



**GOVERNMENT OF KARNATAKA**  
**VISION GROUP ON SCIENCE AND TECHNOLOGY**  
Karnataka Science and Technology Promotion Society  
Department of Electronics, Information Technology, Biotechnology and  
Science & Technology

Application No. **VRN/000192/20-21**

**A. GENERAL INFORMATION**

1	Scheme Applied (CESEM, CISEE, K-FIST L1 & L2 and RGS/F)	K-FIST L1 : Karnataka Fund for Infrastructure Strengthening in Science & Technology (K-FIST L1)
2	About the project	
a)	Title of the project	Establishment of Virtual and Physical Industrial Automation Laboratory
b)	Subject area as per instruction (Please refer serial No.26 under Annexure-II)	Electrical and Electronics Engineering
	Subject category area	Industrial Automation

3	Details of Principal Investigator	
a)	Name	Dr. Basavaraj Madiggond
b)	Date of Birth & Gender (Age as on 30/10/2019)	01/06/1970 ( Male )
c)	Qualification	Ph.D
d)	Designation	Professor & HoD
e)	Department	EEE
f)	Years of teaching/research experience	Teaching : 27.00 ; Research : 4.00
g)	Email ID	bvmadiggond.eee@hsit.ac.in
h)	Cell Number / Alternate Cell Number	9343454993 /
i)	Residential Address	C3, Professors' Quarters, HSIT Campus, Nidasoshi -591236
k)	Ph.D Degree holder	Yes
l)	Alternate Email ID	basavarajvma@gmail.com

4	Details of Co-Principal Investigator	
a)	Name	Onkar Heddurshetti
b)	Date of Birth & Gender (Age as on 30/10/2019)	03/03/1983 , Male
c)	Qualification	M.Tech
d)	Designation	Assistant Professor
e)	Department	Electrical and Electronics Engineering
f)	Years of teaching/research experience	Teaching : 14.00 ; Research : 0.00
g)	Email ID	obheddurshetti.eee@hsit.ac.in
h)	Cell Number / Alternate Cell No	9448420509 / 9480849340
i)	Residential Address	H.No.1559, Market Road, Hukkeri-591309, Dist:Belagavi, Karnataka
J)	Alternate Email ID	onkarheddurshetti@gmail.com





5	Details of the Head of the Department	
a)	Name of the Head of the Department	Dr. Basavaraj Madiggond
b)	Email ID	hod.eee@hsit.ac.in
c)	Cell Number	9343454993

6	Details of the Institution	
a)	Name of the College/Institution with address	HIRASUGAR INSTITUTE OF TECHNOLOGY Address : NIDAOSHI , NIDASOSHI , Hukeri , Belgaum - 591236
b)	Type of the Institution (as per the instruction in Sl.No.29)	Private Institution
c)	Accredited year by NAAC/NBA	2019
d)	Name of the Head of the Institution	Dr. S. C. Kamate
e)	Designation of the Head of the Institution	Principal
f)	Phone Number (Landline) and college website	08333278887 Website : www.hsit.ac.in
g)	Cell Number	9480849331
h)	Email ID	principal@hsit.ac.in

i)	Student strength	
Sno.	Department	UG PG
1	Electrical and Electronics Engineering	98 0
2	Electronics & Communication Engineering	150 0
3	Mechanical Engineering	160 3
4	Computer Science & Engineering	193 0
Total		601 3

	Whether the project involves collaboration with research institution / industry? If yes , please enclose a letter to this effect	Yes
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7	If your proposal is selected,	
a)	Cheque/DD to be written in favour of	The Principal, Hirasugar Institute of Technology

8	If, amount to be credited to your bank	
a)	Name of the Account holder	The Principal, Hirasugar Institute of Technology
b)	Name of the Bank	Union Bank of India
c)	IFS Code	UBIN0537578
d)	SB A/c Number	375701010032124
e)	Address of the Bank	Azad Road, Kulkarni Building, Sankeshwar






