Comfort for Existing Buildings, Prentice Hall, 2009
6. William H. Clark, Retrofitting for Energy Conservation, McGraw Hill Professional, 1997
Paul Apple, Sustainable Retrofit and Facilities Management, Routledge, 2013
7. Zeynep Aygen, International Heritage and Historic Building Conservation; Routledge, 2013

Modes of Evaluation: Quiz/Assignment/ Seminar/Written Examination

Examination Scheme:

| Components | A | H | CT | EE |
|---------------|----|----|----|----|
| Weightage (%) | 05 | 10 | 15 | 70 |

CT: Class Test, HA: Home Assignment, SPQ: Seminar/Pre-Quiz, EE: End Semester Examination; At-Attendance

Relationship between the Course Outcomes (COs) , Programme Outcomes (POs) and Program Specific Outcomes

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PSO 1 | PSO 2 | PSO 3 | PSO 4 | PSO 5 | PSO 6 | PSO 7 |
|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| CO 1 | 1 | 3 | 1 | - | 3 | 3 | - | - | - | - | 2 | 3 | - | - | - | - | - |
| CO | 1 | 3 | 1 | - | 3 | 3 | - | - | - | - | 2 | 3 | - | - | - | - | - |

| | | | | | | | | | | | | | | | | | |
|-----------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | | | | | | | | | | | | | | | | | |
| CO 3 | 1 | 3 | 1 | - | 3 | 3 | - | - | - | - | 2 | 3 | - | - | - | - | - |
| CO 4 | 1 | 3 | 1 | - | 3 | 3 | - | - | - | - | 2 | 3 | - | - | - | - | - |

1: strongly related, 2: moderately related and 3: weakly related

BACHELOR OF ARCHITECTURE

| | ARCHITECTURAL CLIMATOLOGY (ARC2311) | L | T | S | P | C |
|-------------------------|--|---|---|---|---|---|
| Version 1.1 | Date of Approval: | 2 | 0 | 0 | 0 | 2 |
| Pre-requisites/Exposure | Architectural Design -II | | | | | |
| Co-requisites | Architectural Design – III | | | | | |

Catalog Description

The aim of this course is to obtain knowledge required for understanding the influence of climate on architecture. This course helps to acquaint students to various concepts of climate and its use in architecture and makes them understand the concept of human thermal comfort as an essential function of the buildings in accordance with climate responsive architecture, ventilation and air movement. The students are exposed to the various design strategies for building in different types of climatic zones. The subject will be taught in congruence with the Design studio, and assignments for the subject will be linked to the design exercises to achieve higher level of learning and understanding the practical application of the same.

Course Objectives

The objective of this course is

- To acquaint the students to various concepts of climate analysis and its use in Architecture.
- To familiarize students with human thermal comfort as an essential function of building.
- To familiarize students with the design and settings for buildings for daylight and factors that influence temperature.

Course Outcomes

On completion of this course, the students will be able to

CO1: Analyze factors affecting climate and its elements.

CO2: Analyze different climatic zones and their characteristics and design shelters in response to various climate zones. And analyze relation between transfer of heat between buildings and environment and design buildings for thermal comfort.

CO3: Analyze movement of sun in relation to earth and design shading devices. And analyze how to avoid sun's heat but utilize maximum daylight.

CO4: Analyze the effect of water bodies, vegetation and topography on micro urban climate. And Determine orientation of the building with respect to sun and wind for passive cooling and heating techniques for energy efficient, green and sustainable architecture.

| Modules | Blooms level* | Number of hours |
|--|----------------|-----------------|
| MODULE 1: Introduction to climate Importance of climate in architecture, factors affecting climate, elements of climate- Solar radiation, temperature, wind, humidity and precipitation and their measurement. | L1, L2 | 3 |
| MODULE 2: Climatic zones and human thermal comfort Climatic zones, macro and micro climate, elements of climate and climatology data required for design of buildings in different climatic zones, Characteristics of tropical climate, macroclimate and microclimate. Study of various shelters in response to various climate zones in the tropical belt of India. Study of body's heat production and heat loss, comfort zone, bio-climatic chart and effective temperature, Isopleths. | L1, L2, L3, L4 | 6 |
| MODULE 3: Solar chart, shading devices and Daylight Method of recording the position of sun in relation to earth, solar chart, azimuth, altitude, incidence, using shadow angle protractor for designing shading devices. Apparent movement of sun, solar radiation and intensity on surfaces and buildings in different latitude, sun path diagram, shading device and its design, heliodon and its use; Opaque building and heat transfer through its multi-layered envelope; Transparent surface and solar radiation on it, absorbance, reflectance, transmittance and remittance. Fenestration, lighting level and glare, amount of light, sky as a source of light and daylight factor, effect of different types of fenestrations, their size, shape in different planes with and without obstructions, Principles of day lighting in Tropics. | L1, L2, L3, L4 | 8 |
| MODULE 4: Site climate and passive design strategies Microclimate, site climate data, local factors, presence of water body and vegetation, topography, special characteristics, urban climate cooling degree days and heating degree days. Orientation-sitting of building with respect to sun, wind and view, use of evaporative cooling, ground cooling-earth air tunnel, thermal mass-cavity wall, natural ventilation of attic space, night time cooling, reflective surfaces and radiant barrier, cool roof and green roof, solar radiation and sun space. Introduction to ECOTECH and Design Builder software. | L1, L2, L3, L4 | 7 |

**Bloom's Level:*

L1-Knowledge; L2-Comprehension; L3-Application; L4: Analysis; L5: Synthesis, L6: Evaluation

Text Books

- Koenigsberger, O. H. (1975). Manual of Tropical Housing and Building Climatic Design: University Press.
- Krishan, Arvind. (1st Edition 2017). Climate Responsive Architecture: A Design Handbook for Energy Efficient Buildings: Tata McGraw-Hill Education.

Reference Books

- Altan, H., Hajibandeh, M., Tabet Aoul, K. A., & Deep, A. (2016). Passive design. In Springer Tracts in Civil Engineering (pp. 209–236). Springer. https://doi.org/10.1007/978-3-319-31967-4_8
- 2. Mohamed, S. (2002, September). Safety climate in construction site environments. Journal of Construction Engineering and Management. [https://doi.org/10.1061/\(ASCE\)07339364\(2002\)128:5\(375\)](https://doi.org/10.1061/(ASCE)07339364(2002)128:5(375))
- 3. Rind, D. (2002, April 26). Climatology: The Sun’s role in climate variations. Science. <https://doi.org/10.1126/science.1069562>
- 4. Rupp, R. F., Vásquez, N. G., & Lamberts, R. (2015, August 17). A review of human thermal comfort in the built environment. Energy and Buildings. Elsevier Ltd. <https://doi.org/10.1016/j.enbuild.2015.07.047>
- 5. Taleghani, M., Tenpierik, M., Kurvers, S., & Van Den Dobbelsteen, A. (2013). A review into thermal comfort in buildings. Renewable and Sustainable Energy Reviews. <https://doi.org/10.1016/j.rser.2013.05.050>

Modes of Evaluation: Quiz/Assignment/ Seminar/Written Examination

Examination Scheme:

| Evaluation Scheme | | | | | | | Total Marks | Credits | Duration of Exam (hr) | |
|---------------------|----|----|---|---------------------|-----|-----|-------------|---------|-----------------------|-------|
| Internal Assessment | | | | External Assessment | | | | | | |
| CT | | TA | A | Total | ESE | ESJ | | | | Total |
| I | II | | | | | | | | | |
| 10 | 10 | 25 | 5 | 50 | 50 | 0 | 50 | 100 | 2 | 3 |

CT: Class Test; TA: Total Assessment; A: Attendance; ESE: End Semester Examination; ESJ: End Semester Jury

