National Institute of Technical Teachers' Training & Research, Shamla Hills, Bhopal - 462 002 (M.P.), India

Expression of Interest (EOI) and Request for Proposal (RFP) for selection of Technology Partner (TP) to setup a Centre of Excellence for imparting high-end skill training, Industrial Consultancy & Research work in the Field of Industry 4.0 & Digitalization

Ref. No. NITTTR/CoE/EOI/2020 **Date: 19.10.2020**

1. Director, NITTTR Bhopal invites proposals from eligible firms for "Selection of a Technology Partner (TP) to set up a Center of Excellence for Research & Development and imparting high-end skill training in the **field of Industry 4.0 & Digitalization.**

2. **Pre-Qualification Criteria:** Participating Agencies must fulfill the following pre-requisites:-

Sl. No.	Pre-Qualification Criteria
a.	Technology Partner (TP) and the Execution Partner (EP) should be an entity registered in India under the Companies Act/ LLP Act/ Societies Registration Act or as a Trust.
b.	TP/EP should not have been blacklisted by any Government/Department/ Institution/Body.
c.	TP should have been in existence for at least 5 years in India.
d.	TP should be a company recognized for providing technological products in the technology areas listed in the Technical Section 4. They may execute it through their Authorized Partner and thereby name the Authorized Partner as Execution Partner.
e.	The TP should have minimum annual turnover of Rs. 100 Cr. per year in India in the each of the last 3 years.
f.	The TP must have experience of setting up CoE's similar to the scope of this RFP. The TP should have executed a minimum of ten such CoE's within India during last 5 years (in Central Govt./Centrally Funded/State Govt. Institutions with a minimum of two CoEs in Central Government Institutions)
g.	The TP should have the domain expertise in at least 60% of the number of labs. Barring general utility lab/technical items, they should be involved in offering items manufactured by them related to these labs.
h.	Provide documentary evidences in support of working in similar domain with strong industry linkages for assured training demands, internships and placements. TP should be able to submit evidence that minimum 5000 students out of which at least 3000 have been trained during the last three consecutive financial years with a placement record of at least 60%.

3. The bidding documents may be downloaded ***free of cost*** from the website: http://www.nitttrbpl.ac.in / Central Public Procurement Portal (CPPP) at www.eprocure.gov.in / GeM portal.

4. Interested firms shall submit the EOI and RFP in the prescribed format up to **3:00 PM on 09.11.2020.**

5. The duly filled proposal in proper format in a sealed envelope should be submitted in person to the Office of The Director, NITTTR or sent by courier, registered/ speed post etc. to the **Director, National Institute of Technical Teachers' Training & Research, Shamla Hills, Bhopal - 462 002 (M.P.).** Each page of the proposal should be signed alongwith rubber stamp by the authorized representative of the TP.

6. All amendments, time extension, clarifications etc. will be uploaded on the website only and will not be published in the newspapers. The interested firms should regularly visit the website to keep themselves updated.

Key Information:

Sl.No.	Description	Important Information / Date
1.	EOI & RFP advertisement	21.10.2020
2.	Last date for submission of EOI & RFP	09.11.2020 upto 3.00 PM
3.	Date of opening of EOI & RFP	09.11.2020 at 4.00 PM in the institute's committee room
4.	Declaration of shortlisted firms	Will be uploaded on the Institute website
5.	Tentative date of MOA signing	Will be notified to the selected party

(DIRECTOR)
National Institute of Technical Teachers' Training and Research,
Shamla Hills, Bhopal

Selection of Technology Partner (TP)

Expression of Interest and Request for Proposal

EOI and RFP for selection of TP to set up a Center of Excellence for imparting high-end skill training in the Field of Industry 4.0 & Digitalization

National Institute of Technical Teachers' Training & Research
Shamla Hills, Bhopal - 462 002 (M.P.), India

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Section 1.0 Introduction

1.1 Scope of the Project

NITTTR Bhopal is inviting Expression of Interest from Technology Providers to setup a Center of Excellence (CoE) that focuses on upcoming manufacturing technologies related to Industry 4.0 & Digitalization at NITTTR Bhopal.

It is a turnkey project where the TP will be responsible for the supply of the technological product / lab hardware and software, commissioning of it and should run the lab along with the institute faculty for a period of 3 years. It must be state-of-the-art and industry relevant and should cater to the current and futuristic manpower requirements of the country. The CoE will be under the overall administration of NITTTR Bhopal.

NITTTR Bhopal will provide infrastructure to setup the Center of Excellence. The institute contribution will be limited to maximum of 15 % of the total project value and the balance will be contributed by TP. The total value of the project should not exceed Rs.100 Cr. The TP once selected must sign a Memorandum of Agreement (MoA). The services proposed in the CoE can be provided directly by the TP or through their authorized partner.

