	Minimum Criteria to Award the Degree Rules regarding the minimum criteria to award a Degree of Master of Science in Data science shall remain the same as applicable in other Master of Science programmes run by HPU. **ATTENDANCE** • No student shall be allowed to appear in the examination unless he/she has completed 75% of the total attendance in each paper/practical. However, under special circumstances, short fall of 5% can be condoned by the Chairperson/Director of the Department/Institute and a further short fall of 10% can be condoned by the Pro-Vice-Chancellor/Vice Chancellor.
Justification: **The Department of Data Science and Artificial Intelligence was established in 2021 vide Notification No. 9-62/2020 (Genl.) dated 20th April 2021. The Department is offering the above mentioned two post graduate courses in the university. Hence, the evaluation, promotion and completion criteria of these courses offered by the Department are needed to be included in the ordinance.**	
	5. Certificate course in Indian Knowledge System **Duration:** The duration of the course shall be 6 months. **Basis of admission:** Candidates will be admitted on the basis of merit obtained in the qualifying examination. **Eligibility:** Plus two examination under 10+2 system or examination equivalent there to of a Board/University established by law in India with 40% marks (35% marks in case of SC/ST) **Medium of Examination:** The question paper shall be set in English, also the candidate shall write their answers in English. **Pass Marks:** The minimum pass marks shall be 40% in internal and external examination/evaluation. **Continuous Evaluation:** The evaluation shall be Continuous and Comprehensive Evaluation(CCE). The Internal Assessment shall comprise the following: 1. Attendance: 05 marks 2. Class Test/Assignment/Presentation/etc.: 10 marks. The Semester End External Examination shall comprise 35 Marks. **Attendance** • No student shall be allowed to appear in the examination unless he/she has completed 75% of the total attendance in each paper/practical. However, under special circumstances, short fall of 5% can be condoned by the Chairperson/Director of the Department/Institute and a further short fall of 10% can be condoned by the Pro-Vice-Chancellor/Vice Chancellor. **Division:** A successful candidate who obtains 60% or more of the aggregate marks shall be placed in the first division, a candidate who obtains 50% or more but less than 60% of the aggregate marks shall be placed in the second division and a candidate who obtains less than 50% of the aggregate marks shall be placed in the third division. **6. Certificate course in Introduction to Ethical Hacking** **Duration:** The duration of the course shall be 6 months.

Section Officer (Academic)
Himachal Pradesh University
Summer Hill Shimla-171005

Basis of admission: Candidates will be admitted on the basis of merit obtained in the qualifying examination.

Eligibility: Any Engineering Graduate or Any other graduate with Mathematics/Computer/IT/Statistics as Major Subjects in all three years with 50% aggregate marks in qualifying exam (45% for SC/ST/PWD)

Medium of Examination: The question paper shall be set in English, also the candidate shall write their answers in English.

Pass Marks: The minimum pass marks shall be 40% in internal and external examination/evaluation.

Continuous Evaluation: The evaluation shall be Continuous and Comprehensive Evaluation(CCE). The Internal Assessment shall comprise the following:

1. Attendance: 05 marks
2. Class Test/Assignment/Presentation/etc.: 10 marks.

The Semester End External Examination shall comprise 35 Marks.

Attendance

- No student shall be allowed to appear in the examination unless he/she has completed 75% of the total attendance in each paper/practical. However, under special circumstances, short fall of 5% can be condoned by the Chairperson/Director of the Department/Institute and a further short fall of 10% can be condoned by the Pro-Vice-Chancellor/Vice Chancellor.

Division: A successful candidate who obtains 60% or more of the aggregate marks shall be placed in the first division, a candidate who obtains 50% or more but less than 60% of the aggregate marks shall be placed in the second division and a candidate who obtains less than 50% of the aggregate marks shall be placed in the third division.

7. Certificate course in Responsible Artificial Intelligence

Duration: The duration of the course shall be 6 months.

Basis of admission: Candidates will be admitted on the basis of merit obtained in the qualifying examination.

Eligibility: Any Engineering Graduate or Any other graduate with Mathematics/Computer/IT/Statistics as Major Subjects in all three years with 50% aggregate marks in qualifying exam (45% for SC/ST/PWD)

Medium of Examination: The question paper shall be set in English, also the candidate shall write their answers in English.

Pass Marks: The minimum pass marks shall be 40% in internal and external examination/evaluation.

Continuous Evaluation: The evaluation shall be Continuous and Comprehensive Evaluation(CCE). The Internal Assessment shall comprise the following:

1. Attendance: 05 marks
2. Class Test/Assignment/Presentation/etc.: 10 marks.

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The Semester End External Examination shall comprise 35 Marks.

Attendance

- No student shall be allowed to appear in the examination unless he/she has completed 75% of the total attendance in each paper/practical. However, under special circumstances, short fall of 5% can be condoned by the Chairperson/Director of the Department/Institute and a further short fall of 10% can be condoned by the Pro-Vice-Chancellor/Vice Chancellor.

Division: A successful candidate who obtains 60% or more of the aggregate marks shall be placed in the first division, a candidate who obtains 50% or more but less than 60% of the aggregate marks shall be placed in the second division and a candidate who obtains less than 50% of the aggregate marks shall be placed in the third division.

8. Diploma in Data Science

Duration: The duration of the course shall be one (01) year divided into two (02) semesters.

Basis of admission: Candidates will be admitted on the basis of merit obtained in the qualifying examination.

Eligibility: Graduation in any stream with 50% aggregate marks in qualifying exam (45% for SC/ST/PWD).

Medium of Examination: The question paper shall be set in English, also the candidate shall write their answers in English.

Scheme of Examination:

As the degree is spanned over one year and distributed into two semesters, the learning outcomes shall be assessed after every semester. The assessment of the students shall consist of the following components:

S.N.	Assessment Component
1	Semester End External Examinations (Theory)
2	Internal Assessment (Theory)
3	Semester End External Examination (Practical)
4	Internal Assessment (Practical)

Pass Marks: The minimum pass marks shall be 40% in internal and external examination/evaluation.

Minimum Criteria to Award the Diploma:

Minimum Criteria to Award the Diploma is as per Himachal Pradesh University Norms.

Continuous Evaluation: The evaluation shall be Continuous and Comprehensive Evaluation (CCE). The Internal Assessment shall comprise the following:

1. Attendance: 05 marks
2. Class Test/Assignment/Presentation/etc.: 10 marks.

The Semester End External Examination shall comprise 35 Marks.

Attendance

- No student shall be allowed to appear in the examination unless he/she has completed 75% of the total attendance in each paper/practical. However, under special circumstances, short fall of 5% can be condoned by the Chairperson/Director of the Department/Institute and a further short fall of 10% can be condoned by the Pro-Vice-Chancellor/Vice Chancellor.

Section Officer (Academic)
Himachal Pradesh University
Summer Hill, Shimla-171005

	Division: A successful candidate who obtains 60% or more of the aggregate marks shall be placed in the first division, a candidate who obtains 50% or more but less than 60% of the aggregate marks shall be placed in the second division and a candidate who obtains less than 50% of the aggregate marks shall be placed in the third division

Justification:
The Department of Data Science and Artificial Intelligence was established in 2021 vide Notification No. 9-62/2020 (Genl.) dated 20th April 2021. The Department is offering the above mentioned 03 Certificate courses (Add-on Courses) and 01 Diploma course (through ICDEOL) in the university. Hence, the evaluation, promotion and completion criteria of these courses offered by the Department are needed to be included in the ordinance.

Section Officer (Academic)

Annexure - II

File No. CHEM/HPU/1445 dated 30.06.21
Branch: Department of Chemistry
Chairman, Department of Chemistry

Annexure to agenda Item No. 5

Item: 5 To place before the Academic Council the matter for establishing "Centre for Green Energy and Nanotechnology" for consideration and approval.

(Brief Summary: The Himachal Pradesh University proposes the establishment of Centre for Green Energy & Nanotechnology at HPU Shimla. The centre will act a nucleus for interdisciplinary innovation. It will foster the development of advanced systems with practical innovations in clean energy and nano technology. The Centre aims adopt a collaborative, multi-stakeholder approach that brings together academic researchers, industry partners, policymakers and civil society. It will promote translational research, innovation incubation and capacity-building through integrated education and leadership projects. From developing nano-sensors for environmental monitoring to fabricating nanostructured coatings for solar panels, the Centre's initiatives will be grounded in real-world impact and aligned with global sustainable development goals (SDGs). Opening a Center in a state university directly supports Sustainable Development Goals, which aims to ensure access to reliable, sustainable, and modern energy for all. By fostering partnerships, pilot projects, and hands-on learning, the centre not only contributes to reducing the university's carbon footprint but also equips future professionals with the knowledge and skills needed to expand clean energy access globally particularly in underserved regions thus accelerating progress toward SDGs.in order to address the challenges in green energy and nano-technology driven sustainable development and to achieve the State and National mission of Green Energy, HPU Shimla will offer certification, diploma Programmes, Master's and Doctoral Programs.

The University proposes to start certificate, diploma and Degree Programmes in this Centre for Green Energy and Nanotechnology.The manpower required for smooth functioning of centre/degree and Diploma Programme is as per **Annexure-A**. The centre shall be governed by an Advisory board detail of which is as per **Annexure-B**. The necessary amendment/addition, if any, in Statutes and Ordinances of the University will be proposed by the said board and submitted for consideration/approval of the competent bodies/authorities of the University. from time to time.

In view of the position explained above, the matter of Establishment of Centre for Green Energy and Nanotechnology, Advisory Board, Start Certificate, Diploma and Degree Programmes in the Centre and man power required for the same are submitted before the Council for consideration, approval and such decision as it may deem fit).

Points for Consideration:

Submitted for approval and decision in the matter for Establishment of Centre for Green Energy and Nanotechnology, Advisory Board of the same, start Certificate, Diploma and Degree Programmes in the Centre and creation of man power required, as per annexure above.

Ranu
(Dr. Ranu Chand Thakur)
Chemistry

Worthy Dean Planning and Teaching matters

(4)

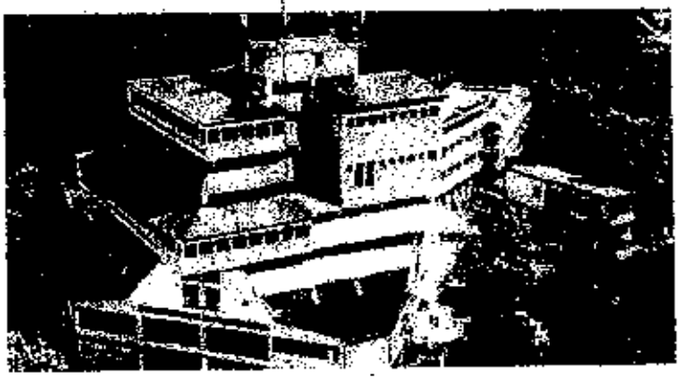
Proposal to establish

Interdisciplinary research Centre

on

"Centre for Green Energy & Nanotechnology"

(C-GENT)



Himachal Pradesh University Shimla

(NAAC Accredited 'A' Grade University)

Table of Contents

1. **Background**

The 21st century, while witnessing remarkable technological innovations and transformative advancements in science and engineering, has also brought to the forefront one of the greatest global challenges: developing sustainable solutions to energy, environmental, and resource-related concerns. This era demands not just incremental improvements but revolutionary approaches to how we harness, store, and use energy a challenge that is existential in scope. At the heart of these solutions lies nanotechnology, a cross-cutting domain that is revolutionizing the way we design materials and systems for cleaner, smarter, and more efficient technologies.

Across the globe, nations are witnessing a rise in energy demand and is falling prey to environmental degradation. Establishing a centre focused on green energy, shall serve as a hub for innovation, research. and education in advance renewable energy technologies. It empowers students and researchers to develop practical, clean energy solutions such as solar, wind, pump hydro, agrivoltaics and hydrogen energy. By integrating green energy along with nanotechnology into academia, the centre not only enhances the University's role in shaping a greener future but also prepares the next generation leaders to build a resilient, low-carbon world.

The **National Education Policy (NEP 2020)** emphasizes the need for enhanced R&D investment and the promotion of innovation-driven ecosystems through strong academia-industry linkages. In alignment with this vision, there is a growing demand for academic programs and research initiatives that equip students with expertise in cutting-edge fields such as renewable energy, while also integrating their applications in nano technology, environmental protection, artificial intelligence, robotics, and smart manufacturing. Developing these future-ready skills is critical to address the complex, interlinked challenges of present scenario.

The integration of **green energy and nanotechnology** is particularly a fertile ground for interdisciplinary academic exploration. It invites novel approaches in research and innovation that span physics, chemistry. materials science, engineering, and environmental studies. The transition toward a low-carbon, resource-efficient economy will require disruptive technologies, behaviour change, regulatory adaptation, and a holistic understanding of emerging systems and markets.

PM-USHA scheme has clearly defined in its objective to create an enabling atmosphere in the higher educational institutions to devote themselves to research and innovations and to identify and fill up the existing gaps in higher education, by augmenting and supporting the State Governments' efforts. In this context as we know, in order to encourage an environmentally friendly transportation system and turn Himachal Pradesh into a hub for electric vehicles, the state government of Himachal Pradesh has approved the electric vehicle policy. However, there are some significant limitations with electric vehicles that prevent them from going mainstream. Most of the issues related to the battery like battery cost, battery overall performance, battery safety, battery recyclability and the performance of an EV battery can also be significantly impacted by temperature, making them unsuitable for extremely cold (Himachal Pradesh) or too hot regions. So, creation of this centre will be useful in the context of battery-based electric vehicles in Himachal Pradesh.

To address such challenges and lead technological innovation, this proposal aims to establish **Centre for Green Energy & Nanotechnology** at Himachal Pradesh University (HPU), Shimla. Leveraging its academic strengths and commitment to interdisciplinary excellence, HPU is well-positioned to create a vibrant ecosystem for education, research, and innovation in green energy with nanotechnology, and environmental applications serving as key integration areas. This Centre will be a strategic platform to drive advance green energy solutions integrating innovative nanotechnology aspects and beyond.

In the context of Himachal Pradesh, the adoption of green energy solutions in the tourism sector holds significant potential for promoting sustainable development. Given the state's fragile mountain ecosystems and high tourist influx, there is a growing emphasis on integrating electric mobility, solar energy systems, and hydrogen fuel initiatives to reduce carbon emissions, enhance the visitor experience, and preserve natural resources. Himachal Pradesh's Electric Vehicle Policy supports clean mobility in popular tourist destinations such as Shimla, Manali, and Dharamshala. Simultaneously, solar-powered resorts, homestays, and charging stations are being established to promote off-grid, eco-friendly tourism. Furthermore, green hydrogen and biofuel technologies offer sustainable energy solutions for remote locations without compromising visitor comfort. At the Centre for Green Energy & Nanotechnology, Himachal Pradesh University (HPU), Shimla, key research focus areas in this domain include **Green Mobility for Tourism, Solar-Powered Tourism Infrastructure, and Smart Renewable-Powered Eco-Villages.**

2. Need for Interdisciplinary Research

Interdisciplinary academic and research programs are essential to navigate the rapid evolution of green energy, especially in their transformative applications across sustainable energy, environment, nanotechnology and healthcare. In the current era of convergence, innovation lies at the integration of disciplines such as materials science, physics, chemistry, biology, engineering, and computational science. Academic institutions must design programs that not only expose students to cutting-edge green energy advances but also equip them to apply this knowledge to address complex real-world problems in nanotechnology.

In order to achieve a cross/inter-disciplinary approach in energy and environment related studies, certifications, diploma courses, Master's and Ph.D programs will need to focus on the global energy and climate challenges. This can be achieved by making higher degree programs more challenge-based, shifting away from single focus topics. Employers today particularly value graduates who possess not only deep technical skills but also a broader understanding of innovation, ethics, sustainability, and socio-economic implications of technological development. While PhD programs are inherently research-intensive and specialized, those focussed in green energy innovations and nanotechnology cultivate a broader awareness of system integration, translational research, policy frameworks, and industrial applicability. This holistic perspective prepares graduates to contribute meaningfully in academia, R&D institutions, regulatory agencies, green technology companies, and start-ups.

The proposed **Centre for Green Energy & Nanotechnology** at HPU Shimla will act as a nucleus for such interdisciplinary innovation. It will foster the development of advanced systems with practical innovations in clean energy and nano technology. The Centre aims to adopt a collaborative, multi-

stakeholder approach that brings together academic researchers, industry partners, policymakers and civil society together. It will promote translational research, innovation incubation and capacity-building through integrated education and leadership projects. From developing nano-sensors for environmental monitoring to fabricating nanostructured coatings for solar panels, synthesising smart and ecofriendly materials for EVs, the Centre's initiatives will be grounded in real-world impact and aligned with global sustainable development goals (SDGs). Opening a centre in a state university directly supports Sustainable Development Goals, which aims to ensure access to reliable, sustainable, and modern energy for all. By fostering partnerships, pilot projects, and hands-on learning, the centre not only contributes to reducing the university's carbon footprint but also equips future professionals with the knowledge and skills needed to expand clean energy access globally particularly in underserved regions thus accelerating progress toward SDGs.