- a) We are aware of all instructions and directions indicated in Guidelines, Terms and Conditions (GTC) present in GRD – Book of VGST.
- b) We undertake to utilize the VGST grant by strictly adhering to the GTC of VGST.
- c) We undertake the responsibility of purchasing/procuring the equipment only within the VGST approved cost/price.
- d) If we purchase the equipment more than the VGST approved cost the college management will meet the extra cost.
- e) In case of transfer/ retirement/ deputation/ termination/ change of work place from this Grantee Institution, we shall obtain NOC from VGST office by suggesting another responsible & suitable faculty member as PI who belongs to the grantee Dept. of this College/ Institution.
- f) We will procure the equipment within the allowed cost as approved by VGST in the Budget Estimate (PART - A of GRD).
- g) We will not procure any equipment which is not approved by VGST. If such procurement of Equipment/Item is made without the VGST's approval, the College Management/ Grantee Institution will bear the cost of the equipment/Item.
- h) While procuring the equipment, Purchase Committee will follow the procurement procedure as per the KTPP Act 1999 & 2000.
- i) We will obtain the VGST approval of the Budget Estimate (both Non-recurring & Recurring) indicated in PART-A of GRD only once in a Financial Year (FY) & we will not submit for the revised Budget Estimate. We will submit to VGST all the necessary Purchase documents (PART-B) within the 4 months period from the date of issue of grant. We will submit quarterly progress report and consolidated report at the end of the project.



( Dr. Basavaraj  
Madiggond )

  
Signature of the  
Principal Investigator



( Onkar Heddurshetti )

  
Signature of Co-  
Principal Investigator




Signature of Head of  
the Department

**Dr. B. V. Madiggond**

Prof. & Head BE,ME,Ph.D.  
Dept. of Electrical & Electronics Engg.  
HIT NIDASOSHI-591 236



  
Signature of the Head  
of the Institution  
(with seal)

**PRINCIPAL**

Hirasugar Institute of Technology  
NIDASOSHI-591 236

#### Attached documents

S No.	Document Name	File Name	Document Description
1	Others	Consent Letter.pdf	Willingness of our Institute for partial financial support
2	Duly Signed & Scanned Copy of Endorsement from the Head of the College/Institution	Endorsement.pdf	Endorsement by HoI
3	Others	List of Equipment.docx	List of Equipment required for I & II installment
4	Others	Methodology.docx	Block diagrams of methodology
5	Part-A	Part-A.pdf	Part-A: Budget Estimation, Justification
6	Others	Time Schedule and work plan.docx	Milestones with Time Schedule and Work plan
7	Duly Signed & Scanned Copy of Undertaking from Principal Investigator And Co-Principal Investigator	Undertaking from PI & Co PI.pdf	

## B. DETAILS OF THE PROJECT PROPOSAL

1. Title of the Project Proposal	Establishment of Virtual and Physical Industrial Automation Laboratory
2. Project Keywords	PLC, SCADA, Virtual, Automation, Control
3. Objectives of the proposal (Not more than six points)	<ol style="list-style-type: none"> <li>1. To augment teaching, learning and research in the field of industrial automation.</li> <li>2. To bridge the gap between industry needs and available set of skills through industrial automation oriented learning.</li> <li>3. To train the students and industry professionals with the software and hardware of PLC and SCADA so that they can gain enough experiences to meet the demand of industrial automation.</li> <li>4. To improve industry competitiveness globally by acquiring the practical skills sufficient to design and realize basic automation process.</li> <li>5. To improve students' employability.</li> </ol>
4. Background of the project	<p>The teaching-learning process in engineering programs requires a balanced combination of theory and practice since students should be able to, correctly, establish the relationship between theory concepts and its application in real time systems. Moreover, it must be valid for different sectors where the application of engineering is in demand. The programming of industrial automation systems is essential for many engineering programs. One of the main goals for the courses related to PLC programming consist on the learning of adequate control procedures applied to different engineering fields and real automation plants to be controlled and monitored using these industry-wide standard controller. The creation of automation plants for students' practice is a difficult task for institutes as it is very complex and requires heavy investment. The difficulty becomes even greater when the institutes offer on-line education programs, as it is not possible to, remotely, bring a real plant to the students connected from home or workplace. Given these conditions, a strategy that has been gaining acceptance is the development of virtual laboratories where the materials and equipment to be used are available to the students at any time. It is important to mention that apart from virtual laboratory, it is very much essential to establish physical laboratory for better understanding of industrial automation. A physical laboratory with physical facilities is the place where students develop their manual skills to build and test experiments, reinforcing the theory of the course. In some areas of engineering, physical laboratory is required since it is considered to be the only way to reproduce the experiment under study and provide the students real situations as they will face during their professional career.</p>





