Notification No: *F.NO. COE/Ph.D./(Notification)/532/2023*

Date of Award: *14/03/2023*

Name of the Scholar	**:**	Sameer Ahmad
Name of the Supervisor	**:**	Prof. Weqar Ahmad Siddiqi
Name of the Department/Centre	**:**	Applied Sciences and Humanities
Topic of Research	**:**	Development of Sustainable Polymer Based Nanocomposites and their Application as Nano-Sieves for water Treatment

Findings

In the present thesis work, the development of cost-effective sustainable porous polymer composite-based adsorbent and membrane sieves are covered for wastewater treatment. The scalability, porosity, tunable surface chemistry, low environmental footprints, and functionalization of porous structures of composite adsorbent and membrane sieves have further enhanced the scope of their potential application in the field of wastewater and other remediation. This thesis work covers the synthesis and fabrication of sustainable porous adsorbent as photocatalyst by using the sol-gel technique, and membrane sieves developed by phase inversion, and casting methods, respectively. These formulated porous nanocomposite materials were characterized with help of FTIR, XRD, UV-Vis, BET, SEM, and EDAX spectroscopic techniques. In the case of porous adsorbent, the photodegradation of Herbicide 2,4-Dichlorophenoxyacetic Acid (2,4-D) from water was studied under visible and UV radiation. On the other hand, Chitosan based graphene oxide (GO) modified membranes were studied for antifouling, and oil-water emulsions separation from water. Antibacterial activity was also investigated by synthesized membrane sieves against the gram-negative *Escherichia coli (E.coli)* pathogen.