3. International & National status

3.1. International status

Green energy and nanotechnology are the need of hour. Below is a list of some globally recognized institutions that are at the forefront of interdisciplinary research integrating Green Energy & Nanotechnology.

S. No.	Details of Institute
1.	MIT Energy Initiative Massachusetts Institute of Technology, Cambridge, Massachusetts, United States
2.	TomKat Centre for sustainable energy Stanford University, United States
3.	The Resnick Sustainability Institute at Caltech California Institute of Technology, United States
4.	Energy Sciences Institute Yale University, United States
5.	University of California Energy Institute Energy and Resources Group University of California, Berkeley, United States
6.	Ecosystem Science and Environmental Change Institute (ECI) University of Oxford, United Kingdom
7.	Andlinger Centre for Energy and Environment Princeton University, United States
8.	Penn State Institutes of Energy and the Environment Pennsylvania State University, United States
9.	Institute for Sustainable Energy (ISE) Boston University, United States
10.	Bartlett School Environment, Energy & Resources University College London, United Kingdom
11.	Energy Institute The University of Texas at Austin, United States
12.	Energy Institute

	University of Michigan, United States
13.	Wisconsin Energy Institute University of Wisconsin-Madison, United States
14.	Centre for Energy and Environment Harvard University, United States
15.	Institute of Energy and Process Engineering (IEPE) ETH Zurich - Swiss Federal Institute of Technology, Zürich, Switzerland
16.	Centre for Energy Policy and Technology Imperial College London, London, United Kingdom
17.	Department of Energy System IFE, Institute for Energy Technology, Kjeller, Norway
18.	Energy Studies Institute National University of Singapore (NUS), Singapore,
19.	Energy Research Institute Nanyang Technological University, Singapore,
20.	EPFL Energy Centre École polytechnique fédérale de Lausanne (EPFL), Lausanne, Switzerland
21.	Clean Energy Research and Education Centre Tsinghua University, Beijing, China (Mainland)
22.	Cornell Energy Systems Institute Cornell University, Ithaca, United States
23.	Centre for Energy Engineering University of Tokyo, Tokyo, Japan
24.	O'Connor Sustainable Energy Institute Johns Hopkins University Baltimore, United States
25.	Institute for Sustainable Energy (ISE) University of Toronto Toronto, Canada
26.	ANU Institute for Climate, Energy & Disaster Solutions Australian National University, Canberra, Australia
27.	Department of Energy Resources Engineering Seoul National University, Seoul, South Korea
28.	UNSW Energy Institute The University of New South Wales (UNSW Sydney), Sydney, Australia
29.	HKUST Energy Institute Hong Kong University of Science and Technology, Hong Kong
30.	Institute of Energy Efficient and Sustainable Design and Building Technical University of Munich, Munich, Germany
31.	Delft Energy Initiative Delft University of Technology (TU Delft), Delft, Netherlands

32.	Energy Environment: Science Technology and Management Ecole Polytechnique, Palaiseau, France
33.	NTUMB-New Energy Centre National Taiwan University (NTU), Taipei City, Taiwan
34.	KU Leuven Energy Institute Katholieke Universiteit (KU) Leuven, Leuven, Belgium
35.	DTU Energy Technical University of Denmark (DTU), Kongens Lyngby, Denmark
36.	Energy Centre Purdue University, West Lafayette, United States
37.	Helsinki Institute of Sustainability Science University of Helsinki, Helsinki, Finland
38.	UiO: Energy Institute University of Oslo, Oslo, Norway
39.	Energy Policy Institute University of Chicago, Chicago, United States
40.	Energy Technologies Area Lawrence Berkeley National Laboratory (Berkeley Lab), Berkeley, United States
41.	National Renewable Energy Laboratory (NREL) Golden, United States
42.	MIT nano Initiative Massachusetts Institute of Technology, Cambridge, Massachusetts, United States
43.	Yale Institute for Nanoscience and Quantum Engineering Yale University, United States
44.	Berkeley Nanosciences and Nanoengineering Institute University of California, Berkeley, United States
45.	Oxford Martin School – Nanotechnology for Clean Energy University of Oxford, United Kingdom
46.	Penn State Materials Research Institute Pennsylvania State University, United States
47.	Boston University Nanotechnology Innovation Centre Boston University, United States
48.	London Centre for Nanotechnology University College London, United Kingdom
49.	Wisconsin Energy Institute University of Wisconsin-Madison, United States
50.	Centre for Nanoscale Systems Harvard University, United States
51.	Centre for Advanced Nanomaterials for Energy and Sustainability Imperial College London, London, United Kingdom
52.	Pritzker School of Molecular Engineering

	University of Chicago, Chicago, United States
53.	Nanoscience and Nanotechnology Initiative National University of Singapore (NUS), Singapore,
54.	Institute of Advanced Studies in Nanotechnology Nanyang Technological University, Singapore,
55.	Laboratory of Nanoscale Electronics and Structures École polytechnique fédérale de Lausanne (EPFL), Lausanne, Switzerland
56.	National Centre for Nanoscience and Technology Tsinghua University, Beijing, China (Mainland)
57.	Centre for Nanotechnology Innovation for Environmental and Energy Applications University of Tokyo, Tokyo, Japan
58.	Johns Hopkins Institute for Nano Bio Technology (INBT) Johns Hopkins University Baltimore, United States
59.	ARC Centre of Excellence in Exciton Science The University of New South Wales (UNSW Sydney), Sydney, Australia
60.	Kavli Institute of Nanoscience Delft University of Technology (TU Delft), Delft, Netherlands
61.	Birck Nanotechnology Centre Purdue University, West Lafayette, United States

3.2. National status

Some of the prominent national institutes/universities running department related to green energy and nano technology are enlisted below.

S. No.	Details of Institute
1.	Indo-German Centre for Sustainability, IIT Madras
2.	Department of Energy Studies, IIT Delhi
3.	Department of Energy Science and Engineering, IIT Bombay
4.	Department of Sustainable Energy Engineering, IIT Kanpur
5.	School of Energy Science and Engineering, IIT Kharagpur
6.	Department of Hydro and Renewable Energy, IIT Roorkee
7.	School of Energy Science and Engineering, IIT Guwahati
8.	Department of Climate Change, IIT Hyderabad
9.	Department of Energy and Environment, NIT Tiruchirapalli
10.	CO_2 Research and Green Technologies Centre, VIT, Vellore
11.	Centre for Green Technology, ICT, Mumbai
12.	Centre for Energy Biosciences, ICT, Mumbai
13.	School of Energy Studies, Jadavpur University
14.	Institute for Energy Studies, Anna University
15.	Centre for Excellence on Renewable Energy Systems, NIT Rourkela
16.	Centre for Sustainable Development, IIT Gandhinagar

17.	School of Energy and Environment, Thapar Institute of Engineering and Technology, Patiala
18.	Centre for Energy and Environment, MNIT, Jaipur
19.	Energy Centre, MANIT, Bhopal
20.	Centre for Energy Studies, NIT Hamirpur
21.	School of Renewable Energy and Efficiency, NIT Kurukshetra
22.	Centre for Energy and Environment, NIT Jalandhar
23.	School of Sustainable Development, Amrita Vishwa Vidyapeetham Coimbatore
24.	School of Energy and Environment studies, Devi Ahilya Vishwavidyalaya, Indore
25.	School of Energy Management, Mata Vaishno Devi University Jammu
26.	Centre for Excellence in Energy Science and Technology, Shoolini University Solan
27.	Department of Energy, Tezpur University Assam
28.	Department of Energy Engineering, School of Engineering & Technologies, Central University of Jharkhand
29.	Institute of New and Renewable Energy, University of Lucknow
30.	Centre for Nanotechnology, IIT Madras
31.	Centre for Research in Nanotechnology and Science, IIT Bombay
32.	Centre for NEMS and Nano photonics, IIT Madras
33.	Centre for Nanoscience, IIT Kanpur
34.	Centre for Nano Science and Engineering, IISc Bangalore
35.	Centre for Nanotechnology, IIT Guwahati
36.	Centre for Nanoscience & Nanotechnology, Punjab university
37.	Centre for Nanoscience and Technology, NIT Warangal
38.	Centre for Nanoscience and Molecular Materials , NIT Calicut
39.	School of Nanoscience and Nanotechnology, Jadavpur University, Kolkata
40.	Centre for Nanoscience and Nanotechnology, University of Madras, Chennai
41.	Department of Nanoscience and Technology, Tezpur University, Assam
42.	Special Centre for Nanoscience, JNU
43.	Centre for Nanoscience and Nanotechnology, Jamia Millia Islamia, New Delhi
44.	Advanced Centre of Research in High Energy Materials (ACRHEM), University of Hyderabad
45.	Amity Institute of Nanotechnology, Noida
46.	Centre for Nanomaterials, ARCI Hyderabad
47.	Institute of Nano Science and Technology, Mohali

3.3 **Advisory Board:**

- Prof. Rajeev Ahuja, Director IIT Ropar; Email: director@iitrpr.ac.in
- Prof. Sudarshan Kumar, Professor, Department of Aerospace Engineering, IIT Bombay; Email: sudar@aero.iitb.ac.in
- Prof. Venkata Krishnan, Professor, School of Chemical Sciences IIT Mandi; **E-mail:** vkn@iitmandi.ac.in

- Prof. (Dr.) Shyam Singh Chandel; Director, Centre for Excellence in Energy Science & Technology, Shoolini University, Solan, Himachal Pradesh. Email: chandel_shyam@yahoo.com
- Prof. Arun Kumar Department of Hydro & Renewable Energy, IIT Roorkee, Uttarakhand; Email: arun.kumar@hre.iitr.ac.in.
- Prof. Satinder Kumar Sharma, School of Computing & Electrical Engineering, IIT Mandi, Himachal Pradesh, Email: satinder@iitmandi.ac.in
- Dr. Rama Raju Baadhe; Department of Biotechnology, NIT Warangal, Telangana Email: rrb@nitw.ac.in

4. Vision & Mission

4.1. Vision

"To be a leading hub of innovation, education, and collaboration in green energy and nanotechnology, driving sustainable solutions that power the future and protect the planet"

4.2. Mission

- To promote research & innovation in sustainable energy solutions and advanced materials for environmental and energy applications.
- To support the Himachal Pradesh Government's goal to transform the state into a Green Energy State by 2027.
- Foster Interdisciplinary Collaboration among scientists, engineers, policymakers, and industry to drive impactful innovation.
- Educate, train & empower students and researchers through cutting-edge curriculum, training, and hands-on projects.
- Support Sustainable Development Goals (SDGs) by translating research into real-world solutions for clean, affordable, and efficient energy.

5. Programmes under the Centre for Green Energy & Nanotechnology

Centre for Green Energy and Nanotechnology will initially propose different certifications, diploma courses, master and research degree programmes. Apart from educational programmes this centre will also promote and create clean and renewable energy solutions such as electric vehicles, solar power projects. This initiative aims to support environmental conservation and making India and particularly State of Himachal Pradesh self-reliant and environmentally sustainable.

6. Working Team:

6.1. Core Team

1. Prof. Mahavir Singh, Hon'ble Vice Chancellor, Himachal Pradesh University
2. Prof. Nainjeet Singh Negi, Department of Physics
3. Dr. Ramesh Chand Thakur, Department of Chemistry
4. Dr. Sandeep Chauhan, Department of Chemistry
5. Dr. Manish Kumar, Department of Electronics and Communication Engineering (UIT)

6.2. Supporting Team

1. Dr. Mahender Singh Thakur, Department of Bio Sciences
2. Dr. Ravi Kant Bhatia, Department of Bio Technology
3. Mr. Pradeep Kumar (Physics, UIT)-Nanotechnology
4. Dr. Jastaine Kaur, Department of Electrical Engineering (UIT)

7. Strategic plan for new Centre

The strategic plan identifies immediate and long- and short-term measures that maintain and enhance the personnel, facilities, information, and other scientific assets that are fundamental to conducting this work at the scope, scale, and quality needed to meet these needs.

7.1 Three-year plan (Short Term Goals):

- Initiate postgraduate programs such as M.Tech/M.E., M.Sc., and Ph.D. in the domains of Green Energy and Nanotechnology.
- Explore collaborations for joint Ph.D. degree programs with reputed national and international institutions.
- Offer skill-based certification and diploma courses designed for undergraduate and postgraduate students.
- Establish a world-class laboratory facility at the Centre to support advanced research and innovation.
- Conduct annual short-term courses focusing on Green Energy and Nanotechnology to enhance hands-on learning.
- Organize national and international conferences and webinar series every year to foster academic and industrial exchange.
- Develop an incubation hub aimed at nurturing entrepreneurial ventures and startups in emerging technologies.
- Design and launch MOOC courses in Green Energy and Nanotechnology for delivery via global online education platforms.
- Pursue strategic collaborations with IIT's and leading research institutions to enhance academic and research excellence.
- Develop innovative technological solutions to address real-world challenges in Green Energy and Nanotechnology.
- Generate a high volume of quality publications and intellectual property (IPRs) in reputed national and international forums.
- Design and patent novel technologies with potential for societal and industrial impact.

7.2 Seven-year plan (Long Term Goals):

- Dual-Degree (DD) programs in Green Energy and Nanotechnology will be launched to offer integrated academic and research opportunities.
- Undergraduate degree programs such as B.Tech, B.E., and B.Sc. in emerging fields of Green Energy will be introduced, recognizing the sector's growing relevance.

- Centre will create an improved research environment by offering greater flexibility and support to faculty and scholars, while continually upgrading research infrastructure.
- Strategic partnerships with top-tier national and international academic institutions, research organizations, and industries will be established to globalize the Centre's operations
- Research and postgraduate education efforts will be focused on select, cutting-edge areas in Green Energy and Nanotechnology.
- Centre will enhance employee capabilities through continuous training, upskilling programs, and redefinition of roles and responsibilities
- Centre will contribute meaningfully to the technological goals of both the state and the nation by addressing real-world challenges.
- Centre will strive to become a globally recognized technological hub, achieving international rankings and leadership in Green Energy and Nanotechnology.
- Efforts will be made to mobilize sufficient funding from government agencies and private sector entities to sustain and expand the Centre's long-term initiatives.

8. Research Focus: Centre for Green Energy & Nanotechnology:

The Centre pursues cutting-edge, interdisciplinary research across two core pillars. The block diagram representation of research focus areas is shown below in Figure 1.

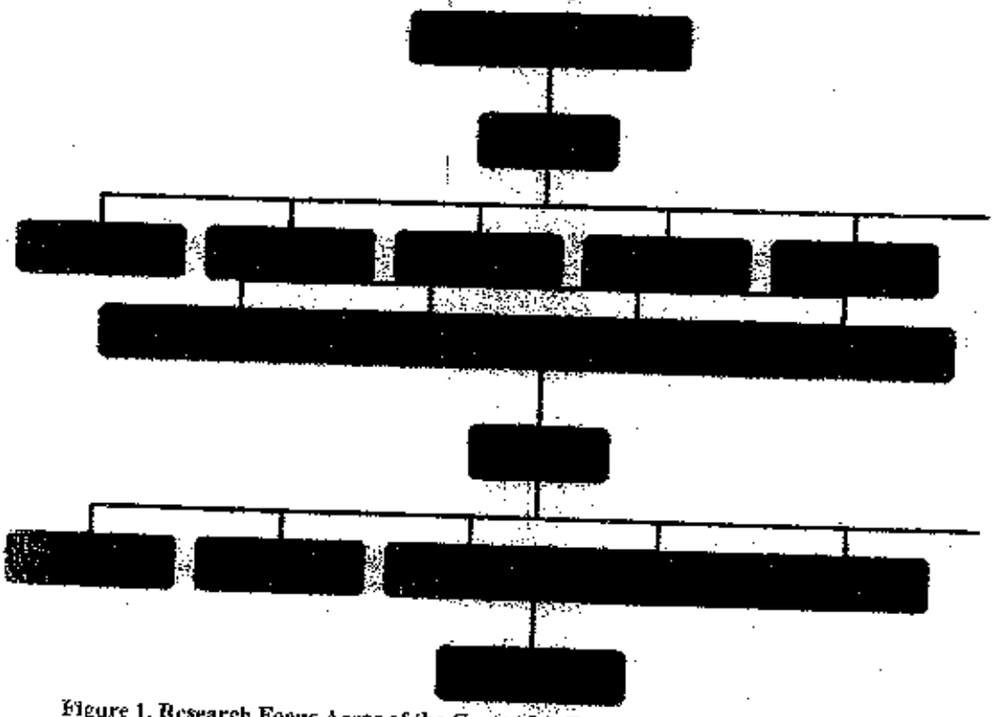


Figure 1. Research Focus Areas of the Centre for Green Energy & Nanotechnology

Under **Green Energy**, we will work on the areas of solar energy harvesting, materials/components for electric vehicles, leverage AI/ML for energy analytics, energy storage techniques, agrivoltaics, advance biofuels, and innovate hydrogen energy and fuel cell technologies, Green Mobility for Tourism and explore other renewable energy resources. In parallel, our **Nanotechnology** program engineers next-generation materials and devices, ranging from nanoelectronics and nanocomposites to smart nanomaterials, applies AI/ML methods to nanoscale systems, investigates environmental nanotechnology solutions, and pioneers' nanomedicine platforms. Together, these efforts aim to deliver sustainable, high-performance energy and material technologies for societal impact.