CO, PO and PSO mapping

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| CO1 | -- | 3 | -- | -- | -- | -- | 1 | -- | -- | -- | -- | -- | 2 | 3 | 1 | -- |
| CO2 | -- | 3 | -- | -- | -- | -- | 2 | -- | -- | -- | -- | -- | 2 | -- | 1 | -- |
| CO3 | -- | -- | 2 | -- | -- | -- | 1 | -- | -- | -- | -- | -- | 2 | 3 | 1 | -- |
| CO4 | -- | -- | 2 | -- | -- | -- | 1 | -- | -- | -- | -- | -- | 2 | 3 | 1 | -- |

1: strongly related, 2: moderately related and 3: weakly related

| | ELECTIVE- ECOLOGY, ENVIRONMENT AND SUSTAINABLE DEVELOPMENT – I (ARC2520) | L | T | S | P | C |
|-------------------------|---|---|---|---|---|---|
| Version 1.1 | Date of Approval: | 3 | 0 | 0 | 0 | 3 |
| Pre-requisites/Exposure | Environmental Sciences, Building Services-1, Building Services-2 | | | | | |
| Co-requisites | Architectural Design, Building Services-3 | | | | | |

Catalog Description

The objective of this course is to offer opportunities in specialized or advance learning in ecology, environment and sustainable aspects which are of concern to Architecture. The course will generally be conducted in the seminar/studio mode to encourage research, exploration and skill developments. The aim of this course is to provide students the exposure to understanding ecology and various environmental problems faced by settlements. The course will also provide the students hands-on ecological and environmental studies of built environment. The course contents to be followed will be developed by course teachers based on the resources at hand and opportunities for cross learning with other courses. The course would be conducted through literature survey, case studies, site visits, community surveys and hands on projects. During the course the students will be working on a live project in groups which are preferably interdisciplinary.

Course Objectives

The objective of this course is

- To understand the basic principles of ecology, environment and sustainable development.
- The course intends to study and understand the different components of city in order to understand how these elements contribute to environment quality.
- To establish the significance of the ecological issues, their impact and initiatives to address the same in the built environs to achieve sustainable development.
- To develop interdisciplinary understanding and sensitivities of future architects.

Course Outcomes

On completion of this course, the students will be able to

- CO1:** Develop a relationship between man and ecology, will understand critical environmental issues and need to address the m by using advanced technology.

CO2: Produce reports and presentation.

| Modules | Blooms level* | Number of hours |
|---|---------------|-----------------|
| <p>MODULE 1: Introduction to Ecology, Environment and Sustainable Development Basic introduction to ecology; Interrelation between natural and built environment; Importance of environment sustainability in built environment; Energy conservation, renewable sources: wind, solar, geo-thermal, bio-fuels; Materials minimizing, recycling, reducing energy content, etc; Other environmental issues related to solid waste management, water resources, air quality, storm water drainage etc; Various case studies related to traditional / vernacular buildings and settlements demonstrating relationship between climate, local material resources and settlement/ building forms.</p> | L1, L2 | 8 |
| <p>MODULE 2: Project Work Selection and understanding of case study; Formulation of Aim and Objectives, Collection of data through primary and secondary sources; Conducting survey; Database development using relevant and advance software; Qualitative and quantitative data analysis; Report writing and presentations.</p> | L4, L5, L6 | 16 |

*Bloom's Level: L1-Knowledge; L2-Comprehension; L3-Application; L4:Analysis; L5:Synthesis, L6:Evaluation

Text Books/References

- Bakari, Mohamed El-Kamel (2017). *The Dilemma of Sustainability in the Age of Globalization: A Quest for a Paradigm of Development*. New York: Lexington Books. ISBN 978-1498551397
- Blewitt, J. (2008). *Understanding Sustainable Development*. London: Earthscan. pp. 21–24. ISBN 978-1-84407-454-9.
- Fulekar, M. H., Pathak, B., Kale, R. K. (2014) *Environment and Sustainable Development* Springer Nature; ISBN-10: 8132211650; ISBN-13: 978-8132211655
- Goudie, Andrew (2000). *The Human Impact on the Natural Environment*. Cambridge, Massachusetts: This MIT Press. pp. 203–239. ISBN 0-262-57138-2.
- James, Paul (2014). *Urban Sustainability in Theory and Practice*. doi:10.4324/9781315765747. ISBN 978-1-315-76574-7.
- James, Paul; Magee, Liam (2016). "Domains of Sustainability". In A. Farazmand (ed.). *Global Encyclopedia of Public Administration, Public Policy, and Governance*. Springer.
- Modak, P. (2017) *Environmental Management Towards Sustainability*, CRC Press, ISBN-10: 9781498796248
- Odum, E. P. (1971). *Fundamentals of Ecology (Third ed.)*. New York: Saunders. ISBN 0-7216-6941-7.

- Porteous, Douglas, J. (1977), Environment Behaviour: Planning and Everyday Urban Life, Addison Wesley
- Thangavel, P., Sridevi, G. (2015) Environmental Sustainability, Springer Nature, ISBN-10: 9788132220558
- Walker, Brian and Salt, David (2006) Resilience Thinking: Sustaining ecosystems and people in a changing world. Island Press. p. xiii. ISBN 978-1597260930.
- Wandenberg, JC (August 2015). Sustainable by Design. Amazon. p. 122. ISBN 978-1516901784

Modes of Evaluation: Presentation/Assignment/Class Test /Written Examination

Examination Scheme:

| Evaluation Scheme | | | | | | | | Total Marks | Credits | Duration of Exam (hr) |
|---------------------|----|----|---|---------------------|-----|-----|-------|-------------|---------|-----------------------|
| Internal Assessment | | | | External Assessment | | | | | | |
| CT | | TA | A | Total | ESE | ESJ | Total | | | |
| I | II | | | | | | | | | |
| 10 | 10 | 25 | 5 | 50 | 0 | 50 | 50 | 100 | 3 | 0 |

CT: Class Test; TA: Total Assessment; A: Attendance; ESE: End Semester Examination; ESJ: End Semester Jury

CO, PO and PSO mapping

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| CO1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | - | 2 | - | - | 1 | 1 |
| CO2 | 2 | 3 | 1 | 2 | 1 | 1 | 2 | 3 | 3 | 1 | - | 1 | - | - | 1 | 1 |

1: strongly related, 2: moderately related and 3: weakly related

| | ELECTIVE- ECOLOGY, ENVIRONMENT AND SUSTAINABLE DEVELOPMENT – II (ARC2621) | L | T | S | P | C |
|-------------------------|--|---|---|---|---|---|
| Version 1.1 | Date of Approval: | 3 | 0 | 0 | 0 | 3 |
| Pre-requisites/Exposure | Environmental Sciences, Building Services-1, Building Services-2 | | | | | |
| Co-requisites | Architectural Design, Building Services-3 | | | | | |

Catalog Description

The objective of this course is to offer opportunities in specialized or advance learning in ecology, environment and sustainable aspects which are of concern to Architecture. The course will generally be conducted in the seminar/studio mode to encourage research, exploration and skill developments. The aim of this course is to provide students the exposure to understanding ecology and various environmental problems faced by settlements. The course will also provide the students hands-on ecological and environmental studies of built environment. The course contents to be followed will be developed by course teachers based on the resources at hand and opportunities for cross learning with other courses. The course would be conducted through literature survey, case studies, site visits, community surveys and hands on projects. During the course the students will be working on a live project in groups which are preferably interdisciplinary.

Course Objectives

The objective of this course is

- To understand the basic principles of ecology, environment and sustainable development.
- The course intends to study and understand the different components of city in order to understand how these elements contribute to environment quality.
- To establish the significance of the ecological issues, their impact and initiatives to address the same in the built environs to achieve sustainable development.
- To develop interdisciplinary understanding and sensitivities of future architects.

Course Outcomes

On completion of this course, the students will be able to

- CO1:** Develop a relationship between man and ecology, will understand critical environmental issues and need to address the m by using advanced technology.

