



IIT Mandi iHub & HCl Foundation
Technology in Harmony with Human Needs

IIT Mandi iHub & HCl Foundation

Section 8 Not-for-Profit Company

Technology Innovation Hub (TIH) in Human-Computer Interaction (HCl)

Regd. Office: Indian Institute of Technology Mandi, VPO Kamand, Mandi, Himachal Pradesh, India – 175075

**EXPRESSION OF INTEREST(EOI)
FOR
SKILL DEVELOPMENT TRAINING PARTNERSHIP**

EOI Ref No: iHub/EOI/2025-26/04

Dated: January 21, 2025

EOI Document can be downloaded from following websites:

www.ihubiitmandi.in

E-mail Address:

Avnish@ihubiitmandi.in

Address to:

**General Manager
iHub and HCl Foundation
North Campus, IIT Mandi
Salgi Mandi,
Himachal Pradesh
175005**

Workplace: IIT Mandi iHub and HCl Foundation Office, North Campus, IIT Mandi, VPO Kamand, District Mandi, Himachal Pradesh - 175075

Email: tih@ihubiitmandi.in | **Website:** <https://www.ihubiitmandi.in> | **CIN:** U73100HP2020NPL008102

Regd. Office: Indian Institute of Technology Mandi, VPO Kamand, Mandi, Himachal Pradesh, India – 175075

EXPRESSION OF INTEREST (EOI)

Dated: January 21, 2025

EOI Ref No: iHub//EOI/2025-2026/04

Expression of Interest (EOI) for skill development training partnership.

IIT Mandi iHub and HCl Foundation is a Technology Innovation Hub (TIH of IIT Mandi). It is focused on Human-Computer Interaction (HCl). It is set up by the Indian Institute of Technology (IIT) Mandi under India's National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS).

The vision of IIT Mandi iHub and HCl Foundation is to be an internationally recognised Hub that nurtures HCl research and enables technology translation for industry and skill development.

IIT Mandi iHub and HCl Foundation has been actively involved in skilling youth across the various regions in India. To expand the reach and impact of this initiative, iHub is seeking partners to deliver skill development training programs in locations outside the IIT Mandi campus on an Opex model of costing.

Interested parties / eligible and competent service providers/agencies, meeting the eligibility criteria as per EOI document may submit their offer in prescribed application form under two bid systems.

The important information and schedule related to EOI:

Date of Issue/Publishing	Jan 21,2025
Start date and time of submission of bids	Jan 22,2025
Last date and time for submissions of bids	Feb 06,2025 up to 5:00pm
Date and time of opening of EOI/ Technical bid	Feb 07,2025 at 3:00pm
EOI processing fee (Non-refundable)	Nil
Cost of EOI document / Registration fee	Nil
Place of submission of EOI	IIT Mandi iHub and HCl Foundation, North Campus Near Mind Tree School Salgi, Mandi Himachal Pradesh 175005
No. of covers (two bid system)	02
Bid validity	90 days from the last date of submission of bids
Contact details	Mansi Pathania
Mobile	8988563800
E-mail Id	Mansi@ihubiitmandi.in

Workplace: IIT Mandi iHub and HCl Foundation Office, North Campus, IIT Mandi, VPO Kamand, District Mandi, Himachal Pradesh - 175075

Email: tih@ihubiitmandi.in | **Website:** <https://www.ihubiitmandi.in> | **CIN:** U73100HP2020NPL008102



IIT Mandi iHub & HCl Foundation
Technology in Harmony with Human Needs

IIT Mandi iHub & HCl Foundation

Section 8 Not-for-Profit Company

Technology Innovation Hub (TIH) in Human-Computer Interaction (HCl)

Regd. Office: Indian Institute of Technology Mandi, VPO Kamand, Mandi, Himachal Pradesh, India – 175075

Location	IIT Mandi iHub and HCl Foundation.
----------	------------------------------------

Note: The applicants are requested to read the EOI document carefully and ensure compliance with all instructions herein. Non-compliance with instructions in the document may disqualify the applicants.

General Manager

Signature & Stamp of Bidder:

.....

Date:

Signature & Stamp of Bidder:

.....

Date:

Workplace: IIT Mandi iHub and HCl Foundation Office, North Campus, IIT Mandi, VPO Kamand, District Mandi, Himachal Pradesh - 175075

Email: tih@ihubiitmandi.in | **Website:** <https://www.ihubiitmandi.in> | **CIN:** U73100HP2020NPL008102

Background:

1. IIT Mandi iHub and HCl Foundation is a Technology Innovation Hub (TIH of IIT Mandi). It is focused on Human-Computer Interaction (HCl). It is set up by the Indian Institute of Technology (IIT) Mandi under India's National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS). The vision of IIT Mandi iHub and HCl Foundation is to be an internationally recognised Hub that nurtures HCl research and enables technology translation for industry and skill development.
2. IIT Mandi iHub and HCl Foundation is operating from IIT Mandi, North campus, located in Mandi, Himachal Pradesh, 175005.
3. IIT Mandi iHub and HCl Foundation invite potential partners to submit **Expression of interest (EOI) for a Skill development training program**. We are seeking budgetary proposals from partners who can deliver effective and innovative skill development training.

