Application Call Document



Research Based Education for the Development of Hydropower Professionals (Hydro-Himalaya)



"The Graduate programs at Hydro-Himalaya Project attract people who share a deep aspiration to continue their career as Hydropower Professionals in the Himalaya Region."











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1 PROJECT BACKGROUND

Norwegian Program for Capacity Development in Higher Education and Research for Development (NORHED), aims to strengthen the capacity of higher education institutions in developing countries to produce high-quality graduates, high-quality research, and more inclusive higher education.

The NORHED-II program has funded the project, **"Research Based Education for Development of Hydropower Professionals for the Himalayan Region (Hydro-Himalaya)"**. The Hydro-Himalaya project has three thematic areas: Effective Production of Hydro Energy, Effective Transmission of Hydro Energy and Effective End-use of Hydro Energy.

1.1 Objectives

- i. Strengthen the research-based education within hydropower engineering at Kathmandu University by producing a better-qualified workforce in the Himalayan region.
- ii. Transfer of academic and research competence from Kathmandu University to the Nepalese and Himalayan region universities in the field of hydropower engineering.
- iii. Bridge academia and industry for sustainable solutions and practices.

1.2 Expected Results of the Project

- **Overarching goal** The Himalaya region has increased access to sustainable and resilient energy infrastructure, educated nationals able to maintain and further develop the energy sector and industry utilizing and promoting sustainable solutions.
- Education The Himalaya region has increased access to local personnel with relevant education and skills to maintain and further develop the energy infrastructure in a sustainable matter.
- **Technology Development** The Himalaya region has increased access to sustainable and resilient technology specifically developed or adapted for the technical challenges in the region.
- **Industry development** Domestic and regional industry are matured and ready to implement new innovations.

1.3 Partners

<u>Applicant Institution</u>: Norwegian University of Science and Technology, Trondheim, Norway (<u>www.ntnu.edu</u>)

Local University Partner: Kathmandu University, Dhulikhel, Nepal (<u>www.ku.edu.np</u>)

Partner at North: University of South-Eastern Norway, Norway (<u>www.usn.no</u>)

Partner at South: Wuhan University, Wuhan, China (en.whu.edu.cn/)

<u>Regional supporting partner</u>: Himalayan University Consortium, Kathmandu, Nepal (*https://www.icimod.org/initiative/huc/*)

2 ACADEMIC BACKGROUND

The holistic approach for the research is to have 'Effective Production of Hydro Energy', 'Effective Transmission of Hydro Energy', and 'Effective End-use of Hydro Energy' in the Himalayan region. The academic focus is on the innovations and solutions to the regional challenge induced by high sediment flows and the effective use of spilled energy.

Thematic Area	Specific Area	Research Domain	Degrees	Total
Effective Production	Sediment Erosion	Basic research, Design,	Post Doc	1
of Hydroelectricity	in hydro turbine	Production, Operation	PhD	3
		and Maintenance	Masters	10
			Double	2
			Degree PhD	
Effective	Electrical Control,	Quality and reliability	PhD	1
Transmission of	and	of power, Surveillance,		
Hydroelectricity	Effective	VFD Control and grid	Double	2
	Transmission	stability	Degree PhD	
			Masters	6
Effective End-use of	Green Hydrogen	H2H: Feasibility,	Post Doc	1
Hydroelectricity		Design cases, develop research facilities.	PhD	1
		prototype, safety.	Double	1
		process control	Degree PhD	
		r	Masters	4
Total				32

Table 1 Academic Details for 2021-2020	Table 1	Academic De	tails for 2021-2026
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The Masters, Ph.D. and Post-Doc program of Hydro-Himalaya at Kathmandu University is a researchintensive graduate program primarily focused on conducting active research in the several domains of Hydropower Engineering.

Masters Degree

The Program is distributed over a period of two years in which the students engage in finding solutions to research questions under the guidance of designated supervisors. The Master's degree is offered by KU upon successful completion of the Masters by Research.

PhD Degree

The program is distributed over three years period in which the students engage in finding solutions to PhD research questions. KU provides the PhD degree upon the completion of the study program.