CO2: Produce reports and presentation.

| Modules | Blooms level* | Number of hours |
|--|---------------|-----------------|
| <p>MODULE 1: Introduction to Ecology, Environment and Sustainable Development Basic introduction to ecology; Interrelation between natural and built environment; Importance of environment sustainability in built environment; Energy conservation, renewable sources: wind, solar, geo-thermal, bio-fuels; Materials minimizing, recycling, reducing energy content, etc; Other environmental issues related to solid waste management, water resources, air quality, storm water drainage etc; Various case studies related to traditional / vernacular buildings and settlements demonstrating relationship between climate, local material resources and settlement/ building forms.</p> | L1, L2 | 8 |
| <p>MODULE 2: Project Work Selection and understanding of case study; Formulation of Aim and Objectives, Collection of data through primary and secondary sources; Conducting survey; Database development using relevant and advance software; Qualitative and quantitative data analysis; Report writing and presentations.</p> | L4, L5, L6 | 16 |

*Bloom's Level: L1-Knowledge; L2-Comprehension; L3-Application; L4:Analysis; L5:Synthesis, L6:Evaluation

Text Books/References

- Bakari, Mohamed El-Kamel (2017). The Dilemma of Sustainability in the Age of Globalization: A Quest for a Paradigm of Development. New York: Lexington Books. ISBN 978-1498551397
- Blewitt, J. (2008). Understanding Sustainable Development. London: Earthscan. pp. 21–24. ISBN 978-1-84407-454-9.
- Fulekar, M. H., Pathak, B., Kale, R. K. (2014) Environment and Sustainable Development' Springer Nature; ISBN-10: 8132211650; ISBN-13: 978-8132211655
- Goudie, Andrew (2000). The Human Impact on the Natural Environment. Cambridge, Massachusetts: This MIT Press. pp. 203–239. ISBN 0-262-57138-2.
- James, Paul (2014). Urban Sustainability in Theory and Practice. doi:10.4324/9781315765747. ISBN 978-1-315-76574-7.
- James, Paul; Magee, Liam (2016). "Domains of Sustainability". In A. Farazmand (ed.). *Global Encyclopedia of Public Administration, Public Policy, and Governance*. Springer.

- Modak, P. (2017) Environmental Management Towards Sustainability, CRC Press, ISBN-10: 9781498796248
- Odum, E. P. (1971). Fundamentals of Ecology (Third ed.). New York: Saunders. ISBN 0-7216-6941-7.
- Porteous, Douglas, J. (1977), Environment Behaviour: Planning and Everyday Urban Life, Addison Wesley
- Thangavel, P., Sridevi, G. (2015) Environmental Sustainability, Springer Nature, ISBN-10: 9788132220558
- Walker, Brian and Salt, David (2006) Resilience Thinking: Sustaining ecosystems and people in a changing world. Island Press. p. xiii. ISBN 978-1597260930.
- Wandemberg, JC (August 2015). Sustainable by Design. Amazon. p. 122. ISBN 978-1516901784

Modes of Evaluation: Presentation/Assignment/Class Test /Written Examination

Examination Scheme:

| Evaluation Scheme | | | | | | | | Total Marks | Credits | Duration of Exam (hr) |
|---------------------|----|----|---|---------------------|-----|-----|-------|-------------|---------|-----------------------|
| Internal Assessment | | | | External Assessment | | | | | | |
| CT | | TA | A | Total | ESE | ESJ | Total | | | |
| I | II | | | | | | | | | |
| 10 | 10 | 25 | 5 | 50 | 0 | 50 | 50 | 100 | 3 | 0 |

CT: Class Test; TA: Total Assessment; A: Attendance; ESE: End Semester Examination; ESJ: End Semester Jury

CO, PO and PSO mapping

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| CO1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | - | 2 | - | - | 1 | 1 |
| CO2 | 2 | 3 | 1 | 2 | 1 | 1 | 2 | 3 | 3 | 1 | - | 1 | - | - | 1 | 1 |

1: strongly related, 2: moderately related and 3: weakly related

| | ELECTIVE- ECOLOGY, ENVIRONMENT AND SUSTAINABLE DEVELOPMENT – III (ARC2722) | L | T | S | P | C |
|-------------------------|---|---|---|---|---|---|
| Version 1.1 | Date of Approval: | 3 | 0 | 0 | 0 | 3 |
| Pre-requisites/Exposure | Environmental Sciences, Building Services-1, Building Services-2 | | | | | |
| Co-requisites | Architectural Design, Building Services-3 | | | | | |

Catalog Description

The aim of this course is to offer opportunities in specialized or advance learning in ecology, environment and sustainable aspects which are of concern to Architecture. The course will generally be conducted in the seminar/studio mode to encourage research, exploration and skill developments. The aim of this course is to provide students the exposure to understanding ecology and various environmental problems faced by settlements. The course will also provide the students hands-on ecological and environmental studies of built environment. The course contents to be followed will be developed by course teachers based on the resources at hand and opportunities for cross learning with other courses. The course would be conducted through literature survey, case studies, site visits, community surveys and hands on projects. During the course the students will be working on a live project in groups which are preferably interdisciplinary.

Course Objectives

The objective of this course is

- To understand the basic principles of ecology, environment and sustainable development.
- The course intends to study and understand the different components of city in order to understand how these elements contribute to environment quality.
- To establish the significance of the ecological issues, their impact and initiatives to address the same in the built environs to achieve sustainable development.
- To develop interdisciplinary understanding and sensitivities of future architects.

Course Outcomes

On completion of this course, the students will be able to

CO1: Develop a relationship between man and ecology, will understand critical environmental issues and need to address the m by using advanced technology.

CO2: Produce reports and presentation.

| Modules | Blooms level* | Number of hours |
|---|---------------|-----------------|
| <p>MODULE 1: Introduction to Ecology, Environment and Sustainable Development Basic introduction to ecology; Interrelation between natural and built environment; Importance of environment sustainability in built environment; Energy conservation, renewable sources: wind, solar, geo-thermal, bio-fuels; Materials minimizing, recycling, reducing energy content, etc; Other environmental issues related to solid waste management, water resources, air quality, storm water drainage etc; Various case studies related to traditional / vernacular buildings and settlements demonstrating relationship between climate, local material resources and settlement/ building forms.</p> | L1, L2 | 8 |
| <p>MODULE 2: Project Work Selection and understanding of case study; Formulation of Aim and Objectives, Collection of data through primary and secondary sources; Conducting survey; Database development using relevant and advance software; Qualitative and quantitative data analysis; Report writing and presentations.</p> | L4, L5, L6 | 16 |

*Bloom's Level: L1-Knowledge; L2-Comprehension; L3-Application; L4:Analysis; L5:Synthesis, L6:Evaluation

Text Books/References

- Bakari, Mohamed El-Kamel (2017). The Dilemma of Sustainability in the Age of Globalization: A Quest for a Paradigm of Development. New York: Lexington Books. ISBN 978-1498551397
- Blewitt, J. (2008). Understanding Sustainable Development. London: Earthscan. pp. 21–24. ISBN 978-1-84407-454-9.
- Fulekar, M. H., Pathak, B., Kale, R. K. (2014) Environment and Sustainable Development' Springer Nature; ISBN-10: 8132211650; ISBN-13: 978-8132211655
- Goudie, Andrew (2000). The Human Impact on the Natural Environment. Cambridge, Massachusetts: This MIT Press. pp. 203–239. ISBN 0-262-57138-2.
- James, Paul (2014). Urban Sustainability in Theory and Practice. doi:10.4324/9781315765747. ISBN 978-1-315-76574-7.
- James, Paul; Magee, Liam (2016). "Domains of Sustainability". In A. Farazmand (ed.). *Global Encyclopedia of Public Administration, Public Policy, and Governance*. Springer.