<p>5. Methodology (Graphs, designs, charts, may be attached as a separate file in the list of attachments by selecting Document Type 'Others')</p>	<p>The Automation Lab allows the students to understand the requirement and functioning of Programmable Logic Controllers (PLCs). This is the first step toward Internet of Things (IOT). Here the students learn how to Program Industrial PLCs, work with Industrial Human Machine Interface (HMI), Industrial SCADA (Supervisory Control &amp; Distributed Acquisition) and PLC networking.</p> <p>The PLC laboratory will be setup to complement the topics studied in the automation theory course. The lab will be equipped with PLC automation trainer kits and modules to enable the study of components of automation system. The students perform experiments to study the components of PLC, programming PLC, interconnection of PLC with computer, SCADA programming and fault detection in automation system.</p> <p>The programmable logic controller (PLC) is a solid state electronic device designed to replace electromechanical relays, timers, counters and sequences, by using a programmable memory for the internal storage of user oriented instructions for implementing specific functions such as logic sequencing timing, counting and arithmetic control through digital or analog inputs and outputs, various types of machines or processes. The architecture of PLC is as shown in fig.1 (Refer attachment 1).</p> <p>The CPU of the PLC executes the user-program over and over again when it is in the RUN mode. The fig.2 shows the PLC scan cycle(Refer attachment 1).</p> <p>In the proposed laboratory, students perform the following experiments virtually and physically:</p> <ol style="list-style-type: none"> <li>1. Liquid level control system</li> <li>2. Speed control of DC motor</li> <li>3. Temperature control system</li> <li>4. Start delta converter</li> <li>5. Traffic signal control system</li> <li>6. Bottle filling system</li> </ol> <p>Please refer Attachment 1 for block diagrams of above experiments.</p>
<p>6. Milestones with time schedule &amp; work plan</p>	<p>Please refer Attachment 2</p>
<p>7. List of equipment available in your Institute/College for the project implementation</p>	<p>Since, the proposed virtual and physical automation lab is new laboratory to be established in our institute, none of the major equipment present in our institute can be utilized for the proposed laboratory.</p>
<p>8. List of equipment required for 1st instalment &amp; 2nd instalment for Project Implementation</p>	<p>Please Refer Attachment 3</p>
<p>9. Relevance, importance &amp; application of the project</p>	<p>The laboratory work is a very important task for an industrial automation course, students need to be hands-on implementing automation tasks by applying different methodologies taught in the course. However, due to the wide variety of automation processes, devices, and manufacturers of equipment used in the industrial area, it is very difficult for an institution to provide all materials and equipment to students. Nowadays, the software modelling tools have reached a high level of precision and are capable of reproducing the behavior of a real automation plant. They allow to impact a large number of users with the advantage of high flexibility in modifications, providing additional opportunities for the exploration of different parameters or configurations in a short time with suitable software. Students using the virtual experiments earn a higher level of understanding of the processes and they do not have to waste time in installation, connection and start-up procedures. Moreover, the use of this strategy is not only valid to increase the skills in automation plant programming but also aligns with the current trend in industrial systems used by many companies in their production plants. The creation of new production plants by virtual modelling avoids the physical construction of experiments or prototypes which are expensive and time consuming to build. This is possible to be achieved by the proposed infrastructure in this work where industrial tools can be used (PLC programming software, SCADA systems, etc.) as if a real industry existed but the expenses associated to the physical construction are avoided. This technique achieves very good and reliable results in less time. However, we must not forget that the use of physical equipment is also recommended as it is the final goal of any industrial automation. These skills to students provides more real environment similar to those that they could find in their future work and thus, will be more appreciated.</p>