Double Degree PhD

The study program will award PhD degrees from both KU and the partner university jointly after fulfilling the requirements at both universities. The Double Degree PhD is also three years long.

Post-Doc

The Postdoc position has been planned with an aim to train the faculty members and researchers for strengthening research competence at KU.

3 KNOWLEDGE EXCHANGE AND MOBILITY

What sets Hydro-Himalaya apart is its unique partnership model – involving two Norwegian universities, one university in Nepal, and one in China. A time-tested partnership with NTNU in developing education and research capacity at KU will be the major foundation for the collaboration in this project. The strength of Wuhan University for fundamental research on sediment erosion of hydro turbines will add a new dimension to the existing competence. The expertise of the University of South-Eastern Norway in electrical and control aspects of hydropower systems will expand the project horizon to effective transmission of power. The collaboration between four academic institutions along with HUC has made Hydro-Himalaya possible with the aim to develop the academic and research activities coming out from the university and transfer to the industrial adaptation. The regional network of the Himalayan University Consortium will ensure better representation of project stakeholders and dissemination of project outcomes with impactful visibility.

All of HHP's masters, doctoral and post-doctoral programs are coupled within one of three institutions: Norwegian University of Science and Technology (NTNU), Wuhan University (WHU) and University of South-Eastern Norway (USN).

	Year	Masters	PhD	Double PhD	Post-Doc	Recruitment
_	2021	7	2	3		Completed
	2022	8	1	2		Completed
	2023	5	1	1		Recruiting
	2024	-	-	-	2	Remaining
_	Total	20	4	6	2	

Table 2 Yearly Recruitment Plan

All the applicants enrolled under this application framework will have an opportunity to have an exchange program with at least one partner university during the academic program period. The mobility of the student to the partner university will depend on the domain of the specific research. The students enrolled under the domain of 'Design and Operation of Sediment Resistant Turbines' and 'Green Hydrogen' will have an exchange program with NTNU. Similarly, students enrolled under the domain 'Quality and Reliability of Power and Effective Transmission' will have the exchange program with USN. The duration of stay at the partner university for Ph.D. will be of 2 semesters (33% of the academic time) and the duration of stay at the partner university for a Master's degree will be of 1 semester (25% of the academic time). The double degree will be awarded Ph.D. degrees from both KU and the partner university after fulfilling the requirements at both universities.

4 APPLICATION CALL FOR 2023

Hydro-Himalaya project welcomes applications from individuals interested to further their academic career as hydropower professionals in the fall term of 2023. Summary of the available positions is provided in **Table 3**.

Research		Research	N	Study	Ν	Iobility
Degree	Code	Domain	INO	Period*	Location	Period
Ph.D.	P2-23	Design of	1	Aug 2023-	NTNU,	12 months
Double degree		sediment		Aug 2026	Norway	
(KU-NTNU)		resistant turbines				
Ph.D.	P4-23	Quality and	1	Aug 2023-	USN,	12 months
(KU)		reliability of		Aug 2026	Norway	
		power and				
		effective				
		transmission				
Masters by	M2.1-23	Operation,	2	Aug 2023-	NTNU,	6 months
Research	and	maintenance of		Aug 2025	Norway	
(KU)	M2.2-23	sediment				
		resistant turbines				
Masters by	M3.1-23	Green Hydrogen:	1	Aug 2023-	NTNU,	6 months
Research		Feasibility,		Aug 2025	Norway	
(KU)		Design cases for				
		H2H				
Masters by	M4.1-23	Quality and	2	Aug 2023-	USN,	6 months
research	and	reliability of		Aug 2025	Norway	
(KU)	M4.2-23	power and grid				
		management				

Table 3	Details	of	available	positions	for	2023
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*Dates are subject to change

*Follow the Program code in Annexes for more details of each position.

Applicants interested in more than one research topic/position can apply for up to two positions. Each application will be evaluated individually. However, the candidate must specify the first choice position as only one interview will be conducted.

5 APPLICATION PROCESS

5.1 General Eligibility Criteria

The applicant must be a Nepali citizen.