Requirements of IIT Mandi iHub and HCl Foundation:

1. **Location:** Pan India.
2. **Skill Courses:** The training programs should focus on the following domains:
 - **AI/ML/IoT:**
 - 3D Printing: Design and Development Fundamentals (**Curriculum as per Annexure-V**)
 - Introduction to IoT Application Development for Smart City (**Curriculum as per Annexure-VI**)
 - Introduction to IoT Application Development for Agriculture (**Curriculum as per Annexure-VII**)
 - AR/VR Development (**Curriculum as per Annexure-VIII**)
 - Model Smart IoT Systems (**Curriculum as per Annexure-IX**).
3. **Number of students:**
 - The target is to train a minimum of 1000 students pan India from February to May 2025.
 - The enrollment for the last batch is acceptable until **March 31, 2025**.
 - Enrollment after March 31, 2025, will be subject to approval by iHub.
 - The number of students can be increased based on the training capacity of the partner, with prior approval from iHub.
4. **Student composition:**
 - At least **50% of the students** must be from the Scheduled Castes (SC) category.
 - The remaining students can be from the general category/other categories.
5. **Placement:** The partner should make every effort to place all certified students within 90 days of certification.
6. **Reporting:** Partner should retain all documents pertaining to the project for 12 months after the project closure.
7. **Students' Qualifications:**
 - For **AI/ML/IoT:** Undergraduate and postgraduate students.

Regd. Office: Indian Institute of Technology Mandi, VPO Kamand, Mandi, Himachal Pradesh, India – 175075

8. Minimum Age of Students: 18 years

9. Classrooms:

- Adequate, fully furnished classrooms equipped with tables, chairs, and basic teaching equipment (such as whiteboards, projectors, or screens).
- Each room should comfortably accommodate at least **30 participants**.

10. Faculty Requirements:

- **Educational Qualification:** B.Tech/MCA/Relevant NSQF Qualification.
Qualified Trainers: Trainers must meet the minimum qualifications as defined by NIELIT and/or iHub as applicable.

11. Supporting Infrastructure: The facility should include restrooms, a lounge or break area for staff and trainees, and secure storage for equipment.

12. Payment from iHub to Partner: Partners must submit their quotes as per the format in **Annexure-III**.

13. Fee Structure:

- **SC Students:** No fees.
- **General Category/Other Categories Students:**
 - Fee structure to be mutually agreed upon and collected in advance.
 - Fees collected from general category/other categories students must be transferred to iHub's designated bank account at intervals defined by iHub.

14. Payment Terms:

- **30%** on enrollment.
- **30%** on 50% completion of the session plan.
- **30%** on certification.
- **10%** retention amount, to be paid upon full documentation and batch closure.

Payment will be applicable only to certified students. For non-certified students, the amounts disbursed against 'enrollment' and '50% completion of the session plan' will be deducted from the final payment at the time of disbursement of the certification amount.

Evaluation Process: Proposals will be evaluated based on:

1. Training capacity.
2. Financial feasibility and transparency.
3. Experience in conducting similar training programs.

Terms & conditions:

1. IIT Mandi iHub reserves the right to verify the capabilities of the partner before awarding the contract.
2. The Partner must be registered in accordance with the Indian Companies Act of 2013.
3. If the Partner is a Section 8 company under the Companies Act of 2013, it must possess a unique Darpan portal ID.
4. Startups that have received recognition from DPIIT (Department for Promotion of Industry and Internal Trade) and MSMEs (Micro, Small, and Medium Enterprises) associated with Atma Nirbhar Bharat are encouraged to take part.

Workplace: IIT Mandi iHub and HCl Foundation Office, North Campus, IIT Mandi, VPO Kamand, District Mandi, Himachal Pradesh - 175075

Email: tih@ihubiitmandi.in | **Website:** <https://www.ihubiitmandi.in> | **CIN:** U73100HP2020NPL008102

Regd. Office: Indian Institute of Technology Mandi, VPO Kamand, Mandi, Himachal Pradesh, India – 175075