10. Novelty/Uniqueness of the project	<p>The teaching-learning process in an engineering degree program is not a simple task since the theoretical part should be complemented by a set of laboratory experiments to reinforce the skills taught in the theory classroom. Laboratory experiments are not always possible, especially for those courses requiring highly specialized equipment and materials. The situation is even worse when moving into online courses where traditional courses need to be adapted and the use of an industrial laboratory is not possible for students who do not have the possibility of attending to a physical laboratory.</p> <p>This project describes a flexible infrastructure where two types of teaching for an industrial automation laboratory can be done: virtual and physical. Using server as the basic data exchange tool, the instructor can use simulated or real data for an industrial plant and the student must use PLC programming to control the proposed automation system. The PLC in turn can also be real hardware or simulated but, in any case, the PLC programming is valid for both cases since it is transparent to it due to data exchange arisen from the server. Furthermore, a visualization interface for the industrial plant can also be created by standard tools linked to the server. This proposal allows students to work as in a real environment by using industry standard tools for programming and monitoring. It also allows more interaction and testing of extreme or unusual conditions in the industrial plant which are not easy to obtain if a real plant is used. Using these software tools favorably completes the development of skills for students and they become familiar with software tools widely used in industrial companies where its use is extensive. Also, with the development of physical laboratory, one can realize the simulated data practically for different applications.</p>
11. Whether this project leads to innovations and patents, if yes explain	<p>YES</p> <p>The industrial automation can significantly enhance the efficiency and flexibility of production processes and augment the value of products and services. The transition towards "smart" factories operating autonomously has already been recognized as an important challenge by industry. Likewise, the deployment of connected objects in transport (autonomous vehicles), energy (smart grids), cities, healthcare and agriculture profoundly changes the way these sectors are organized.</p> <p>The proposed virtual and physical automation lab enables the students and industry professionals to inculcate the knowledge and skill sets in the field of automation. This will motivate the professionals to invent, develop and propose new technologies for automation.</p>
12. Whether this project leads to a Startup, if yes explain	<p>YES.</p> <p>With the establishment of virtual and physical automation lab in the institute, the students acquire the skill sets required for automation in the field of industry, agriculture, etc. Research and Markets released a report titled, "Global Industrial and Factory Automation Market Analysis and Forecast," which laid out the growth for the automation industry through 2022. The report goes on to detail that by 2022 the industrial automation equipment and services market will grow at a compounded annual growth rate (CAGR) of more than 7%. Hence, there will be a huge opportunity for the budding engineers to establish their own startups and get involved in the production of automation modules required for residential, agricultural and industrial automation process.</p>





13. Whether this project leads to cost effective Technology, if yes explain	<p>YES.</p> <p>Since, the project involves mostly the establishment of virtual automation laboratory, the strategy of creating virtual laboratories is beneficial and its impact is greater than a physical or remote laboratory. Nowadays, the software modelling tools have reached a high level of precision and are capable of reproducing the behavior of a real automation plant. They allow to impact a large number of users with the advantage of high flexibility in modifications, providing additional opportunities for the exploration of different parameters or configurations in a short time with less economical cost. Students using the virtual experiments earn a higher level of understanding of the processes and they do not have to waste money in installation, connection and hardware testing procedures. The creation of new production plants by virtual modelling avoids the physical construction of experiments or prototypes which are expensive and time consuming to build. This is possible to be achieved by the proposed infrastructure in this project where industrial tools can be used (PLC programming software, SCADA systems, etc.) as if a real industry existed but the expenses associated to the physical construction are minimized. This technique achieves very good and reliable results in less time and low cost.</p>
14. Highlight reasons in FIVE sentences or less, what is special, unique or novel in your project that makes it an attractive proposition	<p>This project describes a flexible infrastructure where two types of teaching for an industrial automation laboratory can be done: virtual and physical. This proposal allows students to work as in a real environment by using industry standard tools for programming and monitoring. It also allows more interaction and testing of extreme or unusual conditions in the industrial plant which are not easy to obtain if a real plant is used. Using these software tools favorably completes the development of skills for students and they become familiar with software tools widely used in industrial companies where its use is extensive. Also, with the development of physical laboratory, one can realize the simulated data practically for different applications.</p>
15. Deliverables of the project (Precise and in bullet form)	<ol style="list-style-type: none"> <li>1. Establish a state-of-art infrastructure at Hirasugar Institute of Technology.</li> <li>2. A complete learning solution that will build specific skill set and equip students with employable skills in automation and manufacturing.</li> <li>3. Promote Industry-academia partnership.</li> <li>4. Updated technical education curriculum that is more aligned with industry needs.</li> <li>5. Improved employability which is mutually beneficial to the students proposed to be trained as well as the industry.</li> <li>6. Vocational training for skill enhancement of the youth of the region.</li> <li>7. Impart training to the faculty and students of Hirasugar Institute of Technology.</li> <li>8. Impart training to the faculty and students of other engineering institutes and Polytechnics in the region.</li> </ol>
16. Please state willingness of your Institute to give partial financial support to this proposal. If yes, state percentage of the total cost that will be supported by your Institute. Include a signed letter from the head of the institute assuring the said support	15% (Please refer attachment 4)
Information about Principal Investigator, Research track record, Innovation in the proposed work	
a) List of Publications (For the last 5 years) i) Journal Publications listed @ SCImago Journal Rank (Rating : Q1 OR Q2 OR Q3 OR Q4). Specify rating by referring the website: <a href="https://www.scimagojr.com/journalsearch.php">https://www.scimagojr.com/journalsearch.php</a>	
	NIL
	NIL
	NIL
ii) Journal publications -Not listed in SCImago Journal rating rank	
	"Design and Implementation of Z-Source Based Multilevel Inverter" in Sambodhi, UGC Care journal, ISSN:2249-6661, Vol-43, No.-03 (III) November-December (2020)
	"Design Optimization for Low Voltage DC-DC Converter with Coupled Inductor Topology" in Asian Power Electronics Journal, Volume 9, Issue 1, December 2015.