For Masters Degree

The candidate must have a minimum CGPA of 2.5 or equivalent in his/her four-year bachelor's degree in engineering from a reputed university in the relevant field and must have completed 16 years of education (10+2+4).

For Ph.D. Degree

The candidate must have a minimum CGPA of 3.0 or B grade or equivalent in his/her Masters's degree in Engineering and must have completed a minimum of 17.5 years of education (10+2+4+1.5).

For a Double Ph.D. Degree

The candidate must meet all the requirements separately of both KU and the partner university to be eligible to apply. The candidate must have a minimum CGPA of 3.0 or B grade or equivalent in his/her MS degree in Engineering. MS degree must have at least 1 semester of independent thesis load.

The applicant must have gained the required qualification within the start date of the position, so applicants in the last semester of their bachelor's and master's degree are also eligible to apply. In such cases, instead of a transcript and degree certificate, students must submit a letter from their current University/College with the expected completion date.

5.2 Expected Qualifications

Higher CGPA, experience in paper publication, and relevant work experience is an advantage. Proof of excellent written and oral English language skills is required. The application will be further strengthened if documentation of publications and a thesis in the relevant area of study is provided by the candidate.

The candidate with the ability to work independently and the motivation to share knowledge and take part in teamwork is preferred. Cooperation between staff members is an integrated part of the working atmosphere at Kathmandu University and the partner university. The candidate should be motivated and demonstrate a proven ability to work effectively within a team to formulate and realize common objectives. Personal suitability for the post will be emphasized.

Please refer to the specific program document in Annex for more details about the specific program of study.

5.3 Related information

The Department has fewer women in scientific positions; therefore, women are particularly encouraged to apply. The project aims that the students to reflect the diversity of the general population. An expert assessment of applicants will be carried out and the candidates deemed best qualified will be invited to

an interview. The person appointed must comply with the laws, regulations, and agreements that apply at any given time to the post.

5.4 Personal characteristics

- Strongly motivated and determined
- Be structured, targeted and solution-oriented
- Have the motivation to work interdisciplinary
- The candidate should be creative and actively contribute to the team he/she will be a part of
- Have good communication and dissemination skills
- Personal skills such as a positive and friendly attitude, a strong appreciation for diversity, and contributing to a sustainable social environment will also be valued

In the evaluation of which candidate is best qualified, emphasis will be placed on education, experience, and personal suitability, in terms of the qualification requirements specified in the advertisement.

5.5 What to Expect

The candidate enrolled in Masters and Ph.D. can expect the following:

<u>Tuition Fee Scholarship</u>: The tuition fees and expenses incurred during research activities will be covered by the project.

Monthly Stipend: All the students enrolled to this program will be provided with a monthly stipend as per the regulations at Kathmandu University while in Nepal. During mobility at the partner institution, a monthly stipend will be provided as per the regulations of the partner university to cover living costs.

<u>Visa Fees and International Travel</u>: Students enrolled in each degree has the provision of exchange with one of the partner university. For the same, securing visas is important and the project will fund the visa expenses along with two-way flight charges. Personal insurance and other liabilities should be covered by respective candidates.

Leadership Mentoring: Himalayan University Consortium, a partnering institution, conducts a wide range of practical support training for students in order to build their leadership and confidence throughout the program aiming to achieve all-rounded readiness for their future careers.

5.6 What We Offer

- A stimulating and growing research environment, with good opportunities to develop your career and your academic skills
- An open and inclusive work environment with dedicated colleagues
- A healthy social environment where diversity is celebrated
- Team and individual mentoring support to build communication and leadership skills and achieve all-rounded readiness for future career
- Opportunity for physical activities within working hours

5.7 How to Apply

The Hydro-Himalaya Project at KU makes use of online application management. Students should submit the complete application with the attached documentation through the project website: <u>here</u>

The following documents shall be attached to the online application while applying for **Ph.D. position:**

- Transcripts and degree certificates of Bachelors and Masters Degrees. The transcript should clearly show the grades obtained for different courses taken at the Bachelor and Masters Degree. Must have a minimum 3 CGPA on a 4-point scale or equivalent.
- Research Statement (three pages at most)
- A citizenship document
- Two Letters of Recommendation
- Curriculum Vitae
- Other relevant work and academic certificates (Optional)