5. The partner must have been established for at least five years at the time of submitting the project proposal to IIT Mandi iHub.
6. The partner should possess a minimum of two years of experience.
7. Experience should specifically relate to skill development in advanced technologies as outlined in the EOI.
8. Preference will be given to those with experience in executing skill development projects for government initiatives, of value exceeding INR 50 Lakhs.
9. Preference will also be given to those who have experience in skill development projects aimed at marginalized communities, of value exceeding INR 50 Lakhs.
10. The Partner must be capable of delivering training in the local language, if necessary.
11. The decision of IIT Mandi iHub and HCl Foundation will be final in case of any dispute arising in the implementation of the terms of the contract.
12. The timeline to onboard a partner is one year. However, the engagement may be extended on a year-to-year basis, based on need and mutual agreement.
13. If the partner fails to provide the agreed services or does not meet the required standards, IIT Mandi iHub reserves the right to terminate the contract with one-month prior notice.
14. A penalty of up to 10% of the total contract value may be imposed for non-performance, delays, or failure to meet training quality standards.
15. Persistent non-compliance or failure to rectify issues within the notice period will result in immediate termination of the contract.
16. The partner must provide detailed reports on training completion and certification for each student.
17. Payment terms are as follows:
 - 30% on enrollment.
 - 30% on 50% completion of the session plan.
 - 30% on certification.
 - 10% retention amount, to be paid upon full documentation and batch closure.

Payment will be applicable only to certified students. For non-certified students, the amounts disbursed against 'enrollment' and '50% completion of the session plan' will be deducted from the final payment at the time of disbursement of the certification amount.

Preparation and submission of application

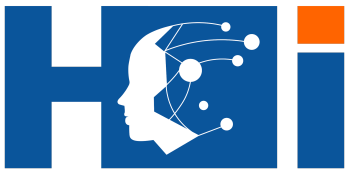
The applicants are advised to go through the EOI documents in detail and understand the requirement and terms & conditions specified therein before submitting the tender.

Both the bids (**Technical and Financial**) duly signed by the authorised signatory should be submitted in two separate sealed envelopes as described below:

Envelope 1: Containing technical bid in **Annexure-I** duly completed in all respects along with all relevant documents, duly signed and stamped by authorised signatory on each page of technical bid and relevant documents and should be super-scribed in bold letters with the statements: **“Technical bid for Skill development training partnership”**.

Workplace: IIT Mandi iHub and HCl Foundation Office, North Campus, IIT Mandi, VPO Kamand, District Mandi, Himachal Pradesh - 175075

Email: tih@ihubiitmandi.in | **Website:** <https://www.ihubiitmandi.in> | **CIN:** U73100HP2020NPL008102



IIT Mandi iHub & HCl Foundation
Technology in Harmony with Human Needs

IIT Mandi iHub & HCl Foundation

Section 8 Not-for-Profit Company

Technology Innovation Hub (TIH) in Human-Computer Interaction (HCl)

Regd. Office: Indian Institute of Technology Mandi, VPO Kamand, Mandi, Himachal Pradesh, India – 175075

Envelope 2: Containing the financial bid, as prescribed in the **Annexure-III** and should be super-scribed in bold letters with the statements: “**Financial for Skill development training program**”. Finally, the above-mentioned envelopes should be kept in a single sealed cover/envelop super-scribed in bold letters with the statements – “**Application for Skill development training partnership**” and to be submitted at:

General Manager

IIT Mandi iHub and HCl Foundation
North Campus IIT Mandi
Salgi, Mandi
Himachal Pradesh
175005

Following documents to be submitted along with the technical bid:

1. Letter for acceptance of terms & conditions of EOI document as per **Annexure-II**.
2. The technical bid should be accompanied by a copy of this EOI document with each page duly signed by the authorized signatory of the applicants, who has signed the application, as token of having read, understood and complied with EOI, the terms & conditions contained herein. Applications not accompanied by a duly signed copy of the EOI document will not be considered.
3. All the requisite information should be filled up in prescribed form and the filled-up application form, relevant information and required document should be clearly readable and all the pages of the document should be signed by authorized signatory.
4. Applications must reach on or before the closing time and date as indicated in the beginning of this document. Any application received after closing date/time shall not be considered. Applications received by **REGISTERED POST/SPEED POST/COURIER** are accepted. Applications received by any other mode like **FAX/E-MAIL etc.** will not be accepted. The IIT Mandi iHub and HCl Foundation will not be responsible for any postal delay.
5. The IIT Mandi iHub and HCl Foundation shall not be responsible for misplacement, loosing or premature opening of the outer envelope if not sealed and/or marked as stipulated. This may be the reason for rejection of the bid. If the financial proposal is not submitted in a separate sealed envelope duly marked as indicated above, this will constitute grounds for declaring the proposal non- responsive.
6. **Bid validity:** The bid shall remain valid for a period of **90 days** from the last date of submission of proposal. In case the applicant withdraws, modifies or changes his offer during the validity period, application is liable to be rejected without assigning any reason thereof and the applicant may be barred for 3 years to participate against any tender / EOI / RFQ of IIT Mandi iHub and HCl Foundation.