9. Budgetary Requirements

9.1 List of Component of PM-USHA to be covered in the proposed Centre for "Green Energy and Nanotechnology"

S. No.	Component S/No of PM-USHA Document	Component Name
1.	11	MoUs signed with industry for internship/research/entrepreneurship/employment
2.	12	Research and Development Cell
3.	21	Smart classrooms, Computer Labs, Wi-Fi facilities.
4.	24	Setting up Startup incubation centres and technology development centres for skill-based courses with the help of industries/micro. Small & medium enterprises (MSME) at state level.
5.	26	Well-equipped research Laboratories, digital barriers with subscriptions to reputed Journals
6.	30	Construction/renovation of infrastructure of institute
7.	31	Purchase of necessary equipments for the institute.

9.2. Detail of Laboratories to be setup in the proposed Centre for Green Energy and Nanotechnology

1. Renewable Energy Laboratory
2. Energy Storage laboratory
3. Solar Energy laboratory
4. Bio-fuel & Hydrogen Laboratory
5. Energy Simulation laboratory
6. Nanotechnology & Advanced Materials laboratory

Annexure-'A'

9.3. Proposed Budgetary Requirements

S. No.	Component S/No of PM-USHA Document	Component	Budgetary Requirement
1	26 &31	Creation of well-equipped research six Laboratories with basic research infrastructure to start the Centre	9.0 Cr
2	21	Creation of Smart Class Rooms, Computer Labs with Wi Fi facility	0.7 Cr
3	11	Collaborations with IITs, Industries and other reputed Institutes for internship /research/entrepreneurship/employment	0.3 Cr
Grand Total			10.0 Cr

10. Organizational Structure & Staffing Plan

10.1. Administration

Name of Post	No. of Posts
Director	1
Additional Director (Green Energy)	1
Additional Director (Nanotechnology)	1

10.2. Academic Faculty

Name of Post	No. of Posts	Pay Level / Academic Level	Desired Qualification
Professor	2	Level 14	**B.Tech** in any engineering discipline **M.Tech** in Energy/Nanotechnology/ Material Science or relevant branch **PhD** in energy/ nanotechnology/ material science or relevant area Or **PhD** in Chemistry / Physics / Environmental Science / Nanotechnology or relevant area
Associate Professor	4	Level 13A	**B.Tech** in any engineering discipline **M.Tech** in Energy/Nanotechnology/ Material Science or relevant branch **PhD** in energy/ nanotechnology/ material science or relevant area Or **PhD** in Chemistry / Physics / Environmental Science / Nanotechnology or relevant area

Assistant Professor	8	Level 10	B.Tech in any engineering discipline M.Tech in Energy/Nanotechnology/ Material Science or relevant branch PhD in energy/ nanotechnology/ material science or relevant area Or PhD in Chemistry / Physics / Environmental Science / Nanotechnology or relevant area

10.3. Technical & Support Staff

Name of Post	No. of Posts	Grade / Group	Desired Qualification
Technical Staff	4	Group IV	B.E/B.Tech in Electronics/ Electrical, Mechanical/ Material Science/ Instrumentation Or M.Sc. in Physics / Chemistry / Environmental Science/Biotechnology
JOA (IT)	2	Group III	10+2 + Diploma in IT / BCA/CSE
Clerk	2	Group III	Bachelor's degree + proficiency in office software
Peon	1	Group IV	10th pass

11. Interdisciplinary Academic Offerings in Alignment with NEP 2020

- M.Sc. in Energy Science
- M.Tech in Energy Science and Engineering
- M.Sc. in Nanotechnology
- Master Programs for Working Professionals (Part-Time or Online)
- Ph.D. Programs
- Certificate and Diploma Courses in Energy Science and Nanotechnology

12. Potential Job opportunities for students after Creating this Centre

Green energy is a wide interdisciplinary area which comprises the study of various subjects like solar photovoltaic, solar thermal, agrovoltaics, energy storage, electric vehicle, wind energy systems, hydrogen energy and more. Therefore, the list of possible career opportunities for graduates with an interdisciplinary PG degree in Green Energy & nanotechnology are very wide in the market. Nanotechnology is a highly interdisciplinary and rapidly evolving field that intersects with diverse domains such as energy, environment, materials science, electronics, and biotechnology. Therefore, the list of possible career opportunities for graduates with an interdisciplinary PG degree in nano technology is very wide in the market.

12.1. Some career opportunities are as follows:

- Scientist
- Academic positions
- Sustainability consultant
- Manager/Auditor
- Sustainability Analyst
- Design engineer
- Research analyst
- Nano fabrication business developer
- Procurement manager
- Renewable energy business developer
- Renewable energy policy researcher
- Environmental engineer
- Environmental engineering consultant
- Environmental health and safety specialist
- solar PV specialist
- Lead-solar performance analysis
- Energy policy analyst

12.2. Companies in green energy & nanotechnology in India and across the globe

- Adani solar/ Adani Green
- Tata power
- Reliance energy
- Suzlon Energy Limited (Indian multinational wind turbine manufacturer based in Pune)
- Waaree
- Vector green
- CleanMax
- Ecolab
- NISE
- Nanosys
- Cummins
- Reliance Industries Ltd.
- Tata Chemicals
- SunCatalyst Pvt. Ltd.
- Thermax Ltd.
- LanzaTech India
- Ayana Renewable Power Pvt Ltd
- KPMG India
- Sunbound Solar
- Sunshine Sustainable Energy
- Avaada Group
- NanoXpert Technologies Pvt. Ltd.

- PwC
- Holmium Technologies
- Swaniti Initiative
- WWF
- Deloitte
- Microsoft
- TCS
- First solar
- JSW Energy
- NTPC Green Energy Ltd.
- ReNew power
- KPI Green Energy
- Hero Future Energies Private Limited
- Azure Power
- Sterling and Wilson
- Ankur scientific
- NESFI

13. Certificate and Diploma Courses & Requisite Technical Support to State Owned Agencies

This Centre shall primarily focus on providing certified courses or requisite technical support to the state-owned agencies like Himachal Pradesh Power Corporation Limited, SJVNL, Himachal Pradesh State Electricity Board, HIMURJA etc. Courses aimed at imparting theoretical and practical knowledge to the young professionals already working in the energy sector.

13.1 Offline/Online Certification/Diploma Courses

The proposed Centre for Green Energy & Nanotechnology can offer the following specialized offline/online certification/Diploma courses to upskill learners and support national energy and sustainability goals:

- **Applications of Renewable Energy Technologies**
  This course aims to build an understanding of how renewable energy systems such as solar, wind, and biomass integrate into modern electrical power systems, with emphasis on grid interconnection and smart energy solutions.
- **Recent Trends in Solar Energy Technologies**
  Designed to impart practical and theoretical knowledge on the latest developments in solar photovoltaic (PV) systems, solar thermal energy, and emerging materials. This course will also train participants in installation and operation of solar systems, equipping them for deployment in both urban and rural settings.
- **Environmental Sustainability Practices**

A comprehensive course covering sustainability principles including circular economy, environmental conservation strategies, carbon accounting, and the concept of "just transitions." It will also address the role of clean energy in achieving the UN Sustainable Development Goals (SDGs).

- **Introduction to Nanotechnology for Clean Energy Applications**
  This foundational course introduces the role of nanomaterials in improving energy efficiency, energy storage, and conversion. Topics include nanostructured solar cells, nano-enabled fuel cells, and nanocoatings for energy conservation.
- **Nanomaterials in Renewable Energy Systems**
  A specialized course focusing on the synthesis, characterization, and application of nanomaterials in photovoltaic, thermoelectric, and hydrogen storage technologies. It will prepare students and professionals for R&D and industrial roles in clean energy innovation.

In addition to these certification programs, the Centre will provide **technical support through student internship programs.** These programs will facilitate short-term collaborative projects between industry and academia, enabling students to gain practical experience while addressing industry challenges. Such initiatives can be a transformative step in narrowing the existing gap between academic training and industrial requirements in the energy sector.

13.2. **Consultancies Aimed at Bridging the Gap Between Sustainability Goals & Actions**

The Government of India, under the "G20 Action Plan to Accelerate Progress on the SDGs," has reiterated its commitment to promoting sustainable, inclusive, and just transitions toward a carbon-neutral future. As part of its national climate targets, the Ministry of New and Renewable Energy is working to install 500 GW of non-fossil fuel-based electricity capacity by 2030. To meet such ambitious targets, the establishment of dedicated Centres of Excellence is imperative. The proposed Centre for Green Energy & Nanotechnology will not only train skilled professionals through targeted certification programs but also act as a consultancy hub, offering evidence-based recommendations, feasibility assessments, and strategic planning to governmental and private stakeholders.

By providing **expert consultancy services**, the Centre can assist in:

Framing policies and project proposals aligned with net-zero targets.
Supporting green procurement and sustainable infrastructure design.
Guiding the integration of nanotechnology and renewable energy for maximum efficiency.
Evaluating and monitoring sustainability indicators for ongoing government projects.

Such a Centre can play a pivotal role in transforming India's energy landscape while ensuring alignment with global sustainability frameworks.

...nal and State Level Outcomes:

The proposed Centre for Green Energy and Nanotechnology at Himachal Pradesh University (HPU), Shimla, is poised to deliver substantial and far-reaching benefits at both national and regional levels.

14.1. Benefits to the Nation

I. **Advancing National Strategic Goals:**

- The Centre will contribute significantly to India's energy security by pioneering research in high-efficiency solar cells, advanced energy storage systems, and hydrogen generation, crucial for a low-carbon economy.
- It will drive innovation in environmental remediation, water purification, agriculture and pollution control, directly addressing pressing environmental challenges.
- The Centre's objectives are directly aligned with national initiatives such as the National Nanotechnology Mission, the National Education Policy (NEP 2020), and the International Solar Alliance (ISA).

II. **Fostering Technological Leadership:**

- By focusing on the intersection of nanotechnology and sustainable energy, the Centre will be at the forefront of developing disruptive technologies essential for India's technological advancement.
- It will act as an innovation hub, promoting translational research, intellectual property generation (patents), and the incubation of startups focused on green energy and nano-enabled sustainable solutions.

III. **Human Resource Development:**

- The Centre will nurture a new generation of scientists, engineers, and thought leaders through specialized Master's (M.Tech/M.E, M.Sc), doctoral, and integrated programs. These programs will equip students with future-ready skills in interdisciplinary fields.
- Through conferences, workshops, and outreach programs, it will disseminate knowledge and enhance the capabilities of the broader scientific and industrial community.

IV. **Enhancing Global Competitiveness:**

- The Centre aims to produce a high volume of quality publications in reputable journals, raising India's profile in global scientific research.
- By building strategic alliances with leading international academic and research institutions, and proposing joint Ph.D. programs with prestigious institutions like IITs, the Centre will globalize India's research efforts and foster a collaborative academic environment.

14.2. Benefits to the State of Himachal Pradesh

I. **Establishment as a Regional Hub of Excellence:**

- HPU will solidify its position as a premier institution for advanced research and education in green energy and nano technology, attracting talent and investment to the state.
- It will drive breakthroughs in nanotechnology for cleaner, smarter, and more efficient technologies, including advancements in solar photovoltaics, next-generation batteries, hydrogen storage, and pollution control.
- The Centre's success, particularly through proposed joint Ph.D. programs with international universities and IITs, will significantly elevate Himachal Pradesh University's reputation, potentially leading to global recognition and improved rankings.

II. Addressing Local Challenges:

- The Centre's research in areas like water purification and renewable energy technologies, specifically focusing on solar, wind, and hydrogen energy applications relevant to Himachal Pradesh's unique geographical and energy potential, will directly contribute to addressing critical environmental and energy needs within the state.
- The Centre's research will specifically focus on solar energy, agrivoltaics, electric vehicles, biofuels applications relevant to Himachal Pradesh's unique geographical and energy potential, directly contributing to the state's critical energy needs.
- The Centre will also concentrate on hydrogen energy applications, leveraging the state's potential to address its energy requirements and environmental concerns.
- The focus on sustainable technologies will create new employment opportunities within the state, encouraging local talent to contribute to Himachal Pradesh's green growth.

III. Educational and Economic Opportunities:

- Local students will gain access to cutting-edge postgraduate and research programs, including opportunities for joint Ph.D.s, reducing the need to seek such specialized education outside the state.
- The incubation centre and focus on entrepreneurship will foster new businesses and contribute to the diversification of Himachal Pradesh's economy beyond traditional sectors.

IV. Strengthening Infrastructure and Talent Pool:

- The Centre will lead to the development of state-of-the-art laboratories and facilities, enhancing the overall research infrastructure within HPU and the state.
- Recruitment of high-quality faculty and staff, coupled with continuous training, will build a stronger academic and research talent pool in Himachal Pradesh.

13. Conclusions

Realizing a sustainable and technologically advanced future requires addressing the technological, economic, and socio-political challenges of our time through innovative, scalable, and interdisciplinary solutions. In this pursuit, green energy and nanotechnology stands as a transformative force capable of enabling breakthroughs in clean energy, environmental remediation, water purification, smart materials, and resource-efficient systems. Its role is vital in supporting India's transition toward a low-carbon, resource-resilient economy and in aligning with long-term national and global objectives such as the UN Sustainable Development Goals (SDGs).

Several initiatives of the Government of India towards futuristic goals have been undertaken, such as the International Solar Alliance (ISA), National Solar Mission (NSM), Green Skill Development Programme and National Nanotechnology Mission reflect a strong policy thrust toward science-driven sustainability. However, the journey toward achieving these goals is riddled with geopolitical, technological, and societal hurdles. Overcoming these requires a new generation of skilled, interdisciplinary professionals equipped not just with domain knowledge but also with the creativity and agility to drive innovation across sectors.

Technological breakthroughs at the nanoscale such as high-efficiency solar cells, advanced energy storage systems, hydrogen generation, and nano-enabled water purification will define the next era of clean

technology. Academic institutions play a pivotal role in fostering such innovation by offering a collaborative, multidisciplinary environment that integrates nanoscience with energy and environmental education, research, and entrepreneurship.

Interdisciplinary academic and research programs in the field of green energy are vital to keep up with the rapid pace of change in emerging areas of engineering and technology. From an educational perspective, this entails programs to expose and introduce students to current innovative thinking, developing an understanding of novel methods, which can be achieved by using the effective approaches advocated in this agenda.

Education is a cornerstone of this transformation. Emerging and disruptive technologies especially those related to nanotechnology, clean energy, environmental preservation, and sustainable infrastructure must be integrated into the curricula to equip students with future-ready skills and ethical awareness. Universities must serve not just as knowledge centres, but also as innovation hubs that bridge science, policy, and industry.

To address these interdisciplinary challenges and lead India's innovation ecosystem, this document proposes the establishment of the Centre for Green Energy and Nanotechnology at Himachal Pradesh University (HPU), Shimla. This visionary Centre will foster advanced research and education in green energy and nano technology, with integrated applications in advance renewable energy systems, environmental protection, water management, and sustainable materials. It will serve as a platform for nurturing the next generation of scientists, engineers, and thought leaders committed to driving India and the world toward a cleaner, smarter, and more sustainable future.

Annexure-D

File No. 1-21/HPU/CWOFN/Centre/Creation-
Office of Campus Networking & Wi-Fi
Dr. Tarun Sharma, (Incharge, Networking).

ITEM 6 : To place before the Academic Council, the matter for establishing "Centre for AI on Cyber Physical Systems" in H.P. University for consideration and approval.

Explanatory Note:

Introduction to the AI on CPS

Artificial intelligence (AI) is a powerful method for augmenting and accelerating scientific research, as it aims to mimic, extend, and expand human intelligence to perform complex tasks. The Artificial intelligence (AI) model is reshaping our world by flourishing and demonstrating human competitive performance in diverse fields, including natural language processing (NLP), computer vision, healthcare, finance, education, autonomous driving, scientific research, creative industries, and more.

