23ID803 **Live-in-Labs® I** **1 0 2 3**

AIM

The purpose of this course is two-fold.

First, to develop the theoretical and knowledge foundation on the fundamentals of ecology and the principles of Participatory Rural Appraisal (PRA) and Human-centered Design (HCD)

Second, the students should be able to apply the mentioned concepts in the rural communities based on which ethnographic research, community ecosystem analyzation, rural community appraisal, and community challenge identification can be confirmed. This will enable students to solidify their research problem and devise methodologies to co-develop interventions in the next phase of their research.

1. **Course Learning Outcome:**

   Upon successful completion of the course, the student should be able to:

   - Identify, survey, map, and understand resources available in rural communities from an ecological sustainability perspective
   - Implement ethnographic research in rural communities to understand challenges prevalent in the communities, understand the inter-relationships between various factors and drivers of the ecosystem, experience and embrace the values, culture, traditions, andsystems prevalent on the communities.
   - Develop community specific participatory engagement models.
   - Ability to identify and analyze community challenges
   - Identify and interpret community experiences using HCD approach
   - Identify and formulate the research challenges in rural communities
   - Develop measures to resolve conflicts and trade-offs
   - Monitor and evaluate local resources through community participation
   - Plan and empower the community to derive at decisions

2. **Learning Outcomes**

   - **Knowledge and Understanding**
     i. Understand the basics of ecological sustainability, PRA, and HCD.
     ii. Fundamentals of mapping and hand-on with GIS tools
     iii. In depth learning and analysis of methods that help identify the challenges of rural communities.
     iv. Develop an encompassing understanding of community resources.
     v. Understand the cultural and traditional practices of the community and their relation with ecological sustainability.
     vi. Ability to understand the livelihood opportunities of rural communities through participatory methods.
     vii. Ability to live within the rural communities and adopt their routine.

   - **Competence and Skills**
     i. Develop user personas based on effective understanding of user goals, tasks, and pain points.
     ii. Develop Spatial thinking to support sustainable development goals
     iii. Understand and capture temporal perspectives in sustainable development
     iv. Develop a detailed user scenario based on the in-depth understanding of user pain points and pitfall moments.
     v. To enhance critical thinking skills and evaluation of information sources

vi. To be able to identify relevant stakeholders that are directly associated with community challenges and develop ways of engagement with the community.
vii. Ability to analyze the cultural and traditional practices of the community
viii. Become critical and proactive thinkers and, with this, successful leaders in the field

3. Syllabus

Ecosystem & Trade-offs to Sustainable Development: Types of ecosystems & interrelationships, factors and trade-offs influencing sustainability of ecosystems. Case study discussion on sustainability & its factors, requirements for sustainability: food security and agriculture, renewable resources - water and energy, non-renewable resources.

Participatory Rural Appraisal (PRA) - Concept; Principles and Philosophy of PRA, Scope and Dimensions of PRA. Important Tools for PRA - Resource Map, Transect Walk, Seasonal Calendar, Income Expenditure Matrix, Inflow-outflow, Venn Diagram, Problem Tree, and Brainstorming. Application of PRA.

Introduction to Geographic Information Systems (GIS) - Introduction to GIS. A Brief History of GIS. Data types and Working with Arc Catalog. Overview of spatial databases available for natural resources and terrain. Types of Maps. Creating GIS Maps, Events, Coordinate Systems & GPS. Selection Methods and Selecting Data. Creating and Using Layer Files. Data Output - Reports, Graphs and Layouts. Real world examples of the applications of Geospatial Technologies in Sustainable development.

Human-centered Design I (HCD) - Fundamentals of Human-centered Design. Challenge Identification - Participant Observation, Interviews, Personas & Scenarios. User Experience. User Research. Data Analysis. Solution Design Proposition.

On-field Exercise - Field journaling. Reflective Writing. PRA - Resource Map, Transect Walk, Seasonal Calendar, Income Expenditure Matrix, Inflow-outflow, Venn Diagram, Problem Tree, and Brainstorming. GIS. HCD - Participant Observation, Interviews, Personas & Scenarios. User Experience. User Research. Data Analysis. Solution Design Proposition.

4. Text Books/Reference Material

- Saito, Osamu. *Sharing Ecosystem Services*. Springer Singapore, 2020.
- Meyers, Robert Allen. *Encyclopedia of sustainability science and technology*. New York: Springer, 2012.
- Chambers, Robert. "Participatory rural appraisal (PRA): Analysis of experience." *World development* 22, no. 9 (1994): 1253-1268.
- Chambers, Robert. "The origins and practice of participatory rural appraisal." *World development* 22, no. 7 (1994): 953-969.
- Brown, Tim, and Jocelyn Wyatt. "Design thinking for social innovation." *Development Outreach* 12, no. 1 (2010): 29-43.
- Varma, Deepak Suresh, Krishna Nandanan, Vishakh Raja PC, B. Soundharajan, Mireia López Pérez, K. A. Sidharth, and Maneesha Vinodini Ramesh. "Participatory design approach to address water crisis in the village of Karkatta, Jharkhand, India." *Technological Forecasting and Social Change* 172 (2021): 121002.
- Ranger, Bryan J., and Aikaterini Mantzavinou. "Design thinking in development engineering education: A case study on creating prosthetic and assistive technologies for the developing world." *Development Engineering* 3 (2018): 166-174.