Workplace: IIT Mandi iHub and HCl Foundation Office, North Campus, IIT Mandi, VPO Kamand, District Mandi, Himachal Pradesh - 175075

Email: tih@ihubiitmandi.in | **Website:** <https://www.ihubiitmandi.in> | **CIN:** U73100HP2020NPL008102

Regd. Office: Indian Institute of Technology Mandi, VPO Kamand, Mandi, Himachal Pradesh, India – 175075

7. Any changes / corrigendum/extension of closing/ opening dates in respect of this EOI shall be issued through IIT Mandi iHub and HCl Foundation **website only** and no **press notification will be issued in this regard. Applicants are therefore requested to regularly visit IIT Mandi iHub and HCl Foundation website for updates.**
8. The applicant shall bear all costs associated with the preparation and submission of the application and IIT Mandi iHub and HCl Foundation will in no case be held responsible or liable for these costs, regardless of the conduct or outcome of this submission of application process.
9. The IIT Mandi iHub and HCl Foundation reserves the right to consider/reject any such proposal without assigning any reason. In case of rejection of application, the decision of competent authority will be final, and binding and the party shall not be entitled to any compensation whatsoever for non-issue of work.

Application opening and evaluation

1. The applications would be evaluated based on the rates quoted by the service provider for the courses.
2. IIT Mandi iHub and HCl Foundation shall be under no obligation to accept the lowest quotation. However, the service should provide satisfying facilities /conveniences / utilities stated in the EOI documents may be considered in the interest of the organisation.
3. Non-fulfilment of any of the above terms shall result in rejection of the application.
4. IIT Mandi iHub and HCl Foundation reserves the right to visit a particular or all locations and reserves full right to choose any location and premises as suitable and may negotiate the rates as applicable.

General Manager
IIT Mandi iHub and HCl Foundation

Signature & Stamp of Bidder:

Date:

Workplace: IIT Mandi iHub and HCl Foundation Office, North Campus, IIT Mandi, VPO Kamand, District Mandi, Himachal Pradesh - 175075

Email: tih@ihubiitmandi.in | **Website:** <https://www.ihubiitmandi.in> | **CIN:** U73100HP2020NPL008102

Regd. Office: Indian Institute of Technology Mandi, VPO Kamand, Mandi, Himachal Pradesh, India – 175075

Annexure- I Technical bid

Dated: January 21, 2025

EOI Ref No: iHub/EOI/2025-2026/04

Sr.No.	Requisite information	Firms' response
01	Name of the service provider/agencies	
02	Full address of the service provider/agencies Telephone /Mobile No. E-mail ID.	
03	Registration of firm.	
04	CIN. PAN. GST certificate (if any).	
05	Prior Experience in executing skill development projects for government initiatives, of value exceeding INR 50 Lakhs.	
06	Prior Experience in skill development projects aimed at marginalized communities, of value exceeding INR 50 Lakhs.	
07	Qualifications and experience of Instructor.	
08	Whether agrees to abide by the terms & conditions of the EOI document? In the event of the award of the contract?	
09	Bank details	Beneficiary name: Account no: Bank name: Branch: IFSC code: MICR no: Type of account: (Saving/Current)
10	Payment terms agreed as specified in EOI documents.	

Signature & Stamp of Bidder:
Date:

Workplace: IIT Mandi iHub and HCl Foundation Office, North Campus, IIT Mandi, VPO Kamand, District Mandi, Himachal Pradesh - 175075

Email: tih@ihubiitmandi.in | **Website:** <https://www.ihubiitmandi.in> | **CIN:** U73100HP2020NPL008102



IIT Mandi iHub & HCl Foundation

Section 8 Not-for-Profit Company

Technology Innovation Hub (TIH) in Human-Computer Interaction (HCl)

Regd. Office: Indian Institute of Technology Mandi, VPO Kamand, Mandi, Himachal Pradesh, India – 175075

This is to certify that all the information stated above is true and correct to the best of my/our knowledge. I/We understand and accept the terms & conditions and further accept that if there is any suppression, fabrication and misstatement of facts in any form, will at once result in cancellation of my application and IIT Mandi iHub and HCl Foundation that reserves its rights to take such action as it may deem fit in such an eventuality.

(Signature of the authorized signatory)

Name of Signatory:

Date:

Name of the Service provider/Agencies:

Place:

Signature & Stamp of Bidder:

Date:

Workplace: IIT Mandi iHub and HCl Foundation Office, North Campus, IIT Mandi, VPO Kamand, District Mandi, Himachal Pradesh - 175075

Email: tih@ihubiitmandi.in | **Website:** <https://www.ihubiitmandi.in> | **CIN:** U73100HP2020NPL008102

Annexure-II Letter for acceptance of terms & conditions

To
General Manager,
IIT Mandi iHub and HCl Foundation
North campus, IIT Mandi,
Mandi, Himachal Pradesh
175005

Date:

Sub: Acceptance of terms & conditions of Expression of interest [EOI] for a Skill development training program.

Dear Sir/Ma'am,

I / We have downloaded / obtained the EOI document(s) for the above mentioned "EOI from the web site namely as per your notice given in the above-mentioned website.