A CPS is the integration of two subsystems (a) a computationally based subsystem which covers communication infrastructure, sensors, and (b) computational elements and application context covers the physical component. The power of the CPS lies in its relatively simple design which leads to the tight integration between cyber and physical systems. So, these two subsystems must work intelligently together and should be coordinated flawlessly. This integration of the cyber & physical system leads to the formation of the cyber-physical bridge and this bridge link occurs at the sensors which convert the measurable physical quantities to the data.

This tight integration is aimed to enable striking system properties which cover, functionality, reliability, adaptability, autonomy, efficiency, safety and usability and these properties will change to the different degree depending upon the applications. In summary, the AI on CPS improves the quality of life in a modern society. The AI on CPS has the ability to perform a main role in the areas where involvement of the human interaction covers both social and technical aspects.

Justification for the Centre

This AI on CPS Centre is comprehensive Centre, which is aimed to provide complete convergence with different disciplines by establishing strong linkages between academia, industry, Government and International Organizations. The AI enhances CPS by enabling intelligent decision-making, real-time analytics, and system optimization. The AI & CPS Centre develop a technology platform to carry out R&D, translational Research, product development, Incubating & Supporting Start-ups as well as Commercialization for the University as well as state. This project report is framed in accordance with the various priority based technological issue of the nation and Himachal Pradesh. The main issue of the Himachal Pradesh will be address with the AI & CPS are the transportation, agriculture, Defence, healthcare, intelligent traffic management system, energy, structure health monitoring, smart grid management, industrial automation and disaster management as well as various other issue of the nation and state priority. This AI & CPS Centre will also train the manpower in area of the CPS & AI technology.

This center will enhance the technical skill and digital competences of students by organizing different technical skill programs, workshops, seminars and other certified courses. The mentorship of experts from the university, the students of the university and affiliated colleges will be able to start their startups and entrepreneurship and moreover, able to get job in industries and government sectors. The centre will also provide opportunity in terms of the job employment to youth of state and will help trained manpower for opening up of the startups. This Centre will involve multi-disciplinary departments of the university such as (Engineering, Biotechnology, Computer Science, Physics, Science, Humanities, Geography, Bio-Science, Management).

Detailed Project Proposal is attached herewith at **Annexure-A** for the perusal of the Academic Council. Further for carrying out regular Monitoring and Evaluation of the Centre for AI on cyber physical system an Advisory board as well as Executive and Monitoring board has been proposed which is attached as **Annexures -B & C** for the perusal of the Academic Council. The necessary amendment/addition, if any, in Statutes and Ordinances of the University will be proposed by the said board and submitted for consideration/approval of the competent bodies/authorities of the University from time to time.

Course Proposed in the Centre: This Centre of the university will offer certificate course on **"Cyber Security"** certificate course on **"Artificial Intelligence"** in initial stage and after the running of these courses, the Centre will later on offer diploma in cyber security, under graduate courses on **"Cyber Physical Systems"**, post graduate courses on **"Cyber Physical Systems" and Ph. D in "Cyber Physical Systems". The certificate course can be run in this session with help of expert lectures from the university faculty member and by the engagement of resource person.** In the later stage in order to proper run all the above Centre courses, there is a scarcity of manpower (Teaching and Non-Teaching Staff), allocation of funds and allotment of the infrastructure. The detail of the manpower (Teaching, Technical and Ministerial Staff) is as follow

Teaching Post (Category-A)

Sr.No.	Name of the Post & Pay Scale	No. of Post & Discipline	Designation of the Post	Desirable	Eligibility
1.	Professor Pay Matrix Academic level 14- (Rs. 1,44,200-2,18,200)	01 Electronics and Communication Engineering (ECE)	Incharge	A person should have experience in design and fabrication of the optoelectronics device. The person should have knowledge about CPS in the area of communication, sensing and networking.	As per AICTE/UGC Norms
2.	Associate Professor Pay Matrix Academic Level 13A- (Rs. 1,31,400-2,17,100)	02 (One post in each the below discipline) i Electrical Engineering (EE) ii Electronics and Communication Engineering (ECE)	Faculty Member	i. EE: A person should have experience in transducer, sensor, signal conditioning, network planning of grid, AI and ML. ii ECE: A person should have fabrication experience in the area of the on-chip photonics devices, handling of the networking electronic equipment's for the CPS for applications in the area of communication, sensing and networking, Artificial Intelligence, Cyber Security.	As per AICTE/UGC Norms
3.	Assistant Professor Pay Matrix Academic Level 10- (Rs. 57,700 – 1,82,400)	04 (One post in each the below discipline) i Civil Engineering ii Electrical Engineer iii Computer Science Engineering iv Biotechnology	Faculty Members	i. A person should have knowledge of the structure health monitoring, municipal waste management ii smart grid, power system iii AI and cyber security iv Knowledge of food and plant engineering	As per AICTE/UGC Norms

Technical Staff (Category -B)

Sr.No.	Name of the Post	Specialization/Expertise	Work Experience	Eligibility	No. of Post
1.	System Analyst Pay Matrix Level 6 (35,400 to 1,12,400)	A person should have experience in Network Troubleshooting, Configuration, Handling, Providing Network Support to the end users.	Minimum 5 year of experience in the field of Network handling and troubleshooting.	Person should have B. Tech/B. E in the Computer Science Engineering or Electronic & Communication Engineering	2 Nos.
2.	Junior System Analyst Pay Matrix Level 5 (29,200 to 92,300)	A person should have experience in Network Troubleshooting, Configuration, Handling, Providing Network Support to the end users.	Minimum 3 year of experience in the field of Network handling and troubleshooting.	Person should have B. Tech/B. E in the Computer Science Engineering or Electronic & Communication Engineering	1 Nos.

The necessarily Non-Teaching Staff (**Ministerial Staff**) is required for the functioning of "Centre for AI on Cyber Physical Systems" could be deployed by Himachal Pradesh University.

Non-Teaching (Class-C & D) Post

Sr.No.	Name of the post	No. of Post
1.	Junior Office Assistant (IT), JOA-IT	1 No.
2.	Peon	1 No.

Infrastructure requirement is at (**Annexure-D**), Budgetary Provision is at (**Annexure-E**), for kind perusal of the Academic Council. In view of the position explained above, the matter of Establishment of "**Centre for AI on Cyber Physical Systems**", Advisory board as well as Executive and Monitoring board, Start Certificate, Diploma, Degree and Doctoral Programmes in the Centre and man power with necessary funds and infrastructure required for the same are submitted before the Council for consideration, approval and such decision as it may deem fit).

POINT FOR CONSIDERATION:

1. **To consider and approve the matter to establish a "Centre for AI on Cyber Physical Systems", Advisory board as well as Executive and Monitoring board of the same, start certificates course, diploma & ungraduate degree courses, postgraduate degree courses and Doctoral degree programme in the Centre with necessary funds and infrastructure as explained in the above-mentioned Annexures.**

2. **To consider and approve the matter for creation of post of Professor 1 No., Associate Professor 02 Nos., Assistant Professor 04 Nos., Technical Staff 3 Nos. to run course in the "Centre for AI on Cyber Physical Systems".**

DR. TARUN SHARMA
Professor Network Security
APCECE/USIT

ANNEXURE-A

Himachal Pradesh University
"NAAC Accredited "A" Grade University"
Campus Networking & Wi-Fi
Summer Hill, Shimla-5
Detailed Project Report (DPR) on Establishment
Of

Centre for AI on Cyber Physical Systems

1.1. Summary of the Proposed Centre

This detailed project report outlines the plan for establishment of a multidisciplinary Centre for Artificial Intelligence on Cyber Physical Systems (CAICPS). This AI on CPS centre is comprehensive centre, which is aimed to provide complete convergence with different disciplines by establishing strong linkages between academia, industry, Government and International Organizations. The AI enhances CPS by enabling intelligent decision-making, real-time analytics, and system optimization. The AI & CPS Centre develop a technology platform to carry out R&D, translational Research, product development, Incubating & Supporting Start-ups as well as Commercialization for the University as well as state. This project report is framed in accordance with the various priority based technological issue of the nation and Himachal Pradesh. The main issue of the Himachal Pradesh will be address with the AI & CPS are the transportation, agriculture, Defence, healthcare, intelligent traffic management system, energy, structure health monitoring, smart grid management, industrial automation and disaster management as well as various other issue of the nation and state priority. This AI & CPS centre will also train the manpower in area of the CPS & AI technology. The project aimed to carry out these challenges of the hilly state by combining computing and physical process which leads to the interaction with the human in a new way. This Centre will involve the various departments (Engineering, Basic Science, Computer Science, Physical Science, Humanities, Geography, Bio-Science) of the Himachal Pradesh University.

Financial Aspects

The total estimated project cost is for Rs 7.65/- Crores and the implementation of the project is proposed in two parts:

Estimated Cost for Part 1: (Rs.3.24 Crores)

This will cover the strengthening of existing centralized networking facility which consists of mainly three parts such as networking, software's and Web services.

Estimated Cost for Part 2 (Rs.4.41 Crores)

The Implementation plan for Part -2 of the Centre for AI on CPS covers the various application area which can be taken care by the AI & CPS.

The issue which can be taken care in the Part -2 listed as:

1. AI on CPS based transportation system
2. AI on CPS for the health system
3. AI on CPS for the smart cities (Intelligent traffic monitoring system, structure health monitoring)
4. AI on CPS for the Power Systems and Smart Grid
5. AI on CPS for the Agriculture & Defence application
6. AI on CPS for Disaster Management and Industrial Automation

This estimated cost of this project proposal acts as initial seed money for strengthening of the existing infrastructure of Networking and Wi Fi and set of the Centre of AI on CPS. Once the initial set-up is ready, we will obtain secondary funding from agencies like DRDO, MeitY, DST and others.

3.2. Introduction to the AI on CPS

Artificial intelligence (AI) is a powerful method for augmenting and accelerating scientific research, as it aims to mimic, extend, and expand human intelligence to perform complex tasks. Inspired by the information-processing mechanisms in the brain, deep learning utilizes multi-layered artificial neural networks to automatically learn data representation and abstraction, exhibiting high-speed information processing and statistical inference capabilities [1-2]. In recent years, significant breakthroughs have been made in AI, and its influence has spread in various fields, including physics, economics, engineering, and medicine. The Artificial intelligence (AI) model is reshaping our world by flourishing and demonstrating human competitive performance in diverse fields, including natural language processing (NLP) [1], computer vision [2, 3], healthcare [4, 5], finance [6, 7], education [8], autonomous driving [9], scientific research[10–12], creative industries [13], and more.

The CPS are the next-generation systems which integrate the computation element with the physical process. The concept of the CPS arose a decade ago and it is the next technological step in Engineering and science[16].

A CPS is the integration of two subsystems (a) a computationally based subsystem which covers communication infrastructure, sensors, and (b) computational elements and application context covers the physical componeat. The power of the CPS lies in its relatively simple design which leads to the tight integration between cyber and physical systems. So, these two subsystems must work intelligently together and should be coordinated flawlessly. This integration of the cyber & physical system leads to the formation of the cyber-physical bridge and this bridge link occurs at the sensors which convert the measurable physical quantities to the data. Hence, CPS are interoperable smart networked systems with distributed and deeply integrated cyber and physical components including control, sensing, processing and computing, communication and actuating elements that are capable of interacting with the physical world and human users in real-time[17].

This tight integration is aimed to enable striking system properties which cover, functionality, reliability, adaptability, autonomy, efficiency, safety and usability and these properties will change to the different degree depending upon the applications. The CPS is so deeply embedded in every aspect of our modern society with the applications which are an integral part of manufacturing, healthcare, agriculture, transportation, energy systems, financial systems, defense and smart infrastructure and many more. The architecture of the CPS includes a physical process in which real world systems interact with the CPS. The collection of the data is done by the sensors and communication network (wired or wireless) that are used to transmit data between the cyber and physical domain. Further this data from the sensors has been processed and realized with help of the communicational node i.e. servers and controller. The command given by the communicational node for the physical process has been taken care of by the actuators. Final control algorithms-based software analyzes the data make decisions and generate the signal.

In summary, the CPS improves the quality of life in a modern society. The CPS has the ability to perform a main role in the areas where involvement of the human interaction covers both social and technical aspects. Moreover, cyber-physical technologies are capable of reducing accidents caused by human error of performing tasks. Fig. 1 shows a concept map for the cyber-physical system.

AI enhances CPS by enabling intelligent decision-making, real-time analytics, and system optimization. AI algorithms process vast datasets, recognize patterns, and automate complex processes. This capability makes CPS smarter, more responsive, and efficient. The main function of the AI in CPS are Data acquisition and analysis, real-time decision-making, adaptive behavior. There are certain challenges which we need to take care in AI driven CPS centric. These challenges are data security and privacy, real-time responsiveness, interoperability and computational complexity. Fig. 2 shows a comparison diagram between AI and CPS [18].

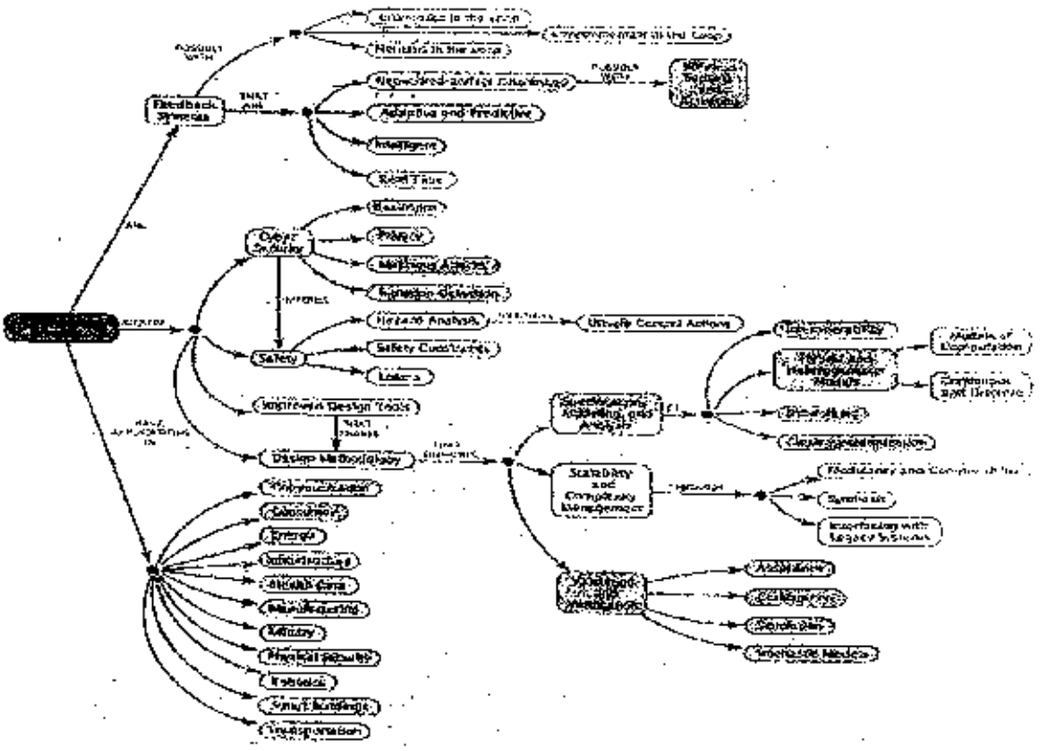


Figure 1: Cyber-physical Systems - a concept map (http://cyberphysicalsystems.org/)

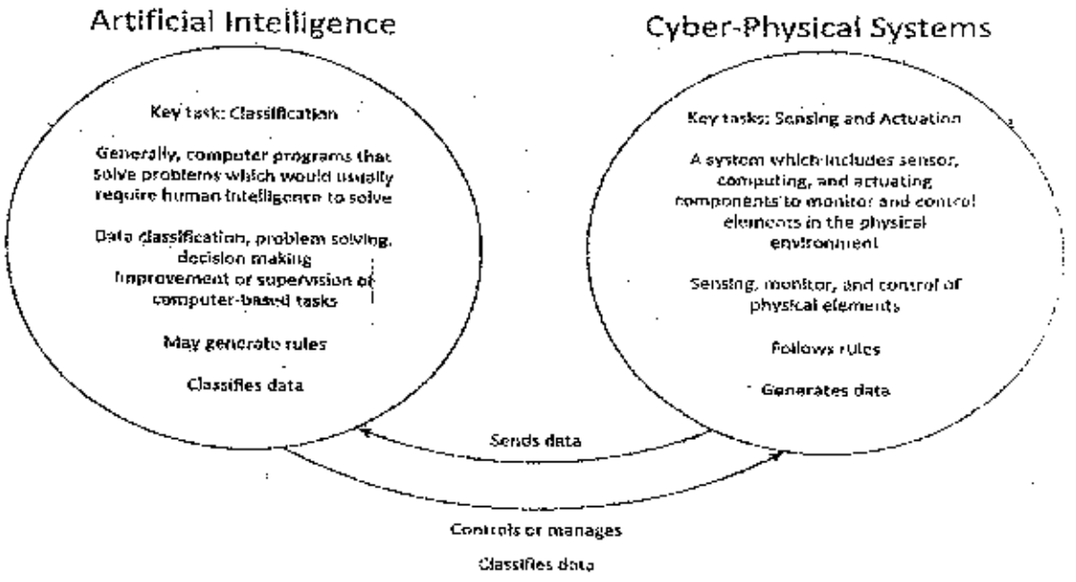


Figure 2: A comparison diagram showing the characteristics and connections between AI for classification and CPS

1.3. Objective for setting up the Centre for AI on CPS

The main objectives of the Centre for AI on CPS are.