- Modak, P. (2017) Environmental Management Towards Sustainability, CRC Press, ISBN-10: 9781498796248
- Odum, E. P. (1971). Fundamentals of Ecology (Third ed.). New York: Saunders. ISBN 0-7216-6941-7.
- Porteous, Douglas, J. (1977), Environment Behaviour: Planning and Everyday Urban Life, Addison Wesley
- Thangavel, P., Sridevi, G. (2015) Environmental Sustainability, Springer Nature, ISBN-10: 9788132220558
- Walker, Brian and Salt, David (2006) Resilience Thinking: Sustaining ecosystems and people in a changing world. Island Press. p. xiii. ISBN 978-1597260930.
- Wandemberg, JC (August 2015). Sustainable by Design. Amazon. p. 122. ISBN 978-1516901784

Modes of Evaluation: Presentation/Assignment/Class Test /Written Examination

Examination Scheme:

| Evaluation Scheme | | | | | | | | Total Marks | Credits | Duration of Exam (hr) |
|---------------------|----|----|---|---------------------|-----|-----|-------|-------------|---------|-----------------------|
| Internal Assessment | | | | External Assessment | | | | | | |
| CT | | TA | A | Total | ESE | ESJ | Total | | | |
| I | II | | | | | | | | | |
| 10 | 10 | 25 | 5 | 50 | 0 | 50 | 50 | 100 | 3 | 0 |

CT: Class Test; TA: Total Assessment; A: Attendance; ESE: End Semester Examination; ESJ: End Semester Jury

CO, PO and PSO mapping

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| CO1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | - | 2 | - | - | 1 | 1 |
| CO2 | 2 | 3 | 1 | 2 | 1 | 1 | 2 | 3 | 3 | 1 | - | 1 | - | - | 1 | 1 |

1: strongly related, 2: moderately related and 3: weakly related

| | | | | | | |
|-------------------------|-----------------------------------|---|---|---|---|---|
| | LEED LAB – I (ARC2717) | L | T | S | P | C |
| Version 1.1 | Date of Approval: | 2 | 0 | 0 | 0 | 2 |
| Pre-requisites/Exposure | Architectural Design- VI | | | | | |
| Co-requisites | Architectural Design – VII | | | | | |

Catalog Description

The aim of this course is to provide fundamental knowledge about natural and built environment. And also introduces fundamental concepts to understand environmental processes. The curriculum further incorporates understanding in relation to Indian context. Course will be interdisciplinary and flexible.

Course Objectives

The objective of this course is

- To acquaint the student with the factors to be taken into consideration
- To understand the applications of an intelligent building.
- To familiarize the students to the Green Building rating systems, design processes, regulations and prevailing best practices

Course Outcomes

On completion of this course, the students will be able to

CO1: Define the fundamental of green building design.

CO2: Identify the role of USGBC, GBCI and their structure.

CO3: Identify the criteria for the selection of site

CO4: Review the fundamental concepts of waste management system.

| Modules | Blooms level* | Number of hours |
|---|---------------|-----------------|
| MODULE 1: Introduction to Green Building & Green Building Rating Systems Introduction to Course, Syllabus and assessment, Fundamental concepts of Green Building Design and Sustainability. Green Rating regime and their scope (regional and global), Policies and legislations | L1, L2 | 6 |
| MODULE 2: LEED Lab & Processes LEED Systems: Organization, fundamentals & Role USGBC/GBCI, Structure of LEED rating (credit, prerequisites and requirements) and Impact categories, LEED Certification & registration process, What, How and where to collect data for LEED certification | L1, L2, L3 | 6 |

| | | |
|--|--------------|---|
| MODULE 3: Site, Location and Transportation Scope and criterion of sustainable site, Transport and resource footprint | L1, L3,L4 | 6 |
| MODULE 4: Buildings Material and Resources Fundamental concepts (LCA), Waste management, 3Rs and Health), Procurement, declarations and documentations of Materials according to requirement of LEED certification | L1, L3,L4 | 6 |

*Bloom's Level: L1-Knowledge; L2-Comprehension; L3-Application; L4:Analysis; L5:Synthesis, L6:Evaluation

Text Books:

- Altomonte, S., & Schiavon, S. (2013). Occupant satisfaction in LEED and non-LEED certified buildings. *Building and Environment*, 68, 66–76. <https://doi.org/10.1016/j.buildenv.2013.06.008>
- Azhar, S., Carlton, W. A., Olsen, D., & Ahmad, I. (2011). Building information modeling for sustainable design and LEED ® rating analysis. *Automation in Construction*, 20(2), 217–224. <https://doi.org/10.1016/j.autcon.2010.09.019>
- Leed. (2014). Reading for the R and D Community, 56(3), 25–27. https://doi.org/10.1007/978-90-313-9258-2_26

References:

- Newsham, G. R., Mancini, S., & Birt, B. J. (2009). Do LEED-certified buildings save energy? Yes, but... *Energy and Buildings*, 41(8), 897–905. <https://doi.org/10.1016/j.enbuild.2009.03.014>
- Suzer, O. (2015). A comparative review of environmental concern prioritization: LEED vs other major certification systems. *Journal of Environmental Management*, 154, 266–283. <https://doi.org/10.1016/j.jenvman.2015.02.029>

Modes of Evaluation: Quiz/Assignment/ Seminar/Written Examination

Examination Scheme:

| Evaluation Scheme | | | | | | | Total Marks | Credits | Duration of Exam (hr) | |
|---------------------|----|----|---|---------------------|-----|-----|-------------|---------|-----------------------|-------|
| Internal Assessment | | | | External Assessment | | | | | | |
| CT | | TA | A | Total | ESE | ESJ | | | | Total |
| I | II | | | | | | | | | |
| 10 | 10 | 25 | 5 | 50 | 50 | 0 | 50 | 100 | 2 | 3 |

CT: Class Test; TA: Total Assessment; A: Attendance; ESE: End Semester Examination; ESJ: End Semester Jury

CO, PO and PSO mapping

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| CO1 | - | - | 2 | -- | 3 | 1 | 2 | - | - | - | -- | - | 2 | - | 1 | -- |
| CO2 | - | - | 2 | -- | 3 | 1 | 2 | - | - | - | -- | - | 2 | - | 1 | -- |
| CO3 | - | - | 2 | -- | 3 | 1 | 2 | - | - | - | -- | - | 2 | - | 1 | -- |
| CO4 | - | - | 2 | - | 3 | 1 | 2 | - | - | - | - | - | 2 | - | - | 2 |

1: strongly related, 2: moderately related and 3: weakly related

| | ELECTIVE- ECOLOGY, ENVIRONMENT AND SUSTAINABLE DEVELOPMENT - IV (ARC2819) | L | T | S | P | C |
|-------------------------|--|---|---|---|---|---|
| Version 1.1 | Date of Approval: | 3 | 0 | 0 | 0 | 3 |
| Pre-requisites/Exposure | Environmental Sciences, Building Services-1, Building Services-2 | | | | | |
| Co-requisites | Architectural Design, Building Services-3 | | | | | |

Catalog Description

The objective of this course is to offer opportunities in specialized or advance learning in ecology, environment and sustainable aspects which are of concern to Architecture. The course will generally be conducted in the seminar/studio mode to encourage research, exploration and skill developments. The aim of this course is to provide students the exposure to understanding ecology and various environmental problems faced by settlements. The course will also provide the students hands-on ecological and environmental studies of built environment. The course contents to be followed will be developed by course teachers based on the resources at hand and opportunities for cross learning with other courses. The course would be conducted through literature survey, case studies, site visits, community surveys and hands on projects. During the course the students will be working on a live project in groups which are preferably interdisciplinary.

Course Objectives

The objective of this course is

- To understand the basic principles of ecology, environment and sustainable development.
- The course intends to study and understand the different components of city in order to understand how these elements contribute to environment quality.
- To establish the significance of the ecological issues, their impact and initiatives to address the same in the built environs to achieve sustainable development.
- To develop interdisciplinary understanding and sensitivities of future architects.

Course Outcomes

On completion of this course, the students will be able to

CO1: Develop a relationship between man and ecology, will understand critical environmental issues and need to address the m by using advanced technology.

