



---

# PROSPECTUS OF CENTRE FOR RIVER STUDIES 2024

---

ARYABHATTA KNOWLEDGE UNIVERSITY, MITHAPUR, PATNA





### **Mission of Centre:**

- ❖ To impart quality teaching and promote research in the field of river basin management.
- ❖ To become a leading national institution contributing to river basin study and management.
- ❖ To maintain rivers as a resources for bring prosperity through innovative, scientific and technical interventions.
- ❖ To work with governments, society and all other stakeholders to maintain the natural integrity of rivers for sustained benefits out of it.
- ❖ To generate and disseminate knowledge to technocrats policy makers, executives and other stakeholders for the best use of rivers and to minimize loss of the precious resource.

### **Objectives of centre:**

- ❖ To establish state of the art facility for teaching and research on river basin and management.
- ❖ To conduct academic courses at bachelor and post graduate levels.
- ❖ To conduct researches on various aspects of river ecology, engineering and basin management.
- ❖ To contribute and enrich knowledge on river engineering and basin management through quality publications.
- ❖ To develop programs for faculty development for field staff and for teachers and researchers of other institutions with similar objectives.

## **Score, 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 multidisciplinary 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 relationship between watersheds, riparian zones, floodplains, groundwater, headwaters and downstream rivers’ (USGS 2010).

The Aryabhatta Knowledge University at Patna has set up Centre for River Studies to address these issues and to prepare human resources to handle the problems related to rivers with a clear emphasis on community participation and extensive application of Information Technology.

## **Academic Programs and Eligibility Criteria:**

Master of Science (M.Sc.) in River Science and Management (2 years)

The applicant must have Bachelor's degree in Engineering (Civil/environmental/water resource), A Bachelor's degree in sciences and Allied Subjects, with not less than 60% marks for General Category and 55% for reserved categories in the absolute system or equivalent CGPA.

Six months certificate Programme in River Management

The applicant must have a Bachelor's degree in Engineering (Civil/Environment/Water Resources), A Bachelor's degree in sciences, social sciences (economics, sociology, political science, geography) and Allied subjects, with not less than 60% marks for General Category and 55% for all reserved categories in the absolute system or equivalent CGPA.

The University may relax the above eligibility criteria for working professionals in water sector with a minimum relevant experience of 2 years.

## Course Structure

M.Sc. in River Science and Management (2 years)

<b>Semester I (20 credits)</b> <ol style="list-style-type: none"><li>1. Introduction to River Science (3-1-0-4)</li><li>2. Surface and Ground Water hydrology (3-0-3-4)</li><li>3. River ecosystem processes (3-1-0-4)</li><li>4. Remote Sensing and GIS applications in river studies (3-0-3-4)</li><li>5. Data analysis (3-0-4-5)</li></ol>	<b>Semester II (23 credits)</b> <ol style="list-style-type: none"><li>1. River engineering (3-0-3-4)</li><li>2. Essentials of River Management (3-1-0-4)</li><li>3. River geomorphology and sediment transport (3-0-3-4)</li><li>4. Ecosystem services and economic valuation (3-1-0-4)</li><li>5. Water policy, law and governance (3-1-0-4)</li><li>6. Field training* (credit)</li></ol>
<b>Summer term: Thesis (5 credits)</b> Minimum of 8 weeks	
<b>Semester III (21 credits)</b> <ol style="list-style-type: none"><li>1. Climate change and its impacts on river systems (3-1-0-4)</li><li>2. Elective 1</li><li>3. Elective 2</li><li>4. Elective 3</li><li>5. Seminar course (0 credits)</li><li>6. Thesis (3 credits)</li></ol>	<b>Semester IV: Thesis (18 credits)</b>

\*To be conducted during winter vacation between Sem. I and II

### List of Electives

1. Environmental chemistry of river systems (3-1-0-4)
2. WQ assessment and monitoring (3-0-3-4)
3. River modeling (3-1-0-4)
4. Watershed management and sustainable agriculture (3-1-0-4)
5. River hazards (3-1-0-4)
6. EIA and ecological economics (3-1-0-4)
7. River Ecology (3-1-0-4)



8. Flood plain management (3-1-0-4)
9. Water security and IWRM (3-1-0-4)
10. Human dimension of river management (3-1-0-4)
11. Wireless sensor network (3-1-0-4)

## **Six- month Certificate Programme**

- (a) River Data analysis and methods (I Sem.)
  - Introduction to River Science (3-1-0-4)
  - Remote Sensing and GIS application in river studies (3-0-3-4)
  - Data analysis (3-0-4-5)
  - Wireless sensor network
  - Project (5 credits)
- (b) Water quality (III sem.)
  - Introduction to River Science (3-1-0-4)
  - Environmental chemistry of river systems (3-0-3-4)
  - WQ assessment and monitoring (3-0-3-4)
  - EIA and ecological economics (3-0-3-4)
  - Project (5 credits)
- (c) River governance and management (II Sem.)
  - Introduction to River Science (3-1-0-4)
  - Essentials of River Management (3-1-0-4)
  - Ecosystem services and economic evaluation (3-1-0-4)
  - Water policy, law and governance (3-1-0-4)
  - Project (5 credits)
- (d) Integrated Water resource management (I and III sem.)
  - Introduction to River Science (3-1-0-4)
  - Climate change and its impacts on river systems (3-1-0-4)
  - Watershed management and sustainable agriculture (3-1-0-4)
  - Water security and IWRM (3-1-0-4)
  - Project (5 credits)

Contact address

Email- [centreforriverstudies@gmail.com](mailto:centreforriverstudies@gmail.com)

Mobile Number-9870551288

Aryabhatta Knowledge University,

Mithapur, Patna