- AI and CPS aims to unlock transformative possibilities in automation, data-driven decision-making, and human-machine collaboration.
- Provide a state-of-the-art infrastructure for students and researchers to innovate, design, and excel in the field of AI and CPS.
- To seamlessly integrate interdisciplinary technologies and design cyber physical components and systems
- To address the various technological issue of the Himachal Pradesh with the CPS set up such as smart health care, smart merchandise, smart agriculture, smart cities, intelligent traffic management system, power grid management and development of sector-specific solutions.
- To establish and strengthen the international collaborative research for cross-fertilization of ideas.

1.4. Scope of the Proposed Centre

The AI & CPS has broad scope which is ranging from research & development, application of the various systems that integrate the physical process, cyber computing and communication together. This centre will be acting as multidiscipline platform for the different department such as (Engineering, Life science, Basic science, Biotechnology, Microbiology & Environmental engineering) of the University. The scope of CPS centre falls in the broader area such as Neuromorphic Computing, Artificial Intelligence (AI), Machine Learning (ML), Internet of Thing (IoT) but will mainly address the various issues in the hill state of Himachal Pradesh in various domains such as,

- AI & CPS for Smart cities (smart infrastructure, intelligent traffic management systems, Smart grid management and IOT based management of resource in urban and rural areas).
- Transportation which deals with connected transport system which is connected with the AI & CPS set up.
- Linkage of the agriculture with the CPS which is helpful in real time crop monitoring.
- Smart healthcare using CPS to help the remote patient for real time health monitoring.
- Energy management using AI & CPS.
- Management of the safety, security, privacy and accountability of the Data using AI & CPS.
- Training of the student for various AI & CPS technologies and principles.
- Secure communication system and Cyber security challenges AI & CPS.

1.5 (a) Current HPU Campus Network Infrastructure

- The HPU campus Wi Fi Network introduced as, In the year 2004, VSAT was installed with a speed of 512 Kbps, and 20 systems were connected with LAN for providing the facility of e-journals for the first time in the University, through Inflibnet.
- In the year 2007, first wired network was installed in Himachal Pradesh University with 809 nodes for the users and speed of 100 Mbps covering 20 buildings. 2.5 KMs Single Mode Optical Fibre supporting a connection speed of 1Gbps was installed.
- Himachal Pradesh University has 1Gbps bandwidth under National Knowledge Network (NKN) established in the year 2010-2011.
- In the year 2016, the extension of campus LAN was done with a wired network, connecting 39 buildings under NMEICT Project. In the project, the hostels received internet facilities for the first time.
- This connectivity was possible due to the installation of an Optical Fibre Network, extending the network capacity up to 2000 nodes covering entire campus, hostels and residential area.
- Later in 2016, H.P. University, Shimla got the facility of first Campus Wi-Fi through NKN with the installation of 14 Wi-Fi Access Points, 10 of which were for indoor usage and remaining 4 were Outdoor Access Points.

- In the year 2019, Himachal Pradesh University was covered with Wi-Fi facility in the campus, raising the nodal capacity to 282 Wi-Fi Access Points, covering the entire campus, hostels and residential areas
- NKN network has provided base infrastructure of 1 Gbps BSNL connectivity to Himachal Pradesh University
- The NKN project under NMEICT and Meity has provided connectivity to the Himachal Pradesh University on cost-sharing basis of 25% of the total amount.

Current Hardware and Software at HPU networking Centre Local Area Network:

1.	Layer-III Switches	Huawei, 3Com	4
2.	Layer-II Switches	Huawei, 3com,dlink,tp-link,Netgear,HP Aruba	85
3.	OFC Cable		15Km
4.	UTP Cable		20,000 mtr
5.	Number of Rack Location	12u	50
6.	Total No. of I/O Points		1500

Current Hardware and Software at HPU Networking Centre for Wi-Fi

1.	Wireless Controller	Cisco 5520	1
2.	Layer-III Switches	Cisco 3850	2
3.	Layer-II Switches	Cisco 3560 PoE Switch & Cisco Meraki Switch	58
4.	Layer-II Switches	Cisco 2960 Non-PoE Switch	7
5.	Network Management System	Cisco NMS-Prime Infra	1
6.	Indoor Access Point	Cisco 3802I-D-K9 & Cisco 9115X Series	318
7.	Outdoor Access Point	Cisco 1572EAC-D-K9	16
8.	Firewall	FortiGate 600E	1

1.5 (h) Implementation Plan

Implementation process flow with time for the Part- 1 Strengthening of Centralized Networking Facility which consists of mainly three parts as networking, software's and Web services.

i. July – December 2025: Implementation of the Eduroam facility, creation of active directory with the purchase of the new server and switching of old network to single network platform. Procurement of the L2 & L3 Switches. Installation of the research and other software in the centralized server.

ii. December 2025– April 2026: Procurement of the Indoor Wireless Access Points and LAN work for the I/O points. Laying of the fibre in new building.

iii. May – June 2026: Centralized Log Analyser procurement for maintaing the internet log records for at least six months.

- **Implementation Plan for Part-2 for setting up Centre for AI on CPS**

The implementation plan for Part -2 of the Centre for AI on CPS covers the various application area which can be taken care by the AI & CPS. The main issue we will address with the AI & CPS are the transportation, agriculture, healthcare, intelligent traffic management system, energy, structure health monitoring, smart grid management, industrial automation and disaster management various other issue of the nation and state priority. The issue which can be taken care in the part -2 listed as

i. AI on CPS based transportation systems
ii. AI on CPS for the health systems
iii. AI on CPS for the smart cities (Intelligent traffic monitoring system, structure health monitoring)
iv. AI on CPS for the Power Systems and Smart Grid
v. AI on CPS for the agriculture & Defense application
vi. AI on CPS in Disaster Management and Industrial Automation

All of the above issue addressed as

a. **AI & CPS for the Smart Cities, Health Care & Transportation systems (July -2025- June 2028)** Department of Biosciences, Department of Geography, Department of Social Science, and UIT engineering Department of Electronics and Communication Engineering & Electrical Engineering, Computer Science Engineering will be active participants for this.

The transformation is driven by AI on CPS principles, which incorporate physical hardware (such as antennas) with software intelligence and real-time control. They are fundamental to the advancement of both smart cities and healthcare (Medical IoT). In smart cities, CPS-enabled antennas facilitate applications such as intelligent traffic control, smart energy management, urban surveillance, and environmental monitoring. These systems rely on antennas integrated into IoT nodes to provide reliable, low-latency communication over networks. For example, a smart traffic light system may use directional antennas to communicate with approaching vehicles, dynamically adjusting signal timings based on congestion data. In healthcare, CPS-enabled antennas are essential for wearable health monitors, implantable medical devices, telemedicine platforms, and hospital asset tracking. These antennas must be miniaturized, low-power, and often biocompatible to suit applications like wireless pacemakers or skin-mounted ECG patches.

Objectives:

- Development of a CPS-enabled smart antenna system for 5G/6G stations capable of real-time beamforming.
- Interference mitigation in dense urban environments.
- Energy-efficient communication by focusing signals only where needed.
- Implement mathematical modelling to optimize antenna array parameters based on real-time data.
- Validate system performance through simulation and hardware testing.

- The objective is to design such VLSI chips for observing and study the real time biomedical signal for application such as cardiac monitoring, blood sugar level detection or wearable health monitors.
- The objective is to design an energy efficient custom VLSI chip- CPS platform with faster processing, tailored for harsh and constrained industrial environments.

b. AI & CPS for Power Systems and Smart Grid Application (July 2025 -June 2028)

UIT engineering Department of Electronics and Communication Engineering & Electrical Engineering, Civil Engineering, Computer Science Engineering will be active participants for this.

Introduction

A CPS is a system in which processing, networking, control, and physical processes are integrated. CPS includes data sharing, intelligent control, real-time monitoring, and automation of power generation, transmission, distribution, and consumption in the context of power systems.

The transformation of traditional power systems into smart, adaptive, and resilient networks is central to the future of electrical engineering. The emergence of the AI on CPS offers a paradigm shift by tightly integrating computation, communication, and physical processes. In the context of power systems, CPS enables real-time data acquisition, intelligent decision-making, predictive control, and robust system automation. This integration is foundational to the development of smart grids, which are essential for managing the increasing complexity brought by renewable energy sources, electric vehicles (EVs), and distributed energy resources (DERs).

AI on CPS Architecture in Power Systems

Cyber-Physical Systems in power engineering are composed of the following three interacting components:

Physical Layer: Includes power generation plants, transformers, transmission lines, substations, DERs, and consumer-end devices..

Cyber Layer: Involves sensors, actuators, embedded controllers, communication networks (e.g., SCI, ZigBee, fiber optics), and computing infrastructure.

Control Layer: Executes decision-making algorithms, optimization processes, and predictive models for system regulation and automation.

This layered architecture allows the power system to become self-aware, self-configuring, and self-healing, thus addressing the dynamic challenges of modern power networks.

Applications of AI & CPS in Smart Grids

- Real-Time Monitoring and Control

  With AI on CPS, real-time data is collected using smart meters, phasor measurement units (PMUs), and IoT-enabled sensors. This data is transmitted to control centres or edge computing nodes where control actions (e.g., voltage regulation, frequency control, load balancing) are executed. The latency reduction and data analytics capabilities of CPS significantly improve the speed and accuracy of system responses.

- Integration of Renewable Energy and DERs
- The variability of solar and wind energy requires intelligent coordination for maintaining grid stability. CPS uses forecasting algorithms, dynamic optimization, and feedback control to enable smooth integration of renewables. Additionally, microgrids embedded with CPS can operate autonomously (in island mode) and improve the resilience of the grid. Demand Response and Energy Efficiency

  CPS empowers demand-side management by analyzing user behavior and dynamically adjusting power delivery. Smart appliances and buildings respond to signals from the grid (e.g., pricing changes or load shedding requests), optimizing both user comfort and grid performance. This contributes to peak load reduction and energy conservation.

- Predictive Maintenance and Fault Management

  Through continuous data acquisition and health monitoring of equipment (e.g., transformers, switchgear), CPS can predict failures using machine learning models. This reduces unexpected downtime and extends the lifespan of critical infrastructure. Furthermore, in the event of faults, CPS systems can automatically isolate the affected areas and reconfigure the network to restore service swiftly.

- Electric Vehicle Integration and V2G Systems

  CPS facilitates coordinated charging of electric vehicles (EVs) based on grid availability and user preferences. Moreover, with Vehicle-to-Grid (V2G) support, EVs act as mobile energy storage systems that can supply power back to the grid during peak demand.

c. **AI & CPS for Agriculture and Defence (July 2025 -June 2028)**

UIT engineering Department of Electronics and Communication Engineering & Electrical Engineering, Computer Science Engineering, geography Department, Bioscience Department, Basic Sciences will be active participants for this.

Agriculture: Climate change and higher needs for agricultural products due to growing population is expected to become a major challenge in the following decades. AI on CPS will play a key role in addressing the pressing need for smarter, more efficient and sustainable supply chain of agricultural products while providing opportunities for higher levels of productivity.

The following objectives will be covers under the Centre of AI on CPS for Agriculture

- AI on CPS used for the foe optimal usage of the resources (groundwater, fertilizers, and electrical energy) for better crop yields.
- AI on CPS for the continuous monitoring of the physical entities as (soil, weather, pumps, etc)
- AI on CPS for the detection of the disease and pests
- AI on CPS for the Automatic weeding and harvesting

Defence: Defense systems are becoming more reliant on complex, adaptable and autonomous AI on CPS such as unmanned aerial vehicles, robotics and surveillance systems for meeting the military and national defense needs to reduce the human involvement. Moreover, cyber warfare's which rely of AI on CPS has become an important part of offensive and defensive operations

The following objectives will be covers under the Centre of AI on CPS for Defence

- AI on CPS used for enhancement of the unmanned aerial vehicles in terms surveillance, reconnaissance and for the sensitive operation.
- To provide the cybersecurity for the Defence system with AI on CPS.
- AI on CPs based drones for the Infrastructure Monitoring.

There is list of the software and hardware required for implementing AI on CPS in the agriculture and the defense systems with detailed budget in the budget estimate section.

d. **AI on CPS for Disaster Management and Industrial Automation**

UIT engineering Department of Electronics and Communication Engineering & Electrical Engineering, Computer Science Engineering, Civil Engineering, Social Sciences Department will be active participants for this.

Introduction

Traditional cyber-physical systems (CPS) in disaster prediction and industrial automation depend on static models and rule-based mechanisms that lack adaptability to rare or unforeseen scenarios. Generative AI offers the potential to simulate complex, high-risk environments-- such as floods, earthquakes, or landslides--and generate synthetic data to train more robust predictive models.

In industrial settings, generative models can facilitate real-time optimization by creating context-aware decision-making algorithms and generating adaptive control logic.

Objective:

- Disaster response systems with predictive capabilities and real-time adaptability
- Industrial automation platforms enabling predictive maintenance, fault recovery, and process optimization

Scope of Work

- Development of generative AI models (GANs, VAEs, and transformers) for simulating real-world disaster and industrial sensor data
- Synthetic data generation for training robust AI models
- Integration with embedded platforms and microcontrollers for real-time inference
- Deployment of low-power AI models for edge computing in IoT-enabled CPS
- Creation of generative digital twins for industrial scenarios
- Collaborative testing with disaster management agencies and industrial partners

Prototype Overview

i. Disaster Response CPS

- Use Case: Flood prediction using synthetic sensor data
- Goal: Train a model using both real and GAN-generated water level + rainfall + humidity data to predict flood risk

ii. Industrial Automation CPS

- Use Case: Predictive maintenance using vibration + temperature data
- Goal: Use synthetic failure cases to train a Transformer/Auto encoder that detects abnormal machinery behavior

Delivery of the Project

This proposal outlines a scalable, future-ready project combining Generative AI with CPS for critical real-world applications. With the tentative budget in budget section, the project is now better equipped to:

- Train sophisticated generative models,
- Support real-time embedded deployment,
- Simulate and visualize complex disaster and industrial conditions,
- Enable robust testing, deployment, and stakeholder collaboration.