1. I / We hereby certify that I / we have read the entire terms & conditions of the EOI documents (including all documents like annexure(s), schedule(s), etc.), which form part of the contract, and I / we shall abide hereby by the terms / conditions / clauses contained therein.
2. I / We hereby unconditionally accept the EOI conditions of above mentioned EOI document(s) / corrigendum(s) in its totality / entirely.
3. No employee or direct relation of any employee of IIT Mandi iHub and HCl Foundation is in any way connected as partner / shareholder / director / advisor / consultant / employee etc. with the agency / firm / company.
4. I / We certify that all information and data furnished, and attachments submitted with the application by our agency / firm / company are true & correct.
5. I / We are aware that if any information is found to be incorrect / untrue or found violated, then your department / organization shall without giving any notice or reason thereof summarily reject our bid or terminate our contract, without prejudice to any other rights or remedy including the forfeiture of the full said earnest money deposit / performance security absolutely.

Yours Faithfully,
(Signature of the applicant, with official seal)

Signature & Stamp of Bidder:

.....

Regd. Office: Indian Institute of Technology Mandi, VPO Kamand, Mandi, Himachal Pradesh, India – 175075

Date:

Annexure-III Financial bid

Dated: January 21, 2025

EOI Ref No: iHub//EOI/2025-2026/04

	Per student amount	Estimated no. of SC students	Estimated no. of SC students general category/Other Categories	Total amount
Training fee: 3D Printing: Design and Development Fundamentals				
Training fee: Introduction to IoT Application Development for Agriculture				
Training fee: Introduction to IoT Application Development for Smart City				
Training fee: AR/VR Development				
Training fee: Model Smart IoT Systems				
Total				

(Signature of the authorized signatory)

Name of signatory:

Date:

Name of the service provider(s)/agencies:

Place:

Workplace: IIT Mandi iHub and HCl Foundation Office, North Campus, IIT Mandi, VPO Kamand, District Mandi, Himachal Pradesh - 175075

Email: tih@ihubiitmandi.in | **Website:** <https://www.ihubiitmandi.in> | **CIN:** U73100HP2020NPL008102



IIT Mandi iHub & HCl Foundation

Section 8 Not-for-Profit Company

Technology Innovation Hub (TIH) in Human-Computer Interaction (HCl)

Regd. Office: Indian Institute of Technology Mandi, VPO Kamand, Mandi, Himachal Pradesh, India – 175075

Signature & Stamp of Bidder:

Date:

Annexure-IV

Dated: January 21, 2025

EOI Ref No: iHub//EOI/2025-2026/04

S.No.	Name of the bidder	Name and number of documents submitted	Remarks

Signature & Stamp of Bidder:

Date:.....

Workplace: IIT Mandi iHub and HCl Foundation Office, North Campus, IIT Mandi, VPO Kamand, District Mandi, Himachal Pradesh - 175075

Email: tih@ihubiitmandi.in | **Website:** <https://www.ihubiitmandi.in> | **CIN:** U73100HP2020NPL008102

Annexure-V

3D Printing: Design and Development Fundamentals:

This NOS offers an in-depth exploration of the fundamentals of design and additive manufacturing, with a focus on 3D printing technology. Participants will gain a comprehensive understanding of the significance of 3D printing across various industries. Practical aspects, such as modeling using software, slicing parameters, and operating a 3D printer, including parts identification, safety precautions, and troubleshooting techniques, will be covered. The program equips students with design, problem-solving, and entrepreneurship skills.

Elements and Performance Criteria:

1. PC1. Grasping the Impact: Gain a comprehensive understanding of how 3D printing is revolutionizing traditional manufacturing processes. Recognize its profound effects on speeding up production, customizing products, and reducing costs across various industries.
2. PC2. Knowing Your Tech: Develop familiarity with the diverse array of 3D printing technologies and materials available. Understand their respective strengths, applications, and limitations, particularly in sectors like healthcare and aerospace.
3. PC3. Getting the Design Right: Acquire proficiency in applying fundamental design principles to ensure the accuracy and aesthetic appeal of 3D models. Master concepts such as geometric shapes, planes, edges, and vertices to create precise and visually appealing designs.
4. PC4. Designing Smart: Learn to incorporate essential design considerations into your 3D modeling process. Understand factors like build volume, print orientation, bridging, support material, and overhangs to optimize the design for successful printing.
5. PC5. Slicing Like a Pro: Develop expertise in slicing techniques to prepare 3D models for printing. Learn to adjust settings such as infill density, layer height, and support structures to achieve optimal print quality and reliability.