CO2: Produce reports and presentation.

| Modules | Blooms level* | Number of hours |
|---|---------------|-----------------|
| <p>MODULE 1: Introduction to Ecology, Environment and Sustainable Development Basic introduction to ecology; Interrelation between natural and built environment; Importance of environment sustainability in built environment; Energy conservation, renewable sources: wind, solar, geo-thermal, bio-fuels; Materials minimizing, recycling, reducing energy content, etc; Other environmental issues related to solid waste management, water resources, air quality, storm water drainage etc; Various case studies related to traditional / vernacular buildings and settlements demonstrating relationship between climate, local material resources and settlement/ building forms.</p> | L1, L2 | 8 |
| <p>MODULE 2: Project Work Selection and understanding of case study; Formulation of Aim and Objectives, Collection of data through primary and secondary sources; Conducting survey; Database development using relevant and advance software; Qualitative and quantitative data analysis; Report writing and presentations.</p> | L4, L5, L6 | 16 |

*Bloom's Level: L1-Knowledge; L2-Comprehension; L3-Application; L4:Analysis; L5:Synthesis, L6:Evaluation

Text Books/References

- Bakari, Mohamed El-Kamel (2017). The Dilemma of Sustainability in the Age of Globalization: A Quest for a Paradigm of Development. New York: Lexington Books. ISBN 978-1498551397
- Blewitt, J. (2008). Understanding Sustainable Development. London: Earthscan. pp. 21–24. ISBN 978-1-84407-454-9.
- Fulekar, M. H., Pathak, B., Kale, R. K. (2014) Environment and Sustainable Development' Springer Nature; ISBN-10: 8132211650; ISBN-13: 978-8132211655
- Goudie, Andrew (2000). The Human Impact on the Natural Environment. Cambridge, Massachusetts: This MIT Press. pp. 203–239. ISBN 0-262-57138-2.
- James, Paul (2014). Urban Sustainability in Theory and Practice. doi:10.4324/9781315765747. ISBN 978-1-315-76574-7.
- James, Paul; Magee, Liam (2016). "Domains of Sustainability". In A. Farazmand (ed.). *Global Encyclopedia of Public Administration, Public Policy, and Governance*. Springer.

- Modak, P. (2017) Environmental Management Towards Sustainability, CRC Press, ISBN-10: 9781498796248
- Odum, E. P. (1971). Fundamentals of Ecology (Third ed.). New York: Saunders. ISBN 0-7216-6941-7.
- Porteous, Douglas, J. (1977), Environment Behaviour: Planning and Everyday Urban Life, Addison Wesley
- Thangavel, P., Sridevi, G. (2015) Environmental Sustainability, Springer Nature, ISBN-10: 9788132220558
- Walker, Brian and Salt, David (2006) Resilience Thinking: Sustaining ecosystems and people in a changing world. Island Press. p. xiii. ISBN 978-1597260930.
- Wandemberg, JC (August 2015). Sustainable by Design. Amazon. p. 122. ISBN 978-1516901784

Modes of Evaluation: Presentation/Assignment/Class Test /Written Examination

Examination Scheme:

| Evaluation Scheme | | | | | | | | Total Marks | Credits | Duration of Exam (hr) |
|---------------------|----|----|---|---------------------|-----|-----|-------|-------------|---------|-----------------------|
| Internal Assessment | | | | External Assessment | | | | | | |
| CT | | TA | A | Total | ESE | ESJ | Total | | | |
| I | II | | | | | | | | | |
| 10 | 10 | 25 | 5 | 50 | 0 | 50 | 50 | 100 | 3 | 0 |

CT: Class Test; TA: Total Assessment; A: Attendance; ESE: End Semester Examination; ESJ: End Semester Jury

CO, PO and PSO mapping

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| CO1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | - | 2 | - | - | 1 | 1 |
| CO2 | 2 | 3 | 1 | 2 | 1 | 1 | 2 | 3 | 3 | 1 | - | 1 | - | - | 1 | 1 |

1: strongly related, 2: moderately related and 3: weakly related

| | | | | | | |
|-------------------------|----------------------------------|---|---|---|---|---|
| | LEED LAB-II (ARC2817) | L | T | P | S | C |
| Version 1.1 | Date of Approval: | 2 | 1 | 0 | 0 | 2 |
| Pre-requisites/Exposure | LEED Lab – I | | | | | |
| Co-requisites | Architectural Design – VIII | | | | | |

Catalog Description

The aim of this course is to provide fundamental knowledge about natural and built environment. And also introduces fundamental concepts to understand environmental processes. The curriculum further incorporates understanding in relation to Indian context. Course will be interdisciplinary and flexible.

Course Objectives

The objective of this course is

- To understand the concept of an Energy and climate
- To understand the importance of Water Efficiency
- To familiarize the students with LEED Arc

Course Outcomes

On completion of this course, the students will be able to

CO1: Define basic concepts of building loads, energy efficiency, environmental concern

CO2: Prepare a documentation plan of water efficiency.

CO3: Calculate the indoor environmental quality for comfort and health.

CO4: Define basic concepts for building data analysis and prepare a report on environment impact on built up area.

| Modules | Blooms level* | Number of hours |
|---|---------------|-----------------|
| MODULE 1: Energy and Climate Basic concepts I (Building loads, Energy efficiency, Environmental concerns), Basic concept II (Electrical systems, Visual & thermal comfort and other concepts), Energy commissioning & performance management Energy audit process, equipment and tools | L1, L2 | 6 |
| MODULE 6: Water Efficiency Water use pattern, source and conservation scope (including water harvesting and treatment), Water flow, fixtures and plumbing networks and water efficient appliances, Water Audit: Performance management and monitoring, LEED requirement and documentation plan | L1, L2, L3 | 6 |
| MODULE 7: Indoor Environment & Human Comfort Fundamentals of Indoors environmental quality (ventilation, air quality, indoor emission, green cleaning) Health and occupational comfort (Natural lighting, Thermal, Quality view & assessment-survey) | L1, L3,L4 | 6 |
| MODULE 4: LEED Arc and Project Communication | L1, L3,L4 | 6 |

| | | |
|---|--|--|
| Basic concepts and pre-requisites, Buildings Data Analysis, Demonstration of input Data in Arc Platform and create output result for the 5 sustainability indicators. Environmental/Building codes, Impact of built environment, sustainable & regional design Project Documentation follow-up | | |
|---|--|--|

*Bloom's Level: L1-Knowledge; L2-Comprehension; L3-Application; L4-Analysis; L5:Synthesis, L6:Evaluation

Text Books:

- Altomonte, S., & Schiavon, S. (2013). Occupant satisfaction in LEED and non-LEED certified buildings. *Building and Environment*, 68, 66–76. <https://doi.org/10.1016/j.buildenv.2013.06.008>
- Azhar, S., Carlton, W. A., Olsen, D., & Ahmad, I. (2011). Building information modeling for sustainable design and LEED ® rating analysis. *Automation in Construction*, 20(2), 217–224. <https://doi.org/10.1016/j.autcon.2010.09.019>
- Leed. (2014). Reading for the R and D Community, 56(3), 25–27. https://doi.org/10.1007/978-90-313-9258-2_26

References:

- Newsham, G. R., Mancini, S., & Birt, B. J. (2009). Do LEED-certified buildings save energy? Yes, but... *Energy and Buildings*, 41(8), 897–905. <https://doi.org/10.1016/j.enbuild.2009.03.014>
- Suzer, O. (2015). A comparative review of environmental concern prioritization: LEED vs other major certification systems. *Journal of Environmental Management*, 154, 266–283. <https://doi.org/10.1016/j.jenvman.2015.02.029>

Modes of Evaluation: Quiz/Assignment/ Seminar/Written Examination

Examination Scheme:

| Evaluation Scheme | | | | | | | | Total Marks | Credits | Duration of Exam (hr) |
|---------------------|----|----|---|---------------------|-----|-----|-------|-------------|---------|-----------------------|
| Internal Assessment | | | | External Assessment | | | | | | |
| CT | | TA | A | Total | ESE | ESJ | Total | | | |
| I | II | | | | | | | | | |
| 10 | 10 | 25 | 5 | 50 | 50 | 0 | 50 | 100 | 2 | 3 |

CT: Class Test; TA: Total Assessment; A: Attendance; ESE: End Semester Examination; ESJ: End Semester Jury