1.6. Tentative Budget Estimate for part -I

Part- I Strengthening of Centralized Networking Facility Requirements with detailed/tentative budget

I. Laying of Fiber Optical Cable for high data transmission: - It has been observed that at some locations/buildings of the H.P University Campus has lack of OFC connectivity and requires OFC Network for higher data transmission and smooth functioning of office work. Details are as under:

Sr. No.	*Name of the Building*	*Route*	*Items required*	*Qty.*	*Tentative Rate/Meter*	*Tentative Total Cost (Rs.)*
1.	*Purchasing of 24 Core Optical Fiber cable (250 Meter)*	*Campus optical fibre network*	*24 Core Optical fibre cable*	*250 Meters*	*40*	*16,000*
2.	*New Building Adjacent to the Law Building, HPU Campus*	*Digging from University Road Near the Construction Division to the New Building, Adjacent to the Law Department for laying of Optical Fiber Cable with fixing HDPE Pipe*	*N/A*	*150 Meters*	*450*	*67,500*
3	*Aerial Route for laying optical 24 Core fiber Cable with HDE Pipe*	*Wi-Fi Server Room to the Construction Division Office*	*N/A*	*100 Meter*	*20*	*3,000*
	Tentative Grand Total in Rs. (A)=					***86,500***

II. Requirement **of New I/O Points Setup for various location:** - Due to absence of the the I/O points in the administrative branches/office of the H.P University,it has been difficult for smooth working of the office work. In this regard, we conducted a preliminary survey and found the following locations where the new I/O points are required:

Location	New I/O Points with fully loaded module	Tentative Cost per unit (Rs)	Tentative Cost (Rs.)
Admin	122	500	61000
Arts	103	500	51500
UBS	24	500	12000
Biotech	34	500	17000
Chemistry & Math	41	500	20500
COE	9	500	4500
Computer Centre	20	500	10000
Dean Of studies	27	500	13500
Gandhi Bhawan	80	500	40000
Himalyan Studies	10	500	5000
HRDC	10	500	5000
ICDEOL	57	500	28500

IMS-MBA	24	500	12000
ITH Hostel	20	500	10000
LAW	33	500	16500
Library	48	500	24000
New Building	250	500	125000
Pre-exam Centre	20	500	10000
Swami Vivekanand Multi	158	500	79000
UIT	70	500	35000
UILS	24	500	12000
VC OFFICE	45	500	22500
Tentative Total (B) (in Rs.) =			**614500**

III. **Procurement of new L-2 & L-3 Network switches:** Purchasing of the following network switches are required for extension/expansion of the existing network as the existing network is no more capable to meet out the future demands. Therefore, It is required to purchase the new network switches for the following locations:

Location	New I/O Points	New Switch	Switch Descriptions	Rate per Unit (Rs)	Total Cost (Rs)
Wi-Fi Server Room	NA	4	24 Port Layer-3 (Core Network Switch)	350000	1400000
Admin	122	6	24 ports Layer-2 POE network Switch	80000	480000
Arts	103	5	24 ports Layer-2 POE network Switch	80000	400000
BBA	24	2	24 ports Layer-2 POE network Switch	80000	160000
Biotech	34	2	24 ports Layer-2 POE network Switch	80000	160000
Chemistry & Math	41	2	24 ports Layer-2 POE network Switch	80000	160000
COE	9	1	24 ports Layer-2 POE network Switch	80000	80000
Computer Centre	20	1	24 ports Layer-2 POE network Switch	80000	80000
Dean Of studies	27	2	24 ports Layer-2 POE network Switch	80000	160000
Gandhi Bhawan	80	4	24 ports Layer-2 POE network Switch	80000	320000
Himalayan Studies	10	1	24 ports Layer-2 POE network Switch	80000	80000
HRDC	10	1	24 ports Layer-2 POE network Switch	80000	80000
ICDEOL	57	3	24 ports Layer-2 POE network Switch	80000	240000
IMS-MBA	24	1	24 ports Layer-2 POE network Switch	80000	80000
ITH Hostel	20	1	24 ports Layer-2 POE network Switch	80000	80000
LAW	33	2	24 ports Layer-2 POE network Switch	80000	160000
Library	48	2	24 ports Layer-2 POE network Switch	80000	160000
New Building	250	11	24 ports Layer-2 POE network Switch	80000	880000

Pre-exam Centre	20	1	24 ports Layer-2 POE network Switch	80000	80000
Swami Vivekanand Multi	158	7	24 ports Layer-2 POE network Switch	80000	560000
ULS	24	2	24 ports Layer-2 POE network Switch	80000	160000
VC OFFICE	45	2	24 ports Layer-2 POE network Switch	80000	160000
UIT	70	3	24 ports Layer-2 POE network Switch	80000	240000
Spare Switches		13	24 ports Layer-2 POE network Switch	80000	1040000
			Tentative Total (C) (in Rs.)=		**7400000**

IV. Passive Network Components Required for Upgradation/Extension of LAN/Wi-Fi Network: Survey conducted by the Network Engineers and found that the following Passive Components are required:

Sr.No.	Name of the Item	Purpose	Qty.	Tentative Rate/Unit	Tentative Total Cost
1	Patch Cord 2 Meter	I/O Points	1229	550	675950
2	Patch Cord 1 Meter	Jack Pannel to Switch Connection	1229	475	583775
3	Cable Management Module	Wall Mounted Rack	50	2000	100000
4	Fiber Patch Cord SC to LC 3 Meter (Single Mode)	Fiber Distribution Management System	50	1200	60000
5	Cat 7 Cable Box 305 Meter	For Lan Connection	100	22000	2200000
6	SFP Module (Single Mode)	Fiber Connectivity to Switch	25	15,000	375000
7	Patch Panel CAT 7	For Punching CAT 7 Cables.	52	3,500	182000
8	Wall Mounted Rack with Inbuilt PDU	Installation of Network Switches	50	15,000	750000
9	16 Amp Switch and Socket with Modular Box	To provide power supply to the Eqipments installed in the Mounted Rack	50	600	30000
10	Pigtail Single Mode SC Type	Fiber Termination	100	600	60,000
		Tentative Total (D) (In Rs.)=			**50,16,725**

V. Material and Labour Cost for LAN Work:

Material & Labour Rate for LAN Work

Sr.No.	Description of Work	UoM	Qty.	Tentative Rate/Unit	Tentative Total Cost
1	Fixing of UTP 4 Pair CAT 6e Cable in PVC Conduit min.19/25 mm dia on surface including making necessary connections	Meter	30500	30	9,15,000
2	Wall Mount 12U Rack Installation	No.	50	500	25,000

3	Switch installation within the rack	No.	66	150	9,900
4	Wireless Indoor Access Points Installation	No.	53	300	15,900
5	OFC Splicing	No.	96	300	28,800
	Tentative Total (E) (in Rs.)=				**9,94,600**

VI. Purchasing of Network Monitoring Software and Hardware to enhance security.: With the rapid advancement of the technology, there is always be a risk of hackers to breach the network by using sophisticated hacking tools Therefore, it is mandatory to have a network monitoring software and end to end security solutions (Comprehensive security solutions) to safeguard the network from external threat and potential hacking attempts.

1	User Authenticator with Add-on licenses upto 8,000 users(3 year subscription)	To authenticate HPU Users	1	16,50,000	1650000
2	Centralized Log Analyser (3 years subscription)	To maintain the daily logs of HPU users due to security purpose	1	8,20,000	820000
	Tentative Total (F) (in Rs.)=				**24,70,000**

VII. Purchasing of the new equipment's & licenses for maintaining of the Existing Wi-Fi Network implemented by Pace:

Sr.No	Name of the Equipment	Purpose	Qty.	Rate per Unit (Rs)	Total Cost (Rs)
1	24 Port Layer-3 Network Switch	For the Maintenance of Existing Pace Network	13	80,000	1040000
2	Indoor Wireless Access Points	For the Maintenance of Existing Pace Network	50	65,000	3250000
3	Wireless Outdoor Access Points	For the Maintenance of Existing Pace Network	5	1,40,000	700000
4	SFP Module (Single Mode)	For the Maintenance of Existing Pace Network	13	15,000	195000
5	CISCO Add-on Licenses required for existing Wireless Access Points	To run the existing Wireless Access Points purchased under ICT Project.	19	17,000	3,23,000
	Tentative Total (G) (in Rs.)=				**55,08,000**

VIII. Procurement of new Wireless Access Points with Add-on Licenses to address the Wi-Fi Signal issues: Numerous complaints have been received from students, staff, and faculty regarding facing Wi-Fi Signal issues at various location within H.P.U, i.e. Hostels, Offices and sections etc. To address these issues, the engineers conducted survey to identify the areas/locations experiencing signal problem

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and found that the following locations/buildings/ floor required installation of additional Indoor Wireless Access Points:

Sr.No.	Name of the Location	Name of the Equipment	Qty.	Tentative Rate/Unit	Total Tentative Cost
1	Network Testing Lab	Wireless Controller	1	15,00,000	1500000
2	Admin	Wireless Indoor Access Point	3	65,000	195000
3	UBS		6	65,000	390000
4	Guest House		10	65,000	650000
5	HEALTH CENTRE		1	65,000	65000
6	HRDC		2	65,000	130000
7	ICDEOL		1	65,000	65000
8	Library		8	65,000	520000
9	New Building		15	65,000	975000
10	UILS		7	65,000	455000
		Tentative Total (H) (in Rs.)=			49,45,000

Tentative total for Part-I comprising of Strengthening of Centralized Networking Facility

Part-I (A to H) (INR)= 3,24,91,325/-

The part 2 of the Centre for AI on CPS covers the various application area which can be taken care by the AI & CPS. The main issue we will address with AI on CPS are the transportation, agriculture, healthcare, intelligent traffic management system, energy, structure health monitoring, smart grid management and various other issue of the nation and state priority.

The tentative budget proposal for the Part -2 with the tools (software & hardware) for the AI on CPS application in

a. Smart Cities, Health Care & Transportation system

Expected Cost:

Software Tools

Category	Tool	No. of license	Expected Cost (INR)
HDL Design & Simulation	Verilog/VHDL	-	Free
	Xilinx Vivado (WebPACK)	-	Free (limited version)
	ModelSim	5	4,00,000
	Cadence	5	10,00,000
	Synopsys	5	12,00,000
Circuit Simulation	LTspice	-	Free
	HSPICE	5	2,50,000
Embedded Programming	Arduino IDE	-	Free
	Keil uVision	-	Free (limited); 80,000 (full)
	STM32CubeIDE	-	Free
RTOS & Modeling	FreeRTOS	-	Free
	MATLAB/Simulink	5	4,00,000

Hardware Tools

Category	Tool	Count	Expected Cost per unit (INR)
Development Boards	FPGA Board (Xilinx Artix-7)	10	30,000 – 40,000
	STM32 Microcontroller	10	500 – 3,000
	Arduino Board	10	1,500 – 2,500
Modules	ECG Simulator Module	5	5,000 – 15,000
	BLE Module	5	500 – 2,000
Sensors/Actuators	Temperature Sensor	10	100 – 500
	Vibration Sensor	40	200 – 800
Communication Modules	ZigBee	5	500 – 1,500
	LoRa	5	1,000 – 3,000
	Wi-Fi (e.g., ESP8266)	5	300 – 1,000
Testing Equipment	Oscilloscope	3	10,000 – 50,000
	Multimeter	3	500 – 5,000
	Power Supply Unit	3	2,000 – 10,000

Total Cost: ₹29,30,000 (software)+ ₹7,60,000 (hardware) = ₹36,90,000/- (approx.)

CATEGORY	ITEM	ESTIMATED COST (INR)
Antenna Components	• RF antenna materials FR4, Rogers RO4003C, RT Duroid 5880, Connectors (SMA, U.FL or MMCX Connectors etc.)	1,00,000
Software tools	• ANSYS HFSS License (academic/commercial)	12,45,000
	• CST Studio Suite License	16,60,000
Subtotal (Software)	30 ,05,000/-	
Fabrication Equipment	• Antenna prototyping machine	25,00,000/-
Testing & Validation	• Vector Network Analyzer (VNA)	25,00,000/-
	• Anechoic chamber (compact or full-size)	75,00,000/
	• Calibration kits, cables, fixtures	1,00,000/-
Subtotal (Testing)	1,26,00000/-	

b. **Tentative budget estimate for implementing AI on CPS for Power Systems and Smart Grid Application**

Infrastructure Requirement:

Equipment	Purpose	Tentative Cost(INR)
Real-Time Digital Simulator (RTDS)	For hardware-in-loop (HIL) and grid simulation	400,0000/-
SCADA System with RTU/IEDs	Monitoring and control infrastructure	2000000/-
Smart Meters (AMI units)	Advanced metering and data acquisition	1000000/-
Grid-connected Microgrid Test Bench	Includes solar PV, wind emulator, inverter, batteries	3000000/-
Phasor Measurement Units (PMUs)	Wide-area monitoring	1500000/-
		Total = 11500000/- (Tentative)

c. **Tentative budget estimate for implementing AI on CPS for Agriculture and Defence**

Equipment/hardware/software	Purpose	Tentative Cost
Sensors: • Soil moisture sensors: • Temperature and humidity sensors • Light sensors: • pH sensors: • Weather stations	Sensors are eyes of the CPS.	100000/ for all for single unit
Actuators: • Irrigation systems • Fertilizer dispensers • Lighting systems	These are the components that perform actions based on the system's decisions.	50000- 100000/-
Microcontrollers:	These are the brains of the system, processing sensor data and controlling actuators.	10000/-
Drones and Robots	For tasks like planting, weeding, harvesting, and monitoring large areas	10000- 70000/-
Data Acquisition and Processing software	to collect, analyze, and process data from various sources like sensors and instruments	200000- 500000/
Server:	May be cloud or hardware based	1500000/-
Defense in CPS cost ranges from	UAV, Photonics CPS for defense	2500000 – 750000/-
	Total =	11500000/- (Tentative)

d. Tentative budget estimate for implementing AI on CPS for Disaster Management and Industrial Automation

Tools and Technologies

Software Tools

Category	Tool	Usage
Generative Model Development	Python, PyTorch, Tensor Flow	Model design and training
Simulation & Modeling	MATLAB/Simulink	CPS modeling and verification
Deployment & Optimization	ONNX, Tensor RT, Edge Impulse	Model compression and edge inference
Visualization & Digital Twin	Unity (Pro), Blender, Plotly	Prototyping of 3D environments
Edge AI Programming	MicroPython, Arduino IDE	Embedded AI model deployment
Data Management	Pandas, NumPy, HDF5	Synthetic and real data processing

Hardware Tools

Category	Tool	Purpose
Edge AI Devices	NVIDIA Jetson Nano, Raspberry Pi 4	On-device inference for CPS
Microcontrollers	ESP32, STM32	Embedded control and data acquisition
Sensor Modules	Temp/Humidity, IMU, Gas, Pressure	Environmental and motion data input
Cameras	RGB/IR Cameras	Visual data for training and inference
Communication Modules	LoRa, Wi-Fi, BLE	Real-time wireless data communication
Compute Infrastructure	GPU Workstation / Cloud (AWS/GCP)	High-performance model training

Expected Budget Software Tools

Category	Tool	Licenses	Estimated Cost
Generative AI Frameworks	PyTorch, TensorFlow	Open-source	Free
Simulation	MATLAB/Simulink	5	₹4,00,000
Visualization	Unity Pro	5	₹2,00,000
Edge Deployment Tools	Edge Impulse, ONNX	Open-source	Free
Software Subtotal			**₹6,00,000**

Hardware Tools

Category	Tool	Qty	Cost/Unit (₹)	Total (₹)
Jetson Nano Dev Kit	NVIDIA Jetson Nano	10	15,000	₹1,50,000
Raspberry Pi 4	Raspberry Pi 4B	10	6,000	₹60,000
ESP32 Module	AI-Thinker ESP32	10	1,000	₹10,000
STM32 Dev Board	STM32F4	10	3,000	₹30,000

Sensor Modules	Temp, IMU, Gas, Pressure	30	2,000 (avg.)	₹60,000
RGB/IR Cameras	Raspberry Pi Camera/IR Cam	10	5,000	₹50,000
Communication Modules	LoRa, Wi-Fi, BLE	20	2,000	₹40,000
Compute Infrastructure	Mid-Range GPU Workstation	1	2,00,000	₹2,00,000
Testing Equipment	Oscilloscope, Logic Analyzer	3 sets	30,000 (avg.)	₹90,000
Hardware Subtotal				**₹6,90,000**

Additional Contingency & Collaboration

Category	Purpose	Estimated Cost
Field Testing & Deployment Support	Prototypes for Disaster Mgmt. Agencies, Industry	₹1,00,000
Cloud GPU Training/Simulation Credits	AWS / Azure / GCP (for GANs, Transformers)	₹1,50,000
Annual License Renewal Buffer	Unity, MATLAB, or unforeseen expansion	₹1,00,000
Contingency Subtotal		**₹3,50,000**

Total Budget Estimate

Component	Amount (₹)
Software Tools	₹6,00,000
Hardware Tools	₹6,90,000
Contingency & Buffer	₹3,50,000
Total	**₹16,40,000**

Total of Part 2 (a+b+c+d) = 4, 40, 145, 00/-(INR)

Total Part 1 &2 = 7, 64, 31,325/-(INR)

1.7. Expected Outcome from the Centre of AI on CPS

The Centre for AI on CPS expected to deliver in the Interdisciplinary domain for boosting technology development in cyber-physical domains like AI, Robotics, ML, Robotics, IoT, Cybersecurity and development of the various other smart infrastructure with the CPS set up. This centre will also offer the Post-graduation (PG) and Doctorates level courses in the Cyber Physical systems. The main outcomes of this centre will take care of the following activity:

- Technology Development

  The centre has potential scope of technological development in CPS and related field. This technological development leads to the advancement in innovation and multidisciplinary research.

- Human Resource Development

This centre also leads to the training of the UG & PG students in the CPS technologies. This trained manpower act as skilled CPS force for the industries and other government sectors.

- Entrepreneurship Development
  This centre has scope for setting up startups, commercialization of the product and enhance placement for the skilled manpower.

- International Collaborations

  The centre promotes the international and nation collaboration with the various agencies, university and government agencies for exchanging knowledge and practice in the CPS technologies.

