



# MADAN BHANDARI UNIVERSITY OF SCIENCE AND TECHNOLOGY

## Sustainable and Resilient Infrastructure (SRI) Program



### Academic Programs

- PhD and Master of Applied Science

### Research Objective

- Promotion of rural tourism for local economic development through sustainable and resilient infrastructure development including homestays, teahouses, trails and trekking routes, and related services.

### Research Topics for the 2025 Intake

- **Sustainable and resilient (re)construction of stone masonry buildings.**
  - Numerical and experimental investigation of structural behavior of stone masonry structures with enhanced mortar mixtures.
  - Material characterization of stone masonry structures with variations in stone and mortar composition.
  - Advancement of 3D Applied Element Method for numerical analysis of heterogeneous stone masonry structures.
  - Computational molecular-level study for enhancing mud mortar bonding properties.
  - Optimization of mortar mix design for improved bonding and load-bearing capacity in masonry structure.
- **Retrofitting of masonry structures:**
  - Structural health monitoring and seismic vulnerability assessment of masonry buildings.

- Experimental and numerical study on the retrofitting of masonry structures using bamboo.
- Vibration-based structural health monitoring and LIDAR Point Cloud Analysis of heritage structures.
- Retrofitting of masonry structures using fiber-reinforced paint.
- Numerical modeling and component-level evaluation for cost-effective retrofitting techniques.
- **Bamboo and timber as sustainable and resilient construction materials:**
  - Experimental evaluation of traditional bamboo jointing techniques in Nepal.
  - Machine Learning-based modeling of the relationship between geometric and mechanical properties of *Bambusa nutans* and *Bambusa balcooa*.
  - Evaluation of geometrical and mechanical characterization of *Bambusa vulgaris* and *bambusa arundinacea*.
  - Evaluation of mechanical performance of laminated bamboo boards for structural applications.
  - Life Cycle Assessment (LCA) of bamboo-based building structures.
  - Evaluation of mechanical characterization of common Nepali timbers.
  - Analysis of structural performance of tradition timber joint connections.
- **Risk resilient planning of rural settlements for tourism promotion:**
  - Risk-sensitive land use planning with multi-hazard risk assessment (earthquake, flood, fire, and landslides).
  - Integration of indigenous knowledge and digital technologies for risk-resilient rural tourism infrastructure planning including homestay buildings, trails and trekking routes, and related services.
  - Socio-economic impact of rural tourism on local communities.

## Eligibility

- **Admission to PhD Program:** Master's degree in engineering, architecture, urban planning or related field with a minimum GPA of 3.0 or equivalent.
- **Admission to MAS Program:** Bachelor's degree in engineering, economics, social science, or related field with a minimum GPA of 2.75 or equivalent.

## Contact

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