JULY 2021

Application Call Document

Hydro Himalaya

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."

NTNU

ICIMOD

HUC Himalayan University Consortium

Web: http://hhp.ku.edu.np (In case of trouble from Chrome, use another web browser)

E-mail: hydro.himalaya@ku.edu.np

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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

Applicant Institution: Norwegian University of Science and Technology, Trondheim, Norway (*www.ntnu.edu*)

Local University Partner: Kathmandu University, Dhulikhel, Nepal (*www.ku.edu.np*)

Partner at North: University of South-Eastern Norway, Norway (*www.usn.no*)

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

Regional supporting partner: 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.

Table 1 Academic Details for 2021-2026

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

The Masters, Ph.D. and Post-Doc program of Hydro-Himalaya at Kathmandu University is a research-intensive graduate program primarily focused on conducting active research in the several domains of Hydropower Engineering.

Masters Degree

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

Table 2 Yearly Recruitment Plan

Year	Masters	PhD	Double PhD	Post-Doc
2021	8	1	3	
2022	8	2	2	1
2023	4	2	-	1
Total	**20**	**5**	**5**	**2**

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 of 'Fundamental Study on Sediment Erosion' will have the exchange program with Wuhan University and the 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 a double degree PhD will be of 3 semesters (50% of the academic time) and will award PhD degrees from both KU and partner university after fulfilling the requirements at both universities. The duration of stay at the partner university for a normal PhD will be of 2 semesters (33% of the academic time) and the duration of stay at the partner university for a Masters degree will be of 1 semester (25% of the academic time).

4 APPLICATION CALL FOR 2021

Hydro-Himalaya project welcomes applications from individuals interested to further their academic career as hydropower professionals in the fall term of 2021. Summary of the available positions is provided in **Table 3**.

Table 3 Details of available positions for 2021

Research Degree	Code	Research Domain	No	Study Period*	Mobility		
					Location	Start Date*	End Date*
Ph.D. (KU)	***P1-21***	Fundamental study on sediment erosion	1	Sept 2021-Aug 2024	WHU, China	Aug 2022	July 2023
Ph.D. Double degree (KU-NTNU)	***P2-21***	Design of sediment resistant turbines	1	Sept 2021-Aug 2024	NTNU, Norway	Jan 2022	Aug 2023
Ph.D. Double degree (KU-NTNU)	***P3-21***	Green Hydrogen: Feasibility, Design cases for H2H	1	Sept 2021-Aug 2024	NTNU, Norway	Aug 2022	Dec 2023
Ph.D. Double degree (KU-USN)	***P4-21***	Quality and reliability of power and effective transmission	1	Sept 2021-Aug 2024	USN, Norway	Jan 2022	Jan 2023
Masters by Research (KU)	***M1.1-21 and M1.2-21***	Fundamental study on sediment erosion	2	Sept 2021-Aug 2023	WHU, China	Aug 2022	Dec 2022
Masters by Research (KU)	***M2.1-21 and M2.2-21***	Operation, maintenance of sediment resistant turbines	2	Sept 2021-Aug 2023	NTNU, Norway	Aug 2022	Dec 2022
Masters by Research (KU)	***M3.1-21 and M3.2-21***	Green Hydrogen: Feasibility, Design cases for H2H	2	Sept 2021-Aug 2023	NTNU, Norway	Aug 2022	Dec 2022
Masters by research (KU)	***M4.1-21 and M4.2-21***	Quality and reliability of power and grid management	2	Sept 2021-Aug 2023	USN, Norway	Aug 2022	Dec 2022

**Dates are subject to change*

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

Applicants who are interested in more than one research topic/position can apply for maximum of two positions. Both the applications will be treated individually.

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 bachelors 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 degree in Engineering and must have completed a minimum of 17.5 years of education (10+2+4+1.5).

For Double Ph.D. Degree

The candidate must meet the requirement 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 Masters degree in Engineering. Masters 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 masters degree are also eligible to apply for Ph.D. In such case, 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 are required. The application will be further strengthened if documentation of publications and thesis in relevant area of study is provided by the candidate.

The candidate with an ability to work independently and having 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 the 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 reflect the diversity of 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 interdisciplinarity
- 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:

Tuition Fee Scholarship: 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.