1.8. Management of the Centre

The running and management of the AI on CPS centre is a very crucial aspect in which we have to manage both the cyber and the physical component. The management AI on CPS covers the continuous measuring against the protective threat detection, secure access and ensuring the network protection. There are following main point which are need to be taken care during the AI on CPS centre management

i. Network security which covers the network protection against threat detection, protection against attack, Encryption protocol to protect data.
ii. Monitoring & Control covers the continuous monitoring and feedback, operational technology management.
iii. Exposure management and prioritize the risk.

1.9. Monitoring and Evaluation of AI on CPS Centre

The monitoring and evaluation of the AI on CPS centre has been done by the multilayered approach. The continues monitoring of the system health, safety and security along with the regular checking of potential issue need to be addressed. The monitoring and evaluation strategies with the key consideration has been formed for proper centre running. We will go for the regular runtime performance with security monitoring and data analysis. The regular auditing and testing of the fault and performance will be addressed. The continuous improvement with safety and security testing of the system will be done time to time. Further for carrying out regular Monitoring and Evaluation of the Centre for AI on cyber physical system an Advisory board as well as Executive and Monitoring board has been formed which is attached as Annexures -B & C. The composition and directives of these bodies will be revised from time to time as per the need and requirement of the Centre.

1.10. Conclusion

The establishment of this centre in the Himachal Pradesh University is a technological advancement step towards the growth and progress of the University teaching and research activity. This centre will provide students and faculty with 24/7 access to research software, enhance research capabilities, and support the university's academic goals. This centre will also be fruitful for our national as well as our hill state by taking care of various state issues as mentioned in objective and scope which can be taken care by the AI on CPS set up.

Hence, setting of the proposed AI on CPS Infrastructure, the University will be at the forefront of delivering innovative and future-oriented educational experience that caters to the necessary computational, programming tools and skills needs of the teachers and students, and will not only enhance the quality of digital infrastructure and quality software needs with improved learning experiences.

This DPR outlines a comprehensive plan and the steps necessary to successfully implement a AI on CPS centre ensuring that the university meets its educational and research objectives while providing users with the best possible cyber security.

1.11 Outreach of the Centre to the Society & State

The outreach of this Centre of AI on Cyber Security Systems at Himachal Pradesh University is to link a multidisciplinary research and innovation hub that combines AI, cyber and Physical systems. This Centre envisions the development of state-of-the-art facilities that encourage collaboration between the Government, Academia, Industries, International institutions and organizations. This centre is anticipated to play a key role in improving automation facilities, data handling and human-machine interaction. The centre outreach is broad, with a special emphasis on the particular difficulties faced by Himachal Pradesh such as Smart grid integration, data privacy and cybersecurity, real-time agricultural monitoring, traffic management, smart infrastructure, remote healthcare systems, and AI on CPS-based industrial and defence applications are all included. The major outreach of this centre is that it will act as a coupling point for Himachal Pradesh University and all affiliated colleges in terms of technology development, research, training of faculty and students and capacity building. It will nurture the potential of all students and faculty in universities and colleges by creating opportunities in the areas of AI, embedded system, IoT and smart grid areas. This centre will enhance the technical skill and digital competences of students by organizing different technical skill programs, workshops, seminars and other certified courses.

The mentorship of experts from the university, the students of the university and affiliated colleges will be able to start their startups and entrepreneurship and moreover, able to get job in industries and government sectors. The centre will also provide opportunity in terms of the job employment to youth of state and will help trained manpower for opening up of the startups. The generated data through CPS will help to make smart infrastructure in state like smart energy management, traffic analysis, and environmental monitoring and electrical load forecasting, renewable energy resource forecasting and advanced monitoring through AI.

Course Proposed in the Centre: This Centre of the university will offer certificate course on **"Cyber Security"** certificate course on **"Artificial Intelligence"** in initial stage and after the running of these courses, the Centre will later on offer diploma in cyber security, undergraduate courses on "Cyber Physical System", post graduate courses on "Cyber Physical System" and Ph. D in "Cyber Physical System". **The certificate course can be run in this session with help of expert lectures from the university faculty member and by the engagement of resource person.** In the later stage in order to proper run all the above Centre courses, there is a scarcity of manpower (Teaching and Non-Teaching Staff), allocation of funds and allotment of the infrastructure. The detail of the manpower (Teaching, Technical and a Ministerial Staff) is as follow

Teaching Post (Category-A)

Sr.No.	Name of the Post & Pay Scale	No. of Post & Discipline	Designation of the Post	Desirable	Eligibility
1.	Professor Pay Matrix Academic level 14- (Rs. 1,44,200-2,18,200)	01 Electronics and Communication Engineering (ECE)	Incharge	A person should have experience in design and fabrication of the optoelectronics device. The person should have knowledge about CPS in the area of communication, sensing and networking.	As per AICTE/UGC Norms
2.	Associate Professor Pay Matrix Academic Level 13A- (Rs. 1,31,400-2,17,100)	02 (One post in each the below discipline) i Electrical Engineering (EE) ii Electronics and Communication Engineering (ECE)	Faculty Member	i. EE: A person should have experience in transducer, sensor, signal conditioning, network planning of grid, AI and ML. ii. ECE: A person should have fabrication experience in the area of the on-chip photonics devices, handling of the networking electronic equipment's for the CPS for applications in the area of communication, sensing and networking, Artificial Intelligence, Cyber Security.	As per AICTE/UGC Norms
3.	Assistant Professor Pay Matrix Academic Level 10- (Rs. 57,700 – 1,82,400)	04 (One post in each the below discipline) i Civil Engineering ii Electrical Engineeri iii Computer Science Engineering iv Biotechnology	Faculty Member	i. A person should have knowledge of the structure health monitoring, municipal waste management ii smart grid, power system iii AI and cyber security iv Knowledge of food and plant engineering	As per AICTE/UGC Norms

Technical Staff (Category -B)

Sr.No.	Name of the Pos	Specialization/Expertise	Work Experience	Eligibility	No. of Post
1.	System Analyst Pay Matrix Level 6 (35,400 to 1,12,400)	A person should have experience in Network Troubleshooting, Configuration, Handling, Providing Network Support to the end users.	Minimum 3 year of experience in the field of Network handling and troubleshooting.	Person should have B. Tech/B. E in the Computer Science Engineering or Electronic & Communication Engineering	2 Nos.
2.	Junior System Analyst Pay Matrix Level 5 (29,200 to 92,300)	A person should have experience in Network Troubleshooting, Configuration, Handling, Providing Network Support to the end users.	Minimum 3 year of experience in the field of Network handling and troubleshooting.	Person should have B. Tech/B. E in the Computer Science Engineering or Electronic & Communication Engineering	1 Nos.

The necessarily Non-Teaching Staff (Ministerial Staff) is required for the functioning of "Centre for AI on Cyber Physical Systems" could be deployed by Himachal Pradesh University.

Non-Teaching (Class-C & D) Post

Sr.No.	Name of the post	No. of Post
1.	Junior Office Assistant (IT), JOA-IT	1 No.
2.	Peon	1 No.

Infrastructure Requirement For "Centre for AI on Cyber Physical Systems"

The "**Centre for AI on Cyber Physical Systems**" is initially proposed to run/functioning at the premises of the placement cell located in the ground floor of the main library for which the following space, infrastructure and wooden furniture is required. Details are given here under:

Sr.No	**Details of the Space & Infrastructure requirement**	**Qty.**
1.	Space for Director Office	1 No.
2.	Space for Smart Class Rooms	3 Nos.
3.	Space for Faculty Rooms	3 Nos.
4.	Space for Administrative Office	1 No.
5.	Space for Server & Storage Control room	1 No.
	Details of the Furniture Requirement	
6.	Desk for Students (Wooden)	90 Nos.
7.	Lecture Stands (Wooden)	3 Nos.
8.	Executive Table for Director	1 No.
9.	Executive Chair for Director	1 No.
10.	Visting Chairs for Director Office	2 Nos.
11.	Office Table for Teaching & Non-Teaching Staff	8 Nos.
12.	Office Chairs	8 Nos.
13.	Visiting Chairs for Office	16 Nos.

Budgetary Provision for the Centre

Recurring Expenditure: The tentative expenditure incurred on the salary expenses is calculated to Rs. 1,20,00,000/- (Rupees. One Crore Twenty-Lacs) only.

Non-recurring Expenditure: The tentative expenditure incurred on the procurement of furniture is calculated to Rs. 25,00,000/- (Rupees. Twenty-Five Lacs) only.

The total estimated project cost is for Rs 7.65/- Crores and the implementation of the project is proposed in two parts:

This estimated cost of this project proposal acts as initial seed money for strengthening of the existing infrastructure of Networking and Wi Fi and set of the Centre of AI on CPS. Once the initial set-up is ready, we will obtain secondary funding from agencies like DRDO, MeitY, DST and others.

Estimated Cost for Part 1: (Rs.3.24 Crores)

This will cover the strengthening of existing centralized networking facility which consists of mainly three parts such as networking, software's and Web services.

Estimated Cost for Part 2 (Rs.4.41 Crores)

The Implementation plan for Part -2 of the Centre for AI on CPS covers the various application area which can be taken care by the AI & CPS.

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Center for Cyber Physical Systems
Himachal Pradesh University, Shimla

Executive and Monitoring Board for the Centre for AI on Cyber Physical Systems

1. Prof. Joginder Singh Dhiman — Chairman
   Dean Planning and Teachers Matters
   Himachal Pradesh University Shimla

2. Prof. Subrat Kar — External Expert Member
   Department of Electrical Engineering, IIT Delhi
   FIETE, FIEI, FOSI, FIOSI, FICEIT, CEng(I)

3. Prof. Jawahar Thakur — Member
   Department of Computer Science
   Himachal Pradesh University, Shimla

4. Dr. Ajay Guleria — Member
   Sr. System Manager (SG)
   Computer Services Centre, Indian Institute of Technology, Delhi

5. Dr. Sanjay Sharma — Member
   Assistant Professor
   Department of Electrical Engineering
   University Institute of Technology
   Himachal Pradesh University, Shimla

6. Dr. Richa Chandel — Member
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   Department of Electronics and Communication Engineering
   University Institute of Technology
   Himachal Pradesh University, Shimla

7. Dr. Shalu — Member
   Assistant Professor
   Department of Electronics and Communication Engineering
   University Institute of Technology
   Himachal Pradesh University, Shimla

8. Mr. Ashok Kumar — Member
   Assistant Prof. (Information Technology)
   Centre for Distance and Online Education
   Himachal Pradesh University, Shimla

9. Dr. Tarun Sharma — Convener
   Assistant Professor
   Department of Electronics and Communication Engineering
   University Institute of Technology
   Himachal Pradesh University, Shimla

Center for Cyber Physical Systems
Himachal Pradesh University, Shimla

Advisory Board for the Centre for AI on Cyber Physical Systems

1. Prof. Mahavir Singh — Chairman
   Vice-Chancellor
   Himachal Pradesh University, Shimla

2. Sh. Sanjeev Bansal — Member
   Director General
   Education and Research Network (ERNET), India

3. Prof. Manoj Mishra — Member
   Department of Computer Science & Engineering
   Indian Institute of Technology, Roorkee

4. Prof. Nainjeet Singh Negi — Member
   Department of Physics
   Himachal Pradesh University, Shimla

5. Prof. Anand Bulusu — Member
   Department of Electronics and Communication Engineering
   Indian Institute of Technology, Roorkee

6. Prof. (Dr.) Umesh Tiwari — Member
   Senior Principal Scientist & Professor AcSIR
   Head of Department Optics and Photonics Instrumentation
   CSIR-CSIO, Chandigarh

7. Dr. Tarun Sharma — Convener/Member
   Department of Electronics and Communication Engineering
   University Institute of Technology
   Himachal Pradesh University, Shimla

Infrastructure Requirement For "Centre for AI on Cyber Physical Systems"

The "**Centre for AI on Cyber Physical Systems**" is initially proposed to run/functioning at the premises of the placement cell located in the ground floor of the main library. Later on the infrastructure requirement for this centre as, the sitting space for the students, teachers and staff members, infrastructure and wooden furniture for office and class rooms are required. Details are given here under:

Sr.No	Details of the Space & Infrastructure requirement	Qty.
1.	Space for Director Office	1 No.
2.	Space for Smart Class Rooms	3 Nos.
3.	Space for Faculty Rooms	3 Nos.
4.	Space for Administrative Office	1 No.
5.	Space for Server & Storage Control room	1 No.
	Details of the Furniture Requirement	
6.	Desk for Students (Wooden)	90 Nos.
7.	Lecture Stands (Wooden)	3 Nos.
8.	Executive Table for Director	1 No.
9.	Executive Chair for Director	1 No.
10.	Visiting Chairs for Director Office	2 Nos.
11.	Office Table for Teaching & Non-Teaching Staff	8 Nos.
12.	Office Chairs	8 Nos.
13.	Visiting Chairs for Office	16 Nos.

(ANNEXURE-E)

Budgetary Provision for the Centre

Recurring Expenditure: The tentative expenditure incurred on the salary expenses is calculated to Rs. 1,20,00,000/- (Rupees. One Crore Twenty-Lacs) 6nly.

Non-recurring Expenditure: The tentative expenditure incurred on the procurement of furniture is calculated to Rs. 25,00,000/- (Rupees. Twenty-Five Lacs) only

The total estimated project cost is for Rs 7.65/- Crores and the implementation of the project is proposed in two parts:

This estimated cost of this project proposal acts as initial seed money for strengthening of the existing infrastructure of Networking and Wi Fi and set of the Centre of AI on CPS. Once the initial set-up is ready, we will obtain secondary funding from agencies like DRDO, MeitY, DST and others.

Estimated Cost for Part 1: (Rs.3.24 Crores)

This will cover the strengthening of existing centralized networking facility which consists of mainly three

parts such as networking, software's and Web services.

Estimated Cost for Part 2 (Rs.4.41 Crores)

The implementation plan for Part -2 of the Centre for AI on CPS covers the various application area whose can be taken care by the AI & CPS.

(ANNEXURE-E)

Budgetary Provision for the Centre

Recurring Expenditure: The tentative expenditure incurred on the salary expenses is calculated to Rs. 1,20,00,000/- (Rupees. One Crore Twenty-Lacs) only.

Non-recurring Expenditure: The tentative expenditure incurred on the procurement of furniture is calculated to Rs. 25,00,000/- (Rupees. Twenty-Five Lacs) only.

The total estimated project cost is for Rs 7.65/- Crores and the implementation of the project is proposed in two parts:

This estimated cost of this project proposal gets as initial seed money for strengthening of the existing infrastructure of Networking and Wi Fi and set of the Centre of AI on CPS. Once the initial set-up is ready, we will obtain secondary funding from agencies like DRDO, MeitY, DST and others.

Estimated Cost for Part 1: (Rs.3.24 Crores)

This will cover the strengthening of existing centralized networking facility which consists of mainly three

parts such as networking, software's and Web services.

Estimated Cost for Part 2 (Rs.4.41 Crores)

The Implementation plan for Part -2 of the Centre for AI on CPS covers the various application area which can be taken care by the AI & CPS.

Office In-Charge: Dean of Studies
Office: Dean of Studies

Item No. :- 7 To place before the Academic Council, the matter regarding creation of centre "Pahadi Culture & Heritage" in H.P. University to preserve, celebrate, and revitalize the rich and diverse cultural Heritage of the Pahadi, before they are lost.

Proposal for Centre for *Pahāḍī* Culture & Heritage

Explanatory Note:-

Apropos of the NEP 2020- MERU mandate, it is submitted that a Centre may be established to study, gather, protect, interpret, present, and represent the culture and preserve the heritage of the Pahari people, including, but not limited to, oral traditions, performing arts, social and religious practices, rituals, festive events, and traditional craftsmanship.

NEP 2020-MERU strongly emphasises integrating Indian culture and heritage into the education system. It aims to foster a sense of cultural awareness, pride, and identity among students by promoting indigenous knowledge systems, languages, arts, and cultural practices. It also encourages experiential learning through local contexts, promoting multilingualism and ensuring education is relatable and relevant to students' lives. Accordingly, the matter is submitted before the Academic Council for kind consideration and such decision as may deem fit in the matter.

Purpose of the Centre

The Pahāḍī communities are a vital part of India's rich cultural tapestry. They have unique traditions, languages, and ways of life that contribute significantly to the country's diversity. However, these communities face numerous challenges, including modernization, economic hardships, and the struggle to preserve their cultural identities. The centre shall study its cultural heritage, social structures, and economic practices, while also addressing the challenges they encounter and the paths toward sustainable development. These pahāḍī have a unique cultural heritage, intertwined with their indigenous socio-cultural and religious fabrics. Although the influence of outside elements is noticeable, a significant part of 'pahāḍī culture' continues with little influence from outside. These include the myriad of socio-religious observances. Many appear to be variations on local deviations from pan-Indian norms, but many are of a different order. They supplement great traditional rituals but all are not derived from them.