CO, PO and PSO mapping

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| CO1 | - | - | 2 | -- | 3 | 1 | 2 | - | - | - | -- | - | 2 | - | 1 | -- |
| CO2 | - | - | 2 | -- | 3 | 1 | 2 | - | - | - | -- | - | 2 | - | 1 | -- |

| | | | | | | | | | | | | | | | | |
|------------|---|---|---|----|---|---|---|---|---|---|----|---|---|---|---|----|
| CO3 | - | - | 2 | -- | 3 | 1 | 2 | - | - | - | -- | - | 2 | - | 1 | -- |
| CO4 | - | - | 2 | - | 3 | 1 | 2 | - | - | - | - | - | 2 | - | 1 | - |

1: strongly related, 2: moderately related and 3: weakly related

BACHELOR OR PLANNING

| | SUSTAINABLE URBAN DEVELOPMENT (PLN2409) | L | T | S | P | C |
|-------------------------|--|---|---|---|---|---|
| Version 1.1 | | 3 | 0 | 0 | 0 | 3 |
| Pre-requisites/Exposure | Ecology, Environment and Resource Development and Management | | | | | |
| Co-requisites | Planning and Management of Utilities and Services | | | | | |

Catalog Description

The course intends to create awareness amongst the students to the various issues and adversities faced by the environment due to extensive and irresponsible use of natural resources such as water, land, energy, etc. The course focuses on the implications on surrounding done by the urban industrial processes, changes in land use and transportation, such as air and water pollution and solid waste management. The course also includes in training the students to suggest and work upon the Environmental Impact Assessment and Strategic Environmental Assessment for urban areas through sustainable strategies such as SDG, Eco- city Approaches, etc.

Course Objectives

The objectives of this course are

- To study Concept and Issues of Sustainable Urban Development.
- To understand the concern for ensuring Sustainability of Land, Water and Energy Sources

Course Outcomes

On completion of this course, the students will be able to

CO1: Plan and develop cities using the sustainable and eco-city approaches of development.

CO2: Suggest and work upon the Environmental Impact Assessment and Strategic Environmental Assessment for urban areas.

CO3: Explain the importance of Land and Energy Resources in day to day life and its diverse implications on the urban development.

CO4: Describe the concepts of Solid waste management, water pollution, Air Pollution, rain water harvesting, water treatment and recycling, etc.

| Modules | Blooms level* | Number of hours |
|--|---------------|-----------------|
| MODULE 1: Concept and Issues Changing perspectives in man-environment relationship with focus on issues of population, urbanization, resource depletion and pollution; limits to growth vis-a-vis sustainable economy; growth and environmental imperatives of developing vs. developed countries; definitions, concepts and parameters in sustainable development with particular reference to Brundtland Commission, Agenda 21, Eco-City approach, etc. | L1, L2 | 6 |
| MODULE 2: Methods and Techniques Application of ecological principles in sustainability: energy and resource cycles, food webs, ecological pyramids and evolution and succession of natural ecosystems; Carrying Capacity based planning: concept, parameters and indicator measures, models and case studies in urban and regional development; Environmental Impact and Strategic Environmental Assessment for urban areas; Ecological Footprint Analysis of cities; Sustainable Lifestyle Assessment and behavioural modifications at household levels. | L1, L2, L3 | 10 |
| MODULE 3: Land, Energy and Water as a Resources Land capability and suitability analysis in location and planning of urban land uses; implications of urban form, density, land use pattern and transportation system in land and energy conservation, Urban interference in hydrological cycle, with particular reference to water pollution, water resources, drainage and natural ecosystems; urban water treatment, recycling and harvesting; use of non-conventional energy sources in urban development | L1, L2 | 10 |
| MODULE 4: Air Quality & Solid Waste Management Sources, types and effects of air pollution and solid waste disposal in cavities, urban industrial processes and land use and transportation implications in air and solid waste pollution; norms, standards, laws, organizations and policies in urban air quality control and solid waste management; examples of best practices | L1, L2 | 10 |

*Bloom's Level:

L1-Knowledge; L2-Comprehension; L3-Application; L4:Analysis; L5:Synthesis, L6:Evaluation

Text Books

- Munier, Nolberto (2007). *Handbook on Urban Sustainability*: Springer
- The Energy and the Resource Institute,(2011). *Climate Resilient and Sustainable Urban Development*: TERI
- United Nations, (2010). *Shanghai Manual, A Guide for Sustainable Urban Development of the 21st Cities*

Modes of Evaluation: Quiz/Assignment/ Seminar/Written Examination

Examination Scheme:

| Components | Internal Assessment | ESE |
|------------|---------------------|-----|
|------------|---------------------|-----|

| | | | | | | | |
|----------------------|-------------|-------------|-----------|------------|-----------|----------|----|
| | CT-1 | CT-2 | HA | S/P | CE | A | |
| Weightage (%) | 10 | 10 | 10 | 10 | 05 | 05 | 50 |

CT: Class Test, HA: Home Assignment, S/P: Seminar/Presentation, CE: Continuous Evaluation, A: Attendance; ESE: End Semester Examination, ESJ: End Semester Jury

CO, PO and PSO mapping

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 | PSO4 |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 1 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 1 | -- | -- |
| CO2 | 1 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 1 | -- | -- |
| CO3 | 1 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 1 | -- | -- |
| CO4 | 1 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 1 | -- | -- |

1: strongly related, 2: moderately related and 3: weakly related

| | | | | | | |
|-------------------------|---|---|---|---|---|---|
| | ECOLOGY, ENVIRONMENT AND RESOURCE DEVELOPMENT AND MANAGEMENT (PLN2511) | L | T | S | P | C |
| Version 1.1 | | 3 | 0 | 0 | 0 | 3 |
| Pre-requisites/Exposure | Environmental Studies-I, Applied Geology and Hydrology | | | | | |
| Co-requisites | Settlement Sociology | | | | | |

Catalogue Description

The aim of this course is to provide exposure to the students to basic concepts of ecology, ecosystems, environment and Resource Development. This course will enable the students a thorough understanding of all the theories and definitions of terms relating to ecology and environment in planning and their usage in urban and regional planning. The students will know about the impact of development on environment and its significance in planning.

Course Objectives

The objectives of this course are

- To understand various types of components in Ecology, Environment.
- To the role of Ecology and Environment for the resource development and management.
- To enhance the knowledge for EIA. (Environment Impact Assessment)

Course Outcomes

On completion of this course, the students will be able to

CO1: Define the meaning and scope of ecology and identification of ecological parameters for planning at different levels.

CO2: Understand the ecosystem and its relevance to environment in planning.

CO3: Understand the concept of environmental impact assessment and its role in planning and development.

CO4: Learn the various environmental policies in planning.

| Modules | Blooms level* | Number of hours |
|---|---------------|-----------------|
| Module 1: Introduction Meaning and scope of ecology; evolution of ecology; man, environment and ecosystem; components of nature and basic concepts and processes of ecology; identification of ecological parameters for planning at different levels; site planning, settlement planning and regional planning; data needs and format for data collection; types of analysis required to evolve ecological parameters.; Environmental zones. | L1, L2, L3 | 8 |

| | | |
|--|------------|----|
| <p>Module 2: Ecosystem and its Relevance to Environment Resources and human settlements impact of advanced agricultural methods, urbanization and industrialization on nature; urban ecosystem approach evolution and significance; soil, water, land, vegetation and solar, biomass, wind, hydro energy resources; settlement planning and energy conservation; development and management. Introduction to quantitative ecology</p> | L1, L2, L3 | 9 |
| <p>Module 3: Environmental Impact Studies Planning for environmentally sensitive areas, EIA - meaning, significance and framework; Methodologies - checklist, matrices, network and social cost-benefit analysis; sources and acquisition of environmental information; Environmental land use classification; Environment impact studies of development projects.</p> | L1, L2, L3 | 9 |
| <p>Module 4: Environmental Policies Global and national policies on environment; Five year plans in relation to environmental aspects; Legal measure for protection of environment; Environmental awareness and education in India; Agencies involved in environment protection; Public participation; Role of planners in shaping the future environment.</p> | L1, L2, L3 | 10 |