The following documents shall be attached to the online application while applying for **Masters Position:**

- Transcript and degree certificate of Bachelor's Degree. The transcript should clearly show the grades obtained for different courses taken at the Bachelor's Degree. Must have a minimum 2.5 CGPA on a 4-point scale or equivalent.
- Research Statement (three pages at most)
- A citizenship document
- Two Letters of Recommendation
- Curriculum Vitae
- Other relevant work and academic certificates (Optional)

5.8 Special initiatives to ensure social inclusion

Initiatives that will ensure equal opportunities for higher education, research, professional development, and leadership for underrepresented or disadvantaged students are encouraged. This could include, but is not limited to:

- Small grants to cover personal expenses enabling disadvantaged students/students with disabilities to attend and complete studies at graduate/post-graduate level.
- Personal assistance during the program where required.
- Special interest groups at university.

5.9 Gender mainstreaming initiative

Any initiatives that will ensure equitable opportunities for higher education, research, professional development, and leadership for females can be supported. This could include, but is not limited to:

- Compensation for up to 3 months maternity leave for those receiving full scholarships and fellowships.
- Assistance in a visa application for spouse and children if required.
- Small grants are provided to cover personal expenses like hygiene articles, local transport, stationaries, etc. to ensure that female students in need can attend and complete the studies at

the graduate/post-graduate level within project thematic areas and in countries where women's underrepresentation is clear.

• Leadership training and mentoring group

6 RIGHT TO APPEAL AND OUR RESERVATIONS

You have a right to appeal if you believe you have been wrongfully rejected for admission or if there has been a mistake in the processing of your application. The individual himself/herself has to appeal to the Hydro-Himalaya Project Admissions committee via email to register their appeal.

Not all applications that meet the minimum requirements will be selected. Admission to the program is highly competitive with many strong applicants. If you have received the rejection 'not admitted due to competition', you cannot appeal on the basis that you meet the requirements.

Deadline

The deadline to appeal is 1 week from the decision that was sent to you. You will receive a reply to your appeal approximately within 3 weeks.

The application will be assessed on the basis of the attached documentation as requested above. Each applicant is responsible for ensuring that the required documentation has been uploaded within the application deadline.

ANNEX 1

Admission call for positions as Ph.D.	Research Fellow (double degree)	and Masters by Research at:
Kathmandu University (KU)/ Norwe	egian University of Science and	Technology (NTNU)

Academic Supervision	KU: Department of Mechanical Engineering, School of Engineering NTNU: Department of Energy and Process Engineering					
Thematic Area	Effective Production of HydropowerResearch DomainSediment Ero in Hydro turb					
Ph.D. Topic (P2-23)	<i>"Experimental investigations in Francis turbines"</i>	Degree awarded by	KU			
Masters Topic (M2.1-23)	"Design and analysis of pump- turbines for pumped storage hydropower projects"	Degree awarded by	KU			
Masters Topic (M2.2-23)	"Strain measurements on a model Francis turbine"	Degree awarded by	KU			
Application deadline	2023.05.29	Expected Decision Date	2023.06.15			

About the Positions

The rivers in Nepal being comparatively young, face a huge problem of sediment erosion that damages the turbines. KU has been backed by NTNU to develop capacity and competence for initiating research activities in Sediment Resistant Turbines by supporting Ph.D. and Masters by Research studies. There is still the need to reinforce past research for the optimum design of Francis turbines. So, the positions are related to the laboratory measurements of a Francis turbine at Turbine Testing Lab.

Department of Mechanical Engineering, KU has a vacancy for a full-time position as Ph.D. Research Fellow and 2 Masters by Research Position equivalent to Research Assistant. The academic and research work will be jointly carried out at Turbine Testing Lab at KU and Waterpower Laboratory at NTNU. The primary objective is to develop technology that strengthens the research in sediment resistance of hydro turbines. The Masters and Ph.D. candidates will have the provision of one and two semesters of exchange with NTNU respectively.