Visa Fees and International Travel: 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: here

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 Bachelors Degree. The transcript should clearly show the grades obtained for different courses taken at the Bachelors 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 and Masters by Research at:
Kathmandu University (KU)/ Wuhan University (WHU)

Academic Supervision	KU: Department of Mechanical Engineering, School of Engineering WHU: School of Water Resources and Hydropower Engineering		
Thematic Area	Effective Production of Hydropower	**Research Domain**	Sediment Erosion in Hydro turbines
PhD Topic (P1-21)	*"The physical mechanism of sediment erosion in Francis turbines"*	**Degree awarded by**	KU
Master Topic (M1.1-21)	*"Parametric study of sediment erosion in alternative designs of Francis turbines by numerical methods"*	**Degree awarded by**	KU
Master Topic (M1.2-21)	*"Experimental study of sediment erosion in Francis turbines in laboratory condition"*	**Degree awarded by**	KU
Application deadline	2021.08.05	**Expected Decision Date**	2021.08.25

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 its partner institutions 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.

Department of Mechanical Engineering at 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 TTL, KU and Hydropower Research Centre for Himalaya Region (HRCHR), WHU. The Masters and Ph.D. candidates will have the provision of one and two semesters exchange with WHU respectively.

Expected Knowledge Base:
Fundamental knowledge within i) Design of Francis turbines ii) Sediment Erosion in hydraulic machinery iii) Multiphase Flow iv) computer programming, with emphasis on languages such as MATLAB, Python, etc.

ANNEX 2

Admission call for positions as Ph.D. Research Fellow (double degree) and Masters by Research at:
Kathmandu University (KU)/ Norwegian 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 Hydropower	**Research Domain**	Sediment Erosion in Hydro turbines
Ph.D. Topic (P2-21)	*"Development of variable speed Francis turbines for sediment-laden Projects"*	**Degree awarded by**	KU and NTNU Jointly
Masters Topic (M2.1-21)	*"Performance evaluation of variable speed Francis turbines with sediments in flow"*	**Degree awarded by**	KU
Masters Topic (M2.2-21)	*"Operation, and maintenance of variable speed Francis turbines in high sediment load"*	**Degree awarded by**	KU
Application deadline	2021.08.05	**Expected Decision Date**	2021.08.25

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.

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 three semesters exchange with NTNU respectively.

Expected Knowledge Base:
Fundamental knowledge within (i) Hydropower Technologies ii) Design of Francis turbines iii) CFD iv) computer programming languages such as MATLAB, Python, etc v) Experimentation and instrumentation skills.

ANNEX 3

Admission call for positions as Ph.D. Research Fellow (double degree) and Masters by Research at:
Kathmandu University (KU)/ Norwegian 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	The effective End-use of Hydropower	**Research Domain**	Green Hydrogen
Ph.D. Topic (P3-21)	*"Hydropower to hydrogen for a low carbon energy value chain in Nepal"*	**Degree Awarded by**	KU and NTNU Jointly
Masters Topic (M3.1-21)	*"Techno-economic assessment of hydrogen production and optimum design case for Nepal"*	**Degree Awarded by**	KU
Masters Topic (M3.2-21)	*"Techno-economic assessment of hydrogen storage and optimum design case for Nepal"*	**Degree Awarded by**	KU
Application deadline	2021.08.05	**Expected Decision Date**	2021.08.25

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 production, storage, transport, and end-use of Green Hydrogen in the Himalaya region by effective use of locally available renewable energy resources.

Department of Mechanical Engineering at 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 Green Hydrogen Lab, KU and NTNU Energy Team Hydrogen, NTNU. The Masters and Ph.D. candidates will have the provision of one and three semesters exchange with NTNU respectively.

Expected Knowledge Base
Fundamental knowledge within i) hydrogen technologies ii) hydropower systems iii) Energy Modelling iv) fuels and emissions

ANNEX 4

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

Academic Supervision	KU: Department of Electrical & Electronics Engineering, School of Engineering USN: Faculty of Technology, Natural Sciences and Maritime Sciences		
Thematic Area	Effective Transmission of Hydroelectricity	**Research Domain**	Electrical control and effective transmission
Ph.D. Topic (P4-21)	*"Optimal operational security within smart-grid and hydropower systems – The operation centre of the future"*	**Degree Awarded by**	KU and USN Jointly
Masters Topic (M4.1-21)	*"Modelling and control for reactive power management using distributed generators and impact on electrical machines"*	**Degree Awarded by**	KU
Masters Topic (M4.2-21)	*"Thermal and dielectric testing of distribution equipment's strengthening the HV-lab"*	**Degree Awarded by**	KU
Application deadline	2021.08.05	**Expected Decision Date**	2021.08.25

About the Positions
The Work Package Power System Operation and Control (PSOC) focuses on super-flexible abilities of hydropower which can be an actor for large-scale energy storage, power system stability improvements, demand-side management, and increased interconnections. In the future, increased demands for capacity, flexibility, and stability will require coordinated R&D involvement from all players in these processes (e.g., grid owners, power producers, and the supervisory authority).

Department of Electrical Engineering at 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 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.