Practical 3D Modeling and Printing:

6. PC6. Mastering the Software: Mastering the Software: Cultivate proficiency in using 3D modeling software to translate creative ideas into digital designs. Explore the full range of tools and features to manipulate shapes and structures with precision and efficiency. Approved in 38th Meeting of NSQC dated
7. PC7. Advanced Modeling Techniques: Explore advanced modeling techniques to overcome challenges in creating complex geometries and intricate details. Develop innovative solutions to push the boundaries of what can be achieved through 3D printing.

Regd. Office: Indian Institute of Technology Mandi, VPO Kamand, Mandi, Himachal Pradesh, India – 175075

8. PC8. Slicing Skills: Hone your skills in slicing models for printing, optimizing parameters to achieve desired outcomes. Fine-tune settings such as infill density, layer height, and support structures to ensure successful printing and minimize material wastage.
9. PC9. Printing Like a Pro: Gain practical experience in operating 3D printers effectively. Learn the nuances of printer setup, material handling, and troubleshooting techniques to address common issues and ensure smooth printing operations.

Annexure VI

Introduction to IoT Application Development for Smart City

The upskilling program “IoT Application Development for Smart City” will enable students to learn how to apply IoT concepts to solve real-life Smart City problems. Emphasis is placed on acquiring modern skill sets like problem solving, critical thinking and innovation with hands-on skills through applied learning and execution platform to provide a solid foundation. Students will learn to build solutions for the Smart City such as: -

1. Smart Parking System
2. Smart Train Coach
3. Smart Waste Management
4. Road Safety and Energy Saving System
5. Pollution control- Air Quality Monitoring
6. Gas Leak Alert and Monitoring for Industries
7. Grain distribution System - Structural Bridge Monitoring
8. Energy Monitoring and Management.

Elements and Performance Criteria Advanced Skills for Deploying and Managing Smart City IoT Solutions:

To be competent, the user/individual on the job must be able to:

1. PC1. Expertise in selecting communication protocols tailored to Smart City Industry IoT applications, considering factors such as reliability, scalability, and compatibility with existing infrastructure to ensure seamless connectivity and data exchange.
2. PC2. Proficiency in utilizing Cloud-based IoT services supporting the MQTT protocol, enabling efficient data processing, storage, and analysis in Smart City environments to derive actionable insights and enhance decision-making processes.
3. PC3. Ability to engineer industry-specific solutions that address real challenges encountered in Smart City environments, leveraging IoT technologies to optimize urban infrastructure, improve public services, and enhance overall quality of life for residents.
4. PC4. Strong analytical skills and troubleshooting capabilities to identify and resolve technical issues in Smart City IoT deployments promptly, ensuring the reliability, security, and performance of IoT systems in dynamic urban settings.

Workplace: IIT Mandi iHub and HCl Foundation Office, North Campus, IIT Mandi, VPO Kamand, District Mandi, Himachal Pradesh - 175075

Email: tih@ihubiitmandi.in | **Website:** <https://www.ihubiitmandi.in> | **CIN:** U73100HP2020NPL008102

Regd. Office: Indian Institute of Technology Mandi, VPO Kamand, Mandi, Himachal Pradesh, India – 175075

5. PC5. Utilization of web and mobile interfaces for IoT solution execution and monitoring in Smart City contexts, empowering stakeholders to access, control, and monitor IoT devices and applications remotely for efficient management and resource optimization.

Annexure VII

IoT Application Development for Agriculture:

The upskilling program IoT Application Development for Agriculture has been designed to enable students to learn how to apply concepts to solve real-life agriculture industry problems. Students will dive into the essentials of sensor technology and communication protocols, essential for modern agriculture. Students will learn to build industry solutions for the Agriculture Industry such as:

1. Smart Agriculture using Moisture Sensor and Pump
2. Smart Agriculture using Moisture Sensor, Solenoid and RTC
3. Smart Rain Detection and Foodgrain Protection
4. Smart Fence to Protect Crops
5. Water Management for Rural Areas
6. Scalable Irrigation using LoRa Protocol
7. Sustainable Farming using Hydroponics

This program is conducted with the help of cloud based IoT infrastructure which eliminates the need for experienced industry experts. Cloud based IoT infrastructure comprising of:

1. Circuit building software to assemble and connect all components required for the application. No-code block programming software tools to connect visual building blocks in a logical way.
2. Python Direct IDE
3. Content Knowledge base modules
4. Cloud based remote IoT application management using mobile interface.

Elements and Performance Criteria:

To be competent, the user/individual on the job must be able to:

1. PC1. Ability to select suitable communication protocols (e.g., LoRaWAN, USB, Bluetooth) for specific Agricultural IoT applications: - Understanding the requirements and constraints of agricultural environments to choose the most appropriate communication protocol for data transmission, considering factors like range, power consumption, and data rate.
2. PC2. Knowledge of Cloud-based IoT services supporting MQTT protocol: - Acquiring familiarity with cloud platforms that support MQTT (Message Queuing Telemetry Transport) protocol,

Regd. Office: Indian Institute of Technology Mandi, VPO Kamand, Mandi, Himachal Pradesh, India – 175075

enabling seamless integration of IoT devices with cloud infrastructure for data storage, analysis, and remote management in agricultural settings.