Expected Knowledge Base:

Fundamental knowledge within (i) Any Industrial Experiences in Hydropower Turbines ii) computer programming languages such as LabView, MATLAB, Python, etc. iii) Experimentation and instrumentation skills.

ANNEX 2

Admission Call for positions as Masters by Research at:

Kathmandu University (KU)/Norwegian University of Science and Technology (NTNU)

Academic	KU: Department of Mechanical Engineering, School of Engineering					
Supervision	NTNU: Department of Energy and Process Engineering					
Master Degree	Department of Mechanical Engineering, School of Engineering,					
Awarded by:	Kathmandu University					
Thematic Area	Effective End-Use of Hydropower	ResearchGreen HydrDomain:				
Masters Topic	ic "Hydrogen Storage System to balance production variation in Hy					
(M3.1-23)	Electricity from Wet to Dry Seasons"					
Application deadline	2023.05.29 Expected Decision 2023.06.15 Date 2023.06.15 2023.06.15					

About the Positions

The Green Hydrogen work package will concentrate on the effective end-use of Hydroelectricity focusing on Hydropower to Hydrogen (H2H) as a means of energy transition towards a sustainable and low carbon economy in Nepal. The scope of the study includes the production, storage, transport, and end-use of Green Hydrogen in the Himalayas region by effective use of locally available renewable energy resources.

Department of Mechanical Engineering at KU has a vacancy as a full-time position for 1 Master by Research Position equivalent to Research Assistant. The academic and research work will be jointly carried out at Green Hydrogen Lab, KU, and NTNU Energy Team Hydrogen, NTNU. The master's candidates will have the provision of one semester's exchange with NTNU.

Expected Knowledge Base

Fundamental knowledge within i) Hydropower technology ii) Hydrogen Technologies Fuel and Energy iii) Experimental Research iv) Energy simulation v) Energy economics

ANNEX 3

Admission call for positions as Ph.D. Research Fellow and Masters by Research at:	
Kathmandu University (KU)/ University of South-Eastern Norway (USN)	

Academic Supervision	cKU: Department of Electrical & Electronics Engineering, School of EnginonUSN: Faculty of Technology, Natural Sciences, and Maritime Sciences						
Thematic Area	Effective Transmission of HydroelectricityResearch DomainElectrical control and effective transmission						
Ph.D. Topic (P4-23)	"Assessing Flexibility in Nepalese Power Grid Infrastructure for Smart Grid Development"	Degree Awarded by	KU				
Masters Topic (M4.1-23)	"Systematic review of regulatory frameworks and policy reformations in the electricity sector of Nepal"	Degree Awarded by	KU				
Masters Topic (M4.2-23)	"Overview of electricity tariff fixation and long term investments planning on infrastructure in Nepal"	Degree Awarded by	KU				
Application deadline	2023.05.29	Expected Decision Date	2023.06.15				

About the Positions

The call focuses on flexible markets and smart grid systems. This Ph.D. research is organized and involves the development of smart grid monitoring and protection systems, entailing conducting realtime system modelling, with a possible stint at the National Smart Grid Laboratory at NTNU. This also focuses on the optimal expansion planning of Nepal's electricity generation and transmission infrastructure. The study will evaluate and determine the best long-term investments to achieve sustained electricity surplus under different generation scenarios.

The MS by Research analyses the current regulatory frameworks in the electricity sector and identifies the associated challenges and opportunities. The research analyses the historical evolution of electricity tariffs in Nepal and identifies reforms to promote the growth of hydropower. The study will also assess the planned investments in the critical electricity infrastructure sectors of transmission, distribution, and generation, with a focus on identifying areas that require improvement.

Department of Electrical Engineering at KU has a vacancy for a full-time position as Ph.D. Research Fellow and 2 Master by Research Position equivalent to Research Assistant. The academic and research work will be jointly carried out at the Department of Electrical and Electronics Engineering, KU, and Department of Electrical Engineering, Information Technology, and Cybernetics at USN. The Masters and Ph.D. candidates will have the provision of one and two-semester exchange with USN respectively.

Expected Knowledge Base

Fundamental knowledge in i) Electrical Power Systems ii) computer programming, with emphasis on languages such as MATLAB, Python, etc.