**Bloom's Level:*

L1-Knowledge; L2-Comprehension; L3-Application; L4:Analysis; L5:Synthesis, L6:Evaluation

Text Books

- Kumar, Pranav. (2017). Fundamentals of Ecology and Environment. *Pathfinder Publication.*
- Sharma, P. D. (2017). Ecology and Environment. *Rastogi Publications.*
- Raman, N. S., Gajbhiye, A. R. & Khandeshwar, S. R. (2019). Environmental Impact Assessment. *Dreamtech Press.*

Reference Book

- Schneider, David C. (1994). Quantitative Ecology Spatial and Temporal Scaling. *Academic Press Inc.*
- Royle, J. Andrew & Dorazio, Robert M. (2009). Conceptual and philosophical considerations in ecology and statistics. *Hierarchical Modelling and Inference in Ecology, 1-26. <https://doi.org/10.1016/B978-0-12-374097-7.00003-X>*

Modes of Evaluation: Quiz/Assignment/ Seminar/Written Examination

Examination Scheme:

| Components | Internal Assessment | | | | | | ESE |
|---------------|---------------------|------|----|-----|----|----|-----|
| | CT-1 | CT-2 | HA | S/P | CE | A | |
| Weightage (%) | 10 | 10 | 10 | 10 | 05 | 05 | 50 |

CT: Class Test, HA: Home Assignment, S/P: Seminar/Presentation, CE: Continuous Evaluation, A: Attendance; ESE: End Semester Examination, ESJ: End Semester Jury

CO, PO and PSO mapping

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| CO1 | 1 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | 2 | -- | -- | -- | 1 | -- |
| CO2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| CO3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| CO4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

1: strongly related, 2: moderately related and 3: weakly related

| | ECO-TOURISM (PLN2514) (ELECTIVE) | L | T | S | P | C |
|-------------------------|--|---|---|---|---|---|
| Version 1.1 | | 0 | 0 | 3 | 0 | 3 |
| Pre-requisites/Exposure | Disaster Risk Management and Climate Change Adaptation | | | | | |
| Co-requisites | Planning and Design Lab V | | | | | |

Catalog Description

The aim of this course is to offer the principles of planning for eco-tourism in the context of sustainable tourism development. The courses will generally be conducted in the seminar/studio mode to encourage research, exploration and skill developments. The focus of the course is getting the insights of relationships between tourism and environment, tourism and urban development, tourism and economic development. In this course, students will be able to grasp planning requirements for developing sustainable eco-tourism hubs and circuits. They will be able to incorporate community needs and sustainable eco-tourism requirements in planning process. The course would be conducted through literature survey, case studies, site visits, community surveys and hands on experimentations. During the course the students will be working on live projects in groups which are preferably interdisciplinary.

Course Objectives

The objectives of this course are

1. To apply planning strategies and tools with reference to sustainable tourism development.
2. To grasp the role of public and private sector as well as community participation in eco-tourism planning and development

Course Outcomes

On completion of this course, the students will be able to

CO1: Apply concept of eco-tourism for sustainable tourism development.

CO2: Identify and plan eco-tourism hubs and circuits.

| Modules | Blooms level* | Number of hours |
|---|---------------|-----------------|
| <p>MODULE 1: Introduction and Planning for Eco-Tourism Definitions, scope, nature, key determinants, characteristics; problems and prospects of eco-tourism; eco-tourism hubs in India; impacts of eco-tourism in developed and developing regions; relationship between tourism and urban development, relationship between tourism and economic development, relationship between tourism and environment; concept of carrying capacity and its significance in eco-tourism. Circuit identification and destination planning; assessment of infrastructure requirement for eco-tourism planning; analysing tourism impacts in transforming local livelihood and lifestyle; role of Government institutions and agencies in eco-tourism development.</p> | L3, L4 L5 | 12 |
| <p>MODULE 2: Project Work Selection and understanding of case study; Formulation of Aim and Objectives, Collection of data through primary and secondary sources; Conducting survey; Database development using relevant and advance software; Qualitative and quantitative data analysis; Report writing and presentations.</p> | L4, L5, L6 | 24 |

*Bloom's Level:

L1-Knowledge; L2-Comprehension; L3-Application; L4:Analysis; L5:Synthesis, L6:Evaluation

Text Books

- Cohen, E. (1978). The impact of tourism on the physical environment. *Annals of Tourism Research*, 5(2), 215–237. [https://doi.org/10.1016/0160-7383\(78\)90221-9](https://doi.org/10.1016/0160-7383(78)90221-9)
- Dávid, L. (2011). Tourism ecology: Towards the responsible, sustainable tourism future. *Worldwide Hospitality and Tourism Themes*, 3(3), 210–216. <https://doi.org/10.1108/1755421111114217>
- Ghasemi, M., & Hamzah, A. (2014). An Investigation of the Appropriateness of Tourism Development Paradigms in Rural Areas from Main Tourism Stakeholders' Point of View. *Procedia - Social and Behavioral Sciences*, 144, 15–24. <https://doi.org/10.1016/j.sbspro.2014.07.269>

References

- Jaini, N., Anuar, A. N. A., & Daim, M. S. (2012). The practice of sustainable tourism in ecotourism sites among ecotourism providers. *Asian Social Science*, 8(4), 175–179. <https://doi.org/10.5539/ass.v8n4p175>
- Stakeholders, E. (1994). The Component of Successful Ecotourism. In *UNEP Division of Technology, Industry and Economics* (pp. 33–59).

- Wiltshier, P., Clarke, A., Adebayo, A., Robinson, P., & Oriade, A. (2019). Community-based tourism. In *Community-Based Tourism in the Developing World* (pp. 98–112). Routledge. <https://doi.org/10.4324/97811351026383-8>

Modes of Evaluation: Presentation/Assignment/Class Test /Written Examination

Examination Scheme:

| Components | Internal Assessment | | | | | | ESJ |
|---------------|---------------------|------|----|-----|----|----|-----|
| | CT-1 | CT-2 | HA | S/P | CE | A | |
| Weightage (%) | - | - | - | 40 | 05 | 05 | 50 |

CT: Class Test, HA: Home Assignment, S/P: Seminar/Presentation, CE: Continuous Evaluation, A: Attendance; ESE: End Semester Examination, ESJ: End Semester Jury

CO, PO and PSO mapping

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| CO1 | 1 | 1 | 1 | -- | -- | 1 | 1 | -- | -- | 2 | 1 | -- | 1 | -- | 1 | 2 |
| CO2 | 1 | 1 | 2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 2 | -- | -- |

1: strongly related, 2: moderately related and 3: weakly related

MASTER OF PLANNING

| | ECO-TOURISM (PLN4111) (Elective) | L | T | P | S | C |
|-------------------------|--|---|---|---|---|---|
| Version 1.1 | | 1 | 0 | 2 | 0 | 2 |
| Pre-requisites/Exposure | Disaster Risk Management and Climate Change Adaptation | | | | | |
| Co-requisites | Planning and Design Lab -V, B. Plan | | | | | |

Catalog Description

The aim of this course is to offer the principles of planning for eco-tourism in the context of sustainable tourism development. The courses will generally be conducted in the seminar/studio mode to encourage research, exploration and skill developments. The focus of the course is getting the insights of relationships between tourism and environment, tourism and urban development, tourism and economic development. In this course, students will be able to grasp planning requirements for developing sustainable eco-tourism hubs and circuits. They will be able to incorporate community needs and sustainable eco-tourism requirements in planning process. The course would be conducted through literature survey, case studies, site visits, community surveys and hands on experimentations. During the course the students will be working on live projects in groups which are preferably interdisciplinary.

Course Objectives

The objective of this course is

3. To demonstrate planning strategies in the context of sustainable tourism development for eco-tourism planning and development
4. To develop interdisciplinary understanding and sensitivities of future planners.

Course Outcomes

On completion of this course, the students will be able to

CO1: Applicate concept of eco-tourism for sustainable tourism development.