	"Behavioral Analysis of Three stage Interleaved Synchronous DC-DC Converter for VRM Applications" in an international Journal of Emerging Technology in Computer Science and Electronics, Volume 14, Issue 2, April 2015, ISSN: 0976-1353.
iii) Conference Presentations	
	Presented a paper on "Design and Implementation of Z-Source Based Multilevel Inverter" in an international conference on 'Continuity, Consistency and Innovation in Applied Sciences and Humanities' on 13th and 14th august 2020 held at St. Martin's Engineering College, Secunderabad.
	Presented a paper on "Design and Simulation of Multiphase Synchronous DC-DC Converter" in an International Conference on Smart Electronics Systems 2016 at KLE Society's Dr.M.S.Sheshagiri College of Engineering and Technology, Belagavi.
	Presented a paper on "Behavioral Analysis of Three stage Interleaved Synchronous DC-DC Converter for VRM Applications" in an International Conference on Emerging Trends in Engineering 2015 at Jain College of Engineering, Belagavi.
iv) Google Impact factor of journal	1. Impact Factor: 2.8 2. Impact Factor: 3.96 3. Impact Factor: 4.780
b) Patent(s) filed/granted with details	NIL
c) Give details of commercialization status for the granted patents	NIL
d) Books published/chapter contributed with details	NIL
e) Industrial consultation (given/undertaken) provide details (past 5 years)	NIL
f) Other details if any You may state willingness of your Institute to financially support this proposal. If yes, what percentage of the cost will be supported by your institute. Include a signed letter from the head of the institute reflecting the same.	YES, 15% (Please refer Attachment 4)
g) Highlight reasons in FIVE sentences, why your project must be chosen over many other proposals received by VGST?	This project describes a flexible infrastructure where two types of teaching for an industrial automation laboratory can be done: virtual and physical. This proposal allows students to work as in a real environment by using industry standard tools for programming and monitoring. It also allows more interaction and testing of extreme or unusual conditions in the industrial plant which are not easy to obtain if a real plant is used. Using these software tools favorably completes the development of skills for students and they become familiar with software tools widely used in industrial companies where its use is extensive. Also, with the development of physical laboratory, one can realize the simulated data practically for different applications. Hence, with the establishment of virtual and physical automation lab will help our institute to conduct in house automation training program to enhance the employability and skill sets of the individuals.
h) Have you tested your concept/innovation? If yes indicate supporting results that makes you to believe in the succusses of the proposal	YES. Our institute has organized one month training program for 21 final year engineering students on "Industrial Automation" by prolofic Systems and Technologies Pvt. Ltd. Bengaluru during July 2019. Our students were trained with extensive, in-depth, hands-on practical training on diversified industrial automation platforms currently used in the industry and equipped with skill sets necessary to function effectively in technology intensive areas of industrial asset management, maintenance, projects, production, and international project consultancy. Industry's feedback revealed that our trained students were found to possess exact skill sets necessary to be successful in the segment of Industrial Automation across broad spectrum of industries. As a result, all 21 trained students got placed in reputed industries in the field of automation. Hence, if our proposal get sanctioned, it will help our institute to conduct in-house automation training program and to enhance employability.
Information about Co-Principal Investigator, Research track record, Innovation in the proposed work	
a) List of Publications (For the last 5 years) i) Journal Publications listed @ SCImago Journal Rank (Rating . Q1 OR Q2 OR Q3 OR Q4). Specify rating by referring the website: <a href="https://www.scimagojr.com/journalsearch.php">https://www.scimagojr.com/journalsearch.php</a>	