3. PC3. Capacity to develop industry-specific solutions addressing real challenges in Agriculture: - Demonstrating the ability to identify and address specific challenges faced in agriculture through the development of IoT solutions, such as precision farming, crop monitoring, and livestock management, to improve productivity, sustainability, and resource efficiency.
4. PC4. Strong analytical abilities and troubleshooting skills for IoT-related technical issues: - Possessing analytical skills to diagnose and troubleshoot technical problems that may arise in the deployment and management of agricultural IoT solutions, ensuring reliable operation and timely resolution of issues to minimize downtime and optimize performance.
5. PC5. Proficiency in utilizing web and mobile interfaces for IoT solution execution and monitoring: - Mastering the use of web and mobile interfaces to interact with and monitor IoT solutions deployed in agricultural environments, allowing for remote management, real-time data visualization, and informed decision-making for farmers and stakeholders.

Programming Proficiency for Agricultural IoT Development:

6. PC6. Proficiency in writing application programs using no-code block programming software tools: - Developing proficiency in using no-code block programming software tools to create application programs for agricultural IoT solutions, enabling rapid prototyping, iteration, and customization without the need for extensive coding expertise.
7. PC7. Acquisition of working knowledge in programming languages such as Python: - Gaining a working knowledge of programming languages like Python, essential for developing custom software components and scripts to enhance the functionality and intelligence of agricultural IoT applications, including data analysis, predictive modeling, and automation. Foundational Skills in Agricultural IoT:
8. PC8. Understanding the necessity of Agricultural IoT: - Recognizing the importance and relevance of Agricultural IoT in addressing critical challenges faced by the agriculture industry, such as increasing food demand, climate change, resource scarcity, and sustainability, by leveraging advanced technologies for data-driven decision-making and precision agriculture.
9. PC9. Familiarity with essential building blocks of IoT applications: - Understanding the fundamental components and principles of IoT applications in agriculture, including sensor technologies, communication protocols, data management techniques, and cloud integration, to design and deploy robust and scalable solutions tailored to agricultural needs.
10. PC10. Identification of necessary sensors and components for Agricultural Industry, such as Climate Sensor, IR Sensor, Motion Sensor, etc., and proficiency in designing functional circuits using circuit building software: - Identifying the appropriate sensors and components required for specific agricultural applications, such as climate monitoring, pest detection, and soil analysis, and designing functional circuits using circuit building software to integrate these sensors into IoT systems effectively, ensuring accurate data collection and actionable insights for farmers.

Workplace: IIT Mandi iHub and HCl Foundation Office, North Campus, IIT Mandi, VPO Kamand, District Mandi, Himachal Pradesh - 175075

Email: tih@ihubiitmandi.in | **Website:** <https://www.ihubiitmandi.in> | **CIN:** U73100HP2020NPL008102

Annexure-VIII

AR/VR Development (Duration:30hrs)

Objective:

This curriculum is designed to equip undergraduate and postgraduate students with the necessary skills and knowledge to excel in Augmented Reality (AR) and Virtual Reality (VR) development. The course emphasizes hands-on experience, fostering innovation and inclusivity in technology development.

Course Structure:

- **Introduction to AR/VR**
 - Overview of AR/VR technologies and their applications
 - History and evolution of immersive technologies
 - Current trends and future directions.
- **Fundamentals of AR/VR Development**
 - Understanding AR/VR hardware and software ecosystems
 - Key concepts: 3D modelling, spatial computing, and user interaction
 - Introduction to development platforms: Unity, Unreal Engine.
- **Designing Immersive Experiences**
 - Principles of user-centered design in AR/VR
 - Storyboarding and prototyping immersive experiences
 - Accessibility and inclusivity in AR/VR design.
- **Programming for AR/VR**
 - Essential programming languages: C#, C++, and JavaScript
 - Development tools and libraries: ARKit, ARCore, Vuforia
 - Hands-on coding sessions: building simple AR/VR applications.
- **Advanced Techniques in AR/VR**
 - Implementing artificial intelligence and machine learning in AR/VR
 - Multi-user and networked AR/VR experiences
 - Optimization techniques for performance and scalability.
- **Practical Workshop and Project Development**

Regd. Office: Indian Institute of Technology Mandi, VPO Kamand, Mandi, Himachal Pradesh, India – 175075

- o Students work in teams to develop a comprehensive AR/VR project
- o Iterative design process: feedback and refinement
- o Presentation and demonstration of final projects.

Assessment and Evaluation:

- Continuous assessment through quizzes and coding assignments
- Mid-term project proposal and presentation
- Final project submission and peer review.

Resources and Support:

- Access to AR/VR labs with cutting-edge equipment
- Online tutorials and community forums for ongoing learning
- Mentorship from industry professionals and academics.

