

ABSTRACT

This project presents a comprehensive system that assists in generating optimized residential building designs for hill station environments. Utilizing Geographic Information Systems (GIS), geotechnical data and environmental parameters, the system proposes suitable structural layouts, building materials and dimensions tailored to specific site conditions. The objective is to provide user-friendly, regulatory-compliant and structurally sound recommendations while minimizing delays and reducing human error. The system integrates slope stability analysis and climate-responsive architecture to ensure long-term safety and comfort. It also supports decision-making through automated design simulations and terrain-adaptive modeling. Additionally, it accounts for drainage planning, seismic considerations and accessibility, enhancing both resilience and livability in challenging topographies. Energy efficiency and environmental sustainability are also embedded into the design process, promoting eco-friendly development practices suitable for sensitive hill ecosystems.