



Project Proposal for Ph.D.

Project Details	
Project Title	Development of Novel Geotextile for Improving load bearing capacity of soft soils through Geotextile Encased Column (GEC) Application
Project Summary (Minimum 500 and maximum 2000 characters)	Geotextiles have revolutionized infrastructure development in challenging terrains globally. However, soft soil foundations pose significant challenges, leading to failures in infrastructure projects. While techniques like stone columns improve soil stiffness and drainage, extremely soft soils demand innovative solutions like geotextile-encased stone columns. The proposed work needs an interdisciplinary approach, combining design principles of materials science, and textile engineering, which aims to develop geotextile products using a blend of woven and nonwoven materials. A combinational design strategy involving both woven/ nonwoven and electrospun materials would provide the required set of mechanical properties derived from both structures. For example, woven/nonwoven fabric will provide the required tensile strength and an electrospun material offers significant elongation capability. Synthetic fibers are known for their superior mechanical properties and durability. Combining them natural fibers can result in geotextiles with the necessary structural integrity to withstand heavy loads, providing long-term reinforcement in soil or construction applications in a cost-effective manner.

Ph.D. Supervisors			
Role	Name of Faculty	Academic Unit in IITD/Institute/University	Email ID (Official)
Supervisor 1	Prof. Amit Rawal	Department of Textile and Fibre Engineering	arawal@iitd.ac.in
Supervisor 2	Prof. Bhabani K. Satapathy	Department of Materials Science and Engineering	bhabani.kumar.satapathy@mse.iitd.ac.in

Project requirements (Student qualifications, experience required, etc.) *The candidate will be shortlisted based on common shortlisting criteria decided by ScRC (SIRe)
As per the institute guidelines

Source of fellowship/funding (CSIR/UGC/DBT/ICMR/ICAR/NEET-PG/DST-INSPIRE/IRD/FITT Project details, if any)
Projest Funding : RP04557G_SN

Role of Faculty Members involved:	
Supervisor-1	Prof. A. Rawal will guide the student in preparing and characterizing the woven/nonwoven structures for geotextile applications. He has a background in textile engineering and has extensive experience in geotextiles.
Supervisor-2	Prof. BK Satapathy will guide the student in preparing and characterizing the electrospun materials for geotextile applications. He has a background in polymer science and has extensive experience in electrospun materials and their interaction with soil particles.