Point for Consideration :-

Centre for *Pahāḍī* Culture & Heritage aims to gather, protect, interpret, present, and represent the culture and preserve the heritage of the Pahari people, including, but not limited to, oral traditions, performing arts, social and religious practices, rituals, festive events, and traditional craftsmanship.

(Dean of Studies)

File No. 609-1/2025/HPU (UIT)-
Dr. Mahesh Sharma
Assistant Professor
Department of Civil Engineering
University Institute of Technology, HPU Shimla

ITEM: 8 To place before the Academic Council, the matter for establishing the "Himalayan Centre for Disaster Risk Reduction and Resilience" (HIM-DR³) at Himachal Pradesh University for consideration and approval.

Explanatory Note:

Introduction

The Indian Himalayan Region—particularly Himachal Pradesh—faces an alarming rise in the frequency, intensity, and complexity of natural hazards, including landslides, flash floods, earthquakes, forest fires, and glacial lake outburst floods (GLOFs). In 2023 alone, the state experienced over 163 landslides and 72 flash floods, resulting in more than 400 fatalities and economic losses exceeding ₹12,000 crore. The region also lies in high seismic Zones IV and V, as illustrated by the 1905 Kangra earthquake (~M7.8), which claimed over 20,000 lives. Adding to these threats is the increasing occurrence of ground subsidence, which introduces a major element of uncertainty into mountain safety and infrastructure planning—often driven by geological vulnerabilities, unregulated construction, and climate impacts. According to estimates, disasters cost the Indian economy nearly 2% of its GDP annually—making a compelling case for a systematic shift toward disaster preparedness, mitigation, recovery, and adaptive planning as the pillars of resilient development.

In this context, it is proposed to establish the Himalayan Centre for Disaster Risk Reduction and Resilience (HIM-DR³)—an interdisciplinary academic and research hub dedicated to comprehensive disaster risk reduction, resilience, mitigation, and management. The Centre will focus on delivering sustainable, engineering-based solutions tailored to the Himalayan region, including terrain stabilization, slope protection, and nature-based bioengineering techniques for erosion control and ecological restoration. A flagship component will be the Geotechnical and Infrastructure Research and Testing Facility (GIRTF), designed to simulate real field conditions—such as rainfall events, seismic stress, and climatic variability—to assess structural safety and materials performance. In addition to its technical capacity, the Centre will enable large-scale socio-economic impact assessments, vulnerability studies, and provide a foundation for high-value research and consultancy projects. Through third-party testing, policy advisory, and collaboration with agencies like BRO, NHIDCL, SJVN, HPPWD, and CPWD, the facility will also serve as a strategic revenue-generating and knowledge-transfer platform.

Aligned with national mandates under NDMA, NIDM, and UGC, and global frameworks such as the Sendai Framework for Disaster Risk Reduction and the National Education Policy (NEP) 2020, HIM-DR³ will also offer a comprehensive academic portfolio at the Ph.D., postgraduate, undergraduate, diploma, and certificate levels. These programs will span a range of disciplines—from engineering, earth sciences, and environmental studies to public health, disaster governance, and climate analytics. HIM-DR³ will position Himachal Pradesh University as a premier knowledge institution advancing disaster preparedness, mitigation, recovery, and adaptive planning in the Indian Himalayan Region.

Justification for the Centre

Himachal Pradesh University (HPU), Shimla, offers the ideal ecosystem to host a multidisciplinary Centre for Disaster Risk Reduction, Resilience, Mitigation, and Management. With its established academic expertise across Environmental Science and Sustainable Studies, Engineering and Technology, Social and Physical Sciences, Management, Public Policy, and Law—and its strategic location in the state capital—HPU is well-positioned to lead research, policy support, technical consultancy, and capacity-building efforts. The Centre will offer a wide range of academic programs at undergraduate, postgraduate, and doctoral levels, along with certified diploma and professional training modules, aligned with the National Education Policy (NEP) 2020 and guidelines issued by UGC, NDMA, and NIDM. It will also house a state-of-the-art **Geotechnical and Infrastructural Research and Testing Facility (GIRTF)** for terrain stability assessments, resilient infrastructure design, and third-party consultancy services. The Centre will further enhance technical skills and digital competencies of students by organizing hands-on workshops, certified courses, and expert-led programs, empowering them to pursue employment in industries and government sectors or launch their own startups. Under the mentorship of university faculty, students from HPU and affiliated colleges will be encouraged to innovate and build entrepreneurship ventures aligned with disaster resilience and climate adaptation. Additionally, the Centre will directly contribute to job creation and provide a trained workforce for emerging startups and state-led initiatives. Functioning as a national-level think tank, the Centre will support evidence-based governance and advance India's commitments under national and international disaster risk reduction and climate adaptation frameworks.

Detailed Project Proposal is attached herewith at Annexure-A for the perusal of the Academic Council. Further for carrying out regular Monitoring and Evaluation of the Centre for AI on cyber physical system an Advisory board as well as Executive and Monitoring board has been proposed which is attached as Annexures -B & C for the perusal of the Academic Council. The necessary amendment/addition, if any, in Statutes and Ordinances of the University will be proposed by the said body and submitted for consideration/approval of the competent bodies/authorities of the University, from time to time.

Courses Proposed at the Centre: The Himalayan Center for Disaster Risk Reduction will offer a short term (up to six-months) Certificate Course on Disaster Risk Reduction (DRR), Disaster Risk Governance, Climate Resilience, and an introductory certificate course on Community-Based Disaster Management in the initial stage. After successfully running these short-term courses, the Centre plans to launch a one-year Postgraduate Diploma in Disaster Management, Disaster Risk Reduction and a two-year MA/M.Sc. in Disaster Risk Reduction and Disaster Management, and a Ph.D. in Disaster Risk Reduction, Resilience and Management in line with the National Education Policy (NEP) 2020 and UGC guidelines.

The certificate courses can be initiated from the current academic session with the help of expert lectures from university faculty members and by engaging external resource persons. The detail of the manpower (Teaching, Technical and a Ministerial Staff) is as follow:

Teaching Post (Category-A)

Sr.No.	Name of the Post & Pay Scale	No. of Post	Qualification	Eligibility
1.	Professor Pay Matrix Academic Level 14- (Rs. 1,44,200-2,18,200)	01 (Civil Engineering)	• B.Tech. in Civil Engineering • M.Tech. in Building Engineering and Disaster Mitigation/Geotechnical Engineering/Environmental/ Structural Engineering or relevant branch • Ph.D. in Building Engineering and Disaster Mitigation/Geotechnical Engineering/Environmental/ Structural Engineering or relevant branch	As per AICTE Norms
2.	Associate Professor Pay Matrix Academic Level 13A- (Rs. 1,31,400-2,17,100)	01 (Geography/Remote Sensing/GIS/ Geology). 01 (Civil Engineering)	• Master's Degree in a relevant subject • Ph.D. Degree in the relevant/allied discipline (Remote Sensing, GIS, Geoinformatics, Geography, Geology, or equivalent field). • B.Tech. in Civil Engineering • M.Tech. in Remote Sensing/GIS/Building Engineering and Disaster Mitigation/Geotechnical Engineering/Environmental/ Structural Engineering or relevant branch • Ph.D. in Building Engineering and Disaster Mitigation/Geotechnical Engineering/Environmental/ Structural Engineering or relevant branch	As per UGC Norms As per AICTE Norms
3.	Assistant Professor Pay Matrix Academic Level 10- (Rs. 57,700 1,82,400)	04 (One post in each discipline) i Civil Engineering ii Geology iii Computer Science Engineering/Information Technology iv Geography	• B.Tech./MTech. in Civil Engineering • Master's degree in Geology / Applied Geology / Earth Sciences • B.E./B.Tech. and M.E./M.Tech. in CSE / IT or related branch • Master's degree in Geography / Disaster Studies / Remote Sensing	As per AICTE /UGC Norms

Technical Staff (Category -B)

Post	No. of Posts	Pay Scale	Minimum Qualification
Technical Officer	1	Level 7 (₹44,900–1,42,400)	B.E./B.Tech./M.Tech. in Civil Engineering
Lab Technician	2	Level 5 (₹29,200–92,300)	Diploma in Civil Engineering
Lab Attendant	2	Level 1 (₹18,000–56,900)	10+2 / ITI in relevant field (Civil/Electrical/Mechanical)

The essential non-teaching (ministerial) staff required for the functioning of the Himalayan Centre for Disaster Risk Reduction and Resilience (HIM-DR²) may be deployed from the existing staff by Himachal Pradesh University.

Non-Teaching (Class-C & D) Post

Sr. No.	Name of the post	No. of Post
1.	Junior Office Assistant (IT), JOA-IT	1 No.
2.	Peon	1 No.

Annexure-A

Himachal Pradesh University
"NAAC Accredited "A" Grade University"
Summer Hill, Shimla-5 (H.P.)

A

Proposal

for the establishment of the

Himalayan Centre for Disaster Risk Reduction and Resilience

(HIM-DR^3)

at

Himachal Pradesh University, Summer Hill, Shimla

Submitted by:

Dr. Mahesh Sharma
Department of Civil Engineering
Himachal Pradesh University, Shimla
Date: June, 2025

The infrastructure requirements are detailed in **Annexure-D**, and the budgetary provisions are provided in **Annexure-E** for the kind perusal of the Academic Council.

In view of the above, the proposal for the establishment of the Himalayan Centre for Disaster Risk Reduction and Resilience (HiM-DR³)—along with the creation of a Geotechnical and Infrastructural Research and Testing Facility provided in **Annexure-F**), formation of an Advisory Board and an Executive and Monitoring Board, the initiation of Certificate, Diploma, and Degree Programmes, and the provision of necessary manpower, financial resources, and infrastructure—is hereby submitted before the Council for consideration, approval, and such decision as it may deem fit.

POINT FOR CONSIDERATION:

1 To consider and approve the matter to establish a "Himalayan Centre for Disaster Risk Reduction and Resilience", Advisory board as well as Executive and Monitoring board of the same, six months certificate course, one-year diploma & two-year master degree and Doctoral degree programme in the Centre with necessary funds and infrastructure as outlined in the above-mentioned Annexures.

2 To consider and approve the matter to create a Geotechnical and Infrastructural Research and Testing Facility (GIRTF) under the Himalayan Centre for Disaster Risk Reduction and Resilience.

3.To consider and approve the matter for creation of post of Professor- 1 No., Associate Professor- 02 Nos., Assistant Professor- 04 Nos., Technical Staff-5 Nos. to support the teaching, research, and training activities of the Centre.

(Dr. Mahesh Sharma)

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1. Introduction

The Indian Himalayan Region (IHR) is among the most disaster-prone areas in the world, characterized by young geology, steep terrain, and extreme climatic variability. Himachal Pradesh and neighboring mountain states face frequent landslides, flash floods, earthquakes, forest fires, and emerging threats like glacial lake outburst floods (GLOFs). In 2023, Himachal Pradesh suffered unprecedented monsoon calamities: 163 landslides and 72 flash floods triggered by intense rains killed over 400 people and caused economic losses exceeding ₹12,000 crore. The following spring (2024) saw a record 2,700+ forest fires that scorched about 23,000 hectares of forest. These figures underscore a stark reality – disasters in the Himalayas are growing in frequency and intensity, amplified by climate change and environmental stress. The region is also highly seismic (Zone IV/V); historically, the 1905 Kangra earthquake (~M7.8) killed over 20,000 people and levelled 100,000 buildings in Himachal Pradesh. Such events could recur, making scientific preparedness and mitigation in the Himalayas absolutely critical.

Despite this vulnerability, there is a critical gap in local research, training, and institutional capacity on disaster management in the Himalayan region. Few dedicated centres exist nationally (mostly in IITs or central universities), and none in Himachal Pradesh. As a result, hazard mapping, risk assessment, early warning systems and community-based disaster risk reduction (DRR) efforts in mountain areas remain limited. Local engineers and officials often must rely on external agencies for specialized training (e.g. landslide mitigation, earthquake-resistant design). Establishing a Centre at Himachal Pradesh University (HPU) directly addresses this gap by generating region-specific knowledge (e.g. Himalayan landslide mechanics, GLOF risk in glacial lakes, forest fire ecology in Western Himalayas) and by building a local cadre of experts in disaster management and climate adaptation.

The proposed Himalayan Centre for Disaster Risk Reduction and Resilience (HIM-DR^3) would be the first of its kind in the Western Himalayas, leveraging HPU's multidisciplinary environment and regional presence. HPU, as a leading state university in the western Himalayan region, is ideally positioned to host this Centre. With more than 10 diverse faculties and over 50 academic departments spanning disciplines such as Physical Sciences, Environmental Sustainability &

Development Studies, Engineering & Technology, Law, Social Sciences, Humanities, Commerce, and Management, HPU offers a rich multidisciplinary ecosystem essential for advancing disaster risk reduction and management (DRRM). The University currently serves over 1 lakh students, providing an unparalleled platform for large-scale capacity building, awareness generation, and grassroots outreach. By hosting the HIM-DR^3, HPU would enhance its academic profile and fulfil its social mandate – emerging as a pioneer knowledge hub for mountain hazard mitigation. The academic vision of the proposed Himalayan Centre for Disaster Risk Reduction and Resilience (HIM-DR^3) is firmly aligned with the National Education Policy (NEP) 2020, which advocates for multidisciplinary, flexible, and socially relevant higher education. In accordance with NEP's emphasis on integrating scientific, technological, and policy-oriented knowledge for national development, the Centre will offer certified academic programs at multiple levels—including Ph.D., Postgraduate (PG), and Postgraduate Diploma (PGD) courses. These programs will span diverse domains such as Engineering and Technology, Social Science, Environmental Sciences, climate change, geotechnical engineering, disaster law, public health, Tourism and data-driven risk analytics etc., reflecting a holistic and applied pedagogical approach. The Centre's curriculum will promote field-based learning, research integration, and community engagement, thereby operationalizing NEP 2020's call for multidisciplinary institutions that produce skilled professionals and thought leaders equipped to address complex societal and environmental challenges.

The Centre would attract research funding and consultancy projects, generate revenue through its testing services, and forge high-profile collaborations, thereby **boosting HPU's standing** in national research rankings. In effect, the University would gain a state-of-the-art interdisciplinary facility that enriches its curriculum, provides hands-on opportunities to students, and contributes tangible solutions to regional problems. This aligns with HPU's vision of community-centric education and will position the University as a **leader in disaster and climate studies in North India.** Establishing the HIM-DR3 is also **timely and strategic.** Climate change is already shifting the Himalayan risk landscape – glaciers are retreating, weather patterns are erratic, and new hazards (like GLOFs and long droughts) are

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emerging file. Mountain communities dependent on climate- sensitive livelihoods (agriculture, horticulture, hydropower) are increasingly vulnerable.

A dedicated Centre focused on **climate change adaptation and disaster risk reduction** will help the region cope with phenomena such as cloudburst-triggered floods, forest fires from prolonged heat, and water scarcity from vanishing glaciers. Furthermore, the initiative aligns with India's policy mandates and international frameworks. The Sendai Framework for Disaster Risk Reduction (2015–2030) calls for strengthening technical-scientific capacity and academic collaboration on DRR, while the Prime Minister's **Ten-Point Agenda for DRR** explicitly urges greater involvement of universities in disaster research, education, and public awareness. The National Disaster Management Authority (NDMA) and National Institute of Disaster Management (NIDM) have identified training, research, and policy support as core needs under the DM Act 2005. Yet these goals demand strong regional centers to implement them. HIM-DR3 at HPU will fulfil this role for the Western Himalayas, acting as an academic arm to support national DRR efforts at the grassroots and informing state policy. It will also support the National Action Plan on Climate Change – particularly the missions on **Sustaining the Himalayan Ecosystem** and **Strategic Knowledge for Climate Change** – by building institutional capacity in a critical mountain state. Importantly, the Centre draws inspiration from successful models like **IIT Roorkee's CoEDMM** (India's first disaster research centre, established 2006) and **IIT Guwahati's CDMR** (established 2020 for the Northeast). These institutes demonstrate how dedicated centers can advance multi-disciplinary research, education, and innovation in DRR. The HIM-DR3 will adopt a hybrid approach – combining cutting-edge technical innovation (as in IITs) with community- and policy-oriented research (as in JNU's disaster research center) - tailored to a state university context file. This ensures HPU's Centre becomes not only a hub of academic excellence but also a **driver of practical risk reduction** on the ground across Himachal and the broader IHR.

In summary, the need for HIM-DR^3 is compelling. It arises from escalating disaster risks in the Himalayas, the pressing challenges of climate change, gaps in local capacity, and strong policy imperatives. By establishing this Centre at HPU, we seize a crucial opportunity to save lives and reduce losses through better risk knowledge,