

COURSE CURRICULUM

FOR

POST GRADUATE PROGRAMMES

UNDER

CENTRE FOR RIVER STUDIES

2017



आर्यभट्ट ज्ञान विश्वविद्यालय
ARYABHATTA KNOWLEDGE UNIVERSITY

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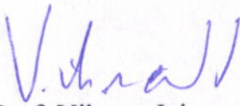
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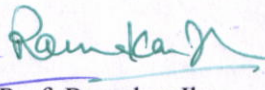
Scope, Motivation and Rationale

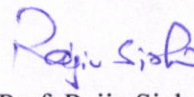
Rivers, particularly large river systems, constitute one of the most fundamental life-support systems that have sustained civilisations; and are projected to be a critical determinant for the future sustenance of human civilisations. In a world that is expected to witness a near doubling of the human population by the middle of the century, and a world that is likely to be impacted by an unprecedented rate of global change, one of the main sustainability agendas will be the construction of dynamic strategies for the management of natural freshwater systems. For more than 5000 years, civilisations have flourished in the South Asian Region, leading up to a population hotspot that hosts almost a fifth of the globe's human population. In turn, this has led to significant human intervention and impacts on the freshwater systems of the region. Therefore, the understanding of water problems and water security in this region has to be embedded in holistic approaches that stress the inter-relationships of earth, water, and humans. As river systems constitute a lifeline for the future of human populations, it is important to understand the large river systems, with the aim of securing their futures and thereby our own futures. In India amongst other issues, surface runoff and stream flow and discharge patterns of both the Himalayan and the peninsular rivers need detailed rigorous scientific studies. Rigorous analysis of the discharge data of the past few decades of the river systems of our country are required to build reliable time series that can be used for an improved forecasting of the future discharge trends of these systems. Water pollution, ecological loss, and degradation of the health of a river system in all its forms, confers a universal burden on all river users, uses, and system processes. As such, there is a clear imperative to provide strategic sustainable river management options for rivers experiencing poor health.

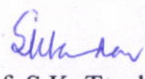
The human relationship to any given river system is a key factor for ensuring healthier river futures, and the importance of place in designing rehabilitation initiatives cannot therefore be underestimated. In the past, humans have made interventions at different scales in river systems in order to use them. These interventions are largely through river engineering which is a discipline that stresses the utilitarian aspects of river systems rather than their evolutionary and their multi-disciplinary aspects. It is now increasingly being realised that river engineering should be practiced on a platform of *River Science*. River Science is an integrative multi-disciplinary subject that includes the study of interactions amongst hydrological, geological, chemical, and ecological processes; and their influence on the form and dynamics of river ecosystems (Figure 1). Also, river science 'includes the study of relationships between watersheds, riparian zones, floodplains, groundwater, headwaters and downstream rivers' (USGS, 2010).

Human disturbances of different types at different scales in river systems are a consequence of the perceived needs of human populations; however, these needs have to be in consonance with the needs of the river itself. For instance, the river requires its own space to perform such functions like flooding and floodplain development. Technological interventions should therefore be

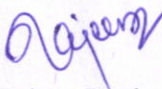

Prof. Vikrant Jain

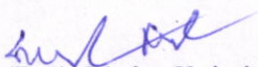

Prof. Ramakar Jha

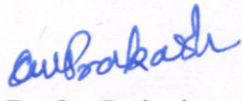

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