	Nil
	Nil
	Nil
ii) Journal publications -Not listed in SCImago Journal rating rank	
	"Design and Implementation of Z-Source Based Multilevel Inverter" in Sambodhi, UGC Care journal, ISSN:2249-6661, Vol-43, No.-03 (III) November-December (2020)
	"Advanced Hybrid Electric Vehicle" in a Journal of Composition Theory, Volume 12, Issue 6, June 2019, UGC Approved & 5.7 Impact Factor, ISSN:0731-6755.
	"Design and Implementation of Trans Z-source Inverter" in Journal of Emerging Technologies and Innovative Research, volume 5, Issue 9, Sept-2018, UGC Approved & 5.87 Impact Factor, ISSN 2349-5162.
iii) Conference Presentations	
	Presented a paper on "Design and Implementation of Z-Source Based Multilevel Inverter" in an international conference on 'Continuity, Consistency and Innovation in Applied Sciences and Humanities' on 13th and 14th august 2020 held at St. Martin's Engineering College, Secunderabad.
	Presented a paper on "Advanced Hybrid Electric vehicle" in 2nd international conference on 'Recent Innovations in Science, Engineering and Technology' on 18th July 2019 held at HIT, Nidasoshi, Karnataka.
	Presented a paper on "Design and Implementation of Trans Z-Source Inverter" in an international conference on 'Recent Innovations in Science, Engineering and Technology' on 18th & 19th May 2018 held at HIT, Nidasoshi, Karnataka.
ii) Journal publications -Not listed in SCImago Journal rating rank	<p>1. "Design and Implementation of Z-Source Based Multilevel Inverter" in Sambodhi, UGC Care journal, ISSN:2249-6661, Vol-43, No.-03 (III) November-December (2020)</p> <p>2. "Advanced Hybrid Electric Vehicle" in a Journal of Composition Theory, Volume 12, Issue 6, June 2019, UGC Approved &amp; 5.7 Impact Factor, ISSN:0731-6755.</p> <p>3. "Design and Implementation of Trans Z-source Inverter" in Journal of Emerging Technologies and Innovative Research, volume 5, Issue 9, Sept-2018, UGC Approved &amp; 5.87 Impact Factor, ISSN 2349-5162.</p> <p>4. "Design and Implementation of smart automobile system" in Journal of Advances in Science and Technology, Volume 12, Issue 25, December 2016, ISSN 2230-9659.</p> <p>5. "Rural electrification with wind and solar hybrid generation system using MPPT" in Journal of Advances in Science and Technology, Volume 12, Issue 25, December 2016, ISSN 2230-9659.</p>
b) Patent(s) filed/granted with details	Nil
c) Give details of commercialization status for the granted patents	Nil
d) Books published/chapter contributed with details	Nil
e) Industrial consultation (given/undertaken) provide details (past 5 years)	Nil
Details Of Industrial Collaboration	
a) Name of the Industry	Infy SKY
b) Type of Industry	IT, Embedded and Industrial Automation
c) Postal Address of the Industry	R/O 471, 1st Floor, 2nd Main, 1st Cross, Sadashiv Nagar, Belagavi - 590001.
d) Industry Email ID	info@infysky.com
e) Website	www.infysky.com
f) Landline Number	Nil
g) Contact person (1)	
	Mr. Vilas M. Patil
	Technical Lead (Development ,R& D & Training)
	Industrial Automation, Control panel design
Contact person (2)	





	Miss.SunitaPatil
	Software Engineer
	IOT, Embedded
h) Financial Commitment if any	No
i) Role of the Industrial Collaboration in the programme/project	As the department of Electrical and Electronics Engineering of Hirasugar Institute of Technology has MoU with Infy SKY, Belagavi, the Infy SKY will provide technical training to the faculty and staff of Hirasugar Institute of Technology in the field of industrial automation to train the students.

Signature of PI and Co-PI

Signature from Industry/Collaborative  
Institute

1)

Bo  
17/2/21

2)

Bo  
17/02/2021