Outcomes:

Upon completion, students will possess:

- Proficient skills in AR/VR development
- An understanding of the ethical implications and societal impact of immersive technologies
- The capability to innovate and create inclusive AR/VR applications that meet the needs of diverse users.

This curriculum aims to inspire the next generation of AR/VR developers, empowering them to shape the future of immersive technology with creativity and responsibility.

Annexure-IX

Model Smart IoT Systems

Duration	30 hrs
Theory + Practical	10 + 20
Description	This course is designed for students who have a basic understanding of probability and are ready to explore more AI and IOT concepts, including conditional probability. The course will cover the integration of AI and IoT technologies, practical applications, and the role of probability in decision-making. Through interactive lessons, hands-on projects, and real-world examples, students will enhance their knowledge and skills in these areas.
Learning Outcomes	<ul style="list-style-type: none"> • Have a deeper understanding of AI and IoT concepts and technologies like AI models and Chat GPT. • Be familiar with the applications of conditional probability in AI and IoT. • Develop problem-solving and critical thinking skills. • Gain practical experience in AI and IoT and project development. • Understand the ethical implications of AI and IoT. • Be able to develop and present a comprehensive AI or IoT-based project. • Understand Ethical use of AI and Electronics



IIT Mandi iHub & HCl Foundation
Technology in Harmony with Human Needs

IIT Mandi iHub & HCl Foundation

Section 8 Not-for-Profit Company

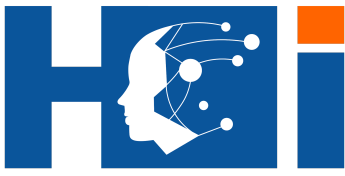
Technology Innovation Hub (TIH) in Human-Computer Interaction (HCl)

Regd. Office: Indian Institute of Technology Mandi, VPO Kamand, Mandi, Himachal Pradesh, India – 175075

<p>Curriculum Description</p>	<ul style="list-style-type: none">● AI Concepts Review of basic AI concepts and Chat GPT. Real-world Applications of AI Basic Concepts: Machine Learning, Neural Networks● IoT Technologies and Applications Overview of IoT architecture and components. IoT communication and data. Real-world applications of IoT in smart homes, healthcare, and industry.● Introduction to Conditional Probability Basic probability concepts. Understanding conditional probability and its applications. Examples of conditional probability in AI and IoT.● AI and IoT Integration Combining AI and IoT for smart solutions. Hands-on activities with AI and IoT tools. Building a simple AI-powered IoT project.● Ethics and Future of AI and IoT Ethical considerations in AI and IoT development. The future of AI and IoT and their potential impact. Discussion on responsible use of technology and AI Ethics.● AI, IoT, and Probability Project Group project: Develop an AI or IoT-based solution incorporating conditional probability. Project planning, execution, and presentation. Peer review and feedback session.
--------------------------------------	--

Workplace: IIT Mandi iHub and HCl Foundation Office, North Campus, IIT Mandi, VPO Kamand, District Mandi, Himachal Pradesh - 175075

Email: tih@ihubiitmandi.in | **Website:** <https://www.ihubiitmandi.in> | **CIN:** U73100HP2020NPL008102



IIT Mandi iHub & HCl Foundation
Technology in Harmony with Human Needs

IIT Mandi iHub & HCl Foundation

Section 8 Not-for-Profit Company

Technology Innovation Hub (TIH) in Human-Computer Interaction (HCl)

Regd. Office: Indian Institute of Technology Mandi, VPO Kamand, Mandi, Himachal Pradesh, India – 175075

Projects	<ol style="list-style-type: none"> 1. Probability and AI 2. Introduction to Electronic Components 3. Introduction to Microcontroller 4. Interface sensor with Microcontroller 5. LED blinking using Microcontroller 6. Create an App to read sensor data in realtime 7. Introduction to Conditional Probability 8. Naïve Bayes(one input feature) with one sensor 9. AI Bulb modelling 10. Smart Home in Arduino/ESP32: Serial I/O and One Sensor,LED 11. Digital Thermometer 12. Smart Trash Can 13. Smart door using App 14. Control LED Brightness with time of day 15. DIY World Clock and Weather Bot 16. Datalogging to Google Sheets 17. Create your own Intruder Detector 18. Create your own Wi-Fi router 19. Smart Irrigation System 20. IoT Based Water Level Indicator
Assessments	<ul style="list-style-type: none"> ● Participation in class activities and discussions. ● Completion of hands-on projects and coding challenges. ● Group project presentation and peer review.

Workplace: IIT Mandi iHub and HCl Foundation Office, North Campus, IIT Mandi, VPO Kamand, District Mandi, Himachal Pradesh - 175075

Email: tih@ihubiitmandi.in | **Website:** <https://www.ihubiitmandi.in> | **CIN:** U73100HP2020NPL008102