CO2: Prepare the detail report and presentation on a given project related to eco-tourism.

| Modules | Blooms level* | Number of hours |
|---|---------------|-----------------|
| <p>MODULE 1: Introduction and Planning for Eco-Tourism</p> <p>Definitions, scope, nature, key determinants, characteristics; problems and prospects of eco-tourism; eco-tourism hubs in India; impacts of eco-tourism in developed and developing regions; relationship between tourism and urban development, relationship between tourism and economic development, relationship between tourism and environment; concept of carrying capacity and its significance in eco-tourism. Circuit identification and destination planning; assessment of infrastructure requirement for eco-tourism planning; analysing tourism impacts in transforming local livelihood and lifestyle; role of Government institutions and agencies in eco-tourism development.</p> | L3, L4 L5 | 12 |
| <p>MODULE 2: Project Work</p> <p>Selection and understanding of case study; Formulation of Aim and Objectives, Collection of data through primary and secondary sources; Conducting survey; Database development using relevant and advance software; Qualitative and quantitative data analysis; Report writing and presentations.</p> | L4, L5, L6 | 24 |

*Bloom's Level:

L1-Knowledge; L2-Comprehension; L3-Application; L4:Analysis; L5:Synthesis, L6:Evaluation

Text Books

1. Cohen, E. (1978). The impact of tourism on the physical environment. *Annals of Tourism Research*, 5(2), 215–237. [https://doi.org/10.1016/0160-7383\(78\)90221-9](https://doi.org/10.1016/0160-7383(78)90221-9)

2. Dávid, L. (2011). Tourism ecology: Towards the responsible, sustainable tourism future. *Worldwide Hospitality and Tourism Themes*, 3(3), 210–216. <https://doi.org/10.1108/1755421111114217>
3. Ghasemi, M., & Hamzah, A. (2014). An Investigation of the Appropriateness of Tourism Development Paradigms in Rural Areas from Main Tourism Stakeholders' Point of View. *Procedia - Social and Behavioral Sciences*, 144, 15–24. <https://doi.org/10.1016/j.sbspro.2014.07.269>

References

1. Jaini, N., Anuar, A. N. A., & Daim, M. S. (2012). The practice of sustainable tourism in ecotourism sites among ecotourism providers. *Asian Social Science*, 8(4), 175–179. <https://doi.org/10.5539/ass.v8n4p175>
2. Stakeholders, E. (1994). The Component of Successful Ecotourism. In *UNEP Division of Technology, Industry and Economics* (pp. 33–59).
3. Wiltshier, P., Clarke, A., Adebayo, A., Robinson, P., & Oriade, A. (2019). Community-based tourism. In *Community-Based Tourism in the Developing World* (pp. 98–112). Routledge. <https://doi.org/10.4324/9781351026383-8>

1. Modes of Evaluation: Presentation/Assignment/Class Test /Written Examination

Examination Scheme:

| Components | CT-1 | CT-2 | HA | S/P | CE | A | ESE |
|---------------|------|------|----|-----|----|----|-----|
| Weightage (%) | - | - | - | 90 | 05 | 05 | - |

CT: Class Test, HA: Home Assignment, S/P: Seminar/Presentation, CE: Continuous Evaluation, A: Attendance; ESE: End Semester Examination.

CO, PO and PSO mapping

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| CO1 | 1 | 1 | 1 | -- | -- | 1 | 1 | -- | -- | 2 | 1 | -- | 1 | -- | 1 | 2 |
| CO2 | 1 | 1 | 2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 2 | -- | -- |

1: strongly related, 2: moderately related and 3: weakly related

| | ENVIRONMENTAL IMPACT ASSESSMENT (PLN4313) (ELECTIVE) | L | T | P | S | C |
|-------------------------|--|---|---|---|---|---|
| Version 1.1 | | 1 | 0 | 2 | 0 | 2 |
| Pre-requisites/Exposure | Land Economics and Real Estate Planning Disaster Risk Mitigation and Management | | | | | |
| Co-requisites | Project Management and Financial Development Planning Design Lab VII | | | | | |

Catalog Description

The aim of the course is to provide advance learning on the field of Environment Planning in the context of EIA which is one of the key concern of policy makers and land use planner. The course will generally be conducted in the seminar/studio mode to encourage research, exploration and skill developments. The aim of this course is to provide exposure to the students to essential understanding of Environmental Impact Assessment (EIA). UNEP defines Environmental Impact Assessment (EIA) as a tool used to identify the environmental, social and economic impacts of a project prior to decision-making. This course will enable the students using EIA as tool for both environmental and economic benefits, such as reduced cost and time of project implementation and design, avoided treatment/clean-up costs and impacts of laws and regulations. Students will also be able to apply or reference these techniques in their planning studios. The course contents to be followed will be developed by course teachers based on the resources at hand and opportunities for interdisciplinary learning. The course would be conducted through literature survey, case studies, site visits, community surveys and hands on experimentations. During the course the students will be working on live projects in groups which are preferably interdisciplinary.

Course Objectives

The objective of this course is

1. To learn with different methods and process of Environment Impact Assessment.
2. To develop interdisciplinary understanding and sensitivities of future planners.

Course Outcomes

On completion of this course, the students will be able to

CO1: Apply EIA techniques while assessing the impacts on land use, resources, health and social conditions.

CO2: Prepare the detail report and presentation on a given project related to Environment Impact Assessment.

| Modules | Blooms level* | Number of hours |
|--|---------------|-----------------|
| MODULE 1: Introduction Role of Environmental Impact Assessment in the planning and decision-making process; Definition and need, evolution and objectives and scope. Different methods of Environmental Impact Assessment; Advantages and limitations; Public - private - people's participation in EIA, Impact assessment on land use, resources, social and health impacts. | L1, L2, L3 | 12 |
| MODULE 2: Project Work Selection and understanding of case study by reviewing case studies from India and abroad on projects of various types covering different levels of planning and practical exercises on Environmental Impact Assessments. Formulation of aim and objectives, Collection of data through primary and secondary sources; Conducting survey; Database development using relevant and advance software; Qualitative and quantitative data analysis; Report writing and presentations. | L4, L5, L6 | 24 |

**Bloom's Level:*

L1-Knowledge; L2-Comprehension; L3-Application; L4:Analysis; L5:Synthesis, L6:Evaluation

Text Books

1. Raman N.S., Gajbhiye, A.R., (2014). Environmental Impact Assessment, I. K. International Publishing House New Delhi, India

- Marriott, Betty Bowers, (1997). *Environmental Impact Assessment – A Practical Guide*, McGraw Hill, New Delhi, India
- Watheren, Peter, (2004). *Environmental Impact Assessment: Theory and Practice*, Tayler & Francis, New York & London

Reference

- Jay, S., Jones, C., Slinn, P., & Wood, C. (2007). Environmental impact assessment: Retrospect and prospect. *Environmental Impact Assessment Review*, 27(4), 287–300. <https://doi.org/10.1016/j.eiar.2006.12.001>
- Ott, K., Mohaupt, F., & Ziegler, R. (2012). Environmental Impact Assessment. In *Encyclopedia of Applied Ethics* (pp. 114–123). Elsevier Inc. <https://doi.org/10.1016/B978-0-12-373932-2.00345-8>

2. Modes of Evaluation: Presentation/Assignment/Class Test /Written Examination

Examination Scheme:

| Components | CT-1 | CT-2 | HA | S/P | CE | A | ESE |
|---------------|------|------|----|-----|----|----|-----|
| Weightage (%) | - | - | - | 90 | 05 | 05 | - |

CT: Class Test, HA: Home Assignment, S/P: Seminar/Presentation, CE: Continuous Evaluation, A: Attendance; ESE: End Semester Examination.

CO, PO and PSO mapping

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| CO1 | 2 | 2 | 1 | -- | -- | 1 | 1 | -- | -- | 2 | 1 | -- | 1 | -- | 1 | 2 |
| CO2 | 1 | 2 | 2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 2 | -- | 2 |

1: strongly related, 2: moderately related and 3: weakly related