The Center of Excellence should be focused on developing skill excellence in the field of Digitalization and Industry 4.0. Through the training and implementation of industry-relevant technology and processes, the center should facilitate a multi-disciplinary learning environment across Technology, Engineering and Science faculties. It should meet the demands of the industries' ever-changing processes and help build skills around collaboration and innovation. The center should leverage the TP's capability to draw upon the expertise from various areas of Automotive, Aerospace, Defense and their suppliers, Industrial Engineering, Electrical and Process Industries, etc.

1.2 Project Overview and Objectives

The purpose of setting up of Industry Linked Centre of Excellence (CoE) is to bridge the skill gap of faculty / students' vis-à- vis current industry needs and impart state-of-the-art industry-oriented training to help foster significant innovation and learning in technology with special focus to technical education.

The mission of the CoE should be to promote and implement advanced digital manufacturing concepts through research and education partnership with the industry.

a. The center is aimed at Industry connected skill development programs and hence the proposal should also have a MoA with leading Technology Firm.
b. This center should be on Build, Operate and Transfer Mode.

c. The software should not be restricted to educational versions. TP should provide software and related hardware with industrial features allowing the Client to offer Industrial consultancy and research as well.

d. The TP can depute their authorized partner for executing the CoE in terms of supply and running the center. However, the proposal should have a clear information on who is the Execution partner and who is the TP.

In this proposal, we invite TP to set up Center of Excellence in Industry 4.0 & Digitalization with NITTTR Bhopal to cater the industry oriented needs of competent manpower through skill development. And also address the requirements of research and consultancy in the areas of engineering, product design & development and digital manufacturing technologies towards the various technical domains, some of the major ones are listed below:-

1.	Aerospace and Aviation	9.	Defense
2.	Automotive – Passenger & Commercial Vehicles	10.	Electrical and Mechanical Machineries
3.	Agriculture and Farm Machineries	11.	Electronics and Telecommunications
4.	Oil and Power Sector	12.	Digital Factories
5.	Industrial machinery and Heavy engineering	13.	Marine and Ship Building
6.	Iron & Steel Sector	14.	Food Production and Processing Industries
7.	Infrastructure Sector and Construction Equipment	15.	Chemical & Petrochemical
8.	Industrial Automation	16.	Bio-Medical Engineering

Section 2.0 Instructions to Technology Partner (ITP) and Data Sheet

2.1 General Provisions

1. Definitions	1.1. "Applicable Guidelines" means the policies of Government of India, Ministry of Education governing the selection and Contract award process as set forth in this RFP. 1.2. "Applicable Law" means the laws and any other instruments having the force of law in India, as they may be issued and in force from time to time. 1.3. "Client" means National Institute of Technical Teachers' Training and Research, Bhopal. 1.4. "Technology Partner (TP)" means a legally- established firm or an entity that is contracted with under this Contract. 1.5. "Contract" means a legally binding written agreement signed between the Client and the TP and includes all additional documents as may be specified by the Client. 1.6. "Data Sheet" means an integral part of the Instructions to TPs (ITP) Section-2 that is used to reflect specific assignment conditions to supplement, but not to over- write, the provisions of the ITP. 1.7. "Day" means a calendar day. 1.8. "Experts" means, collectively, Key Experts, Non-Key Experts, or any other personnel of the TP, Execution Partner or Consortium member(s). 1.9. "Government" means the Government of India (GoI). 1.10. "Joint Venture (JV)" means an association with or without a legal personality distinct from that of its members, where one member has the authority to conduct all business for and on behalf of any and all the members of the JV, and where the members of the JV are jointly and severally liable to the Client for the performance of the Contract. 1.11. "Key Expert(s)" means an individual professional whose skills, qualifications, knowledge and experience are critical to the performance of the Services under the Contract. 1.12. "ITP" (this Section-2 of this document-RFP) means the Instructions to Technology Partners that provides the TPs with all information needed to prepare their proposals. 1.13. "Non-Key Expert(s)" means an individual professional provided by the TP or its Execution Partner and who is assigned to perform the services or any part thereof under the Contract. 1.14. "Proposal" means the response to this Request for Proposal (RFP) submitted by the TP. 1.15. "RFP" means the Request for Proposals to be prepared by the Client for the selection of TP. 1.16. "Services" means the work to be performed by the TP pursuant to the Contract. 1.17. "TORs" means the Terms of Reference that explain the objectives, scope of work, activities, and tasks to be performed, respective responsibilities of the Client and the TP, and expected outcomes.

2. Introduction	2.1.	The Client named in the Data Sheet intends to select TP in accordance with the method of selection specified in the Data Sheet.
	2.2.	The TPs are invited to submit a Proposal for the Labs named in the Data Sheet. The Proposal will be the basis for negotiating and ultimately signing the Contract with the selected TP.
	2.3.	The TP's should familiarize themselves with the local conditions and take them into account in preparing their Proposals.
3. Conflict of Interest	3.1.	The TP is required to provide services, at all times holding the Client's interest paramount, strictly avoiding conflicts with other assignments or its own corporate interests and acting without any consideration for future work.
	3.2.	The TP has an obligation to disclose to the Client any situation of actual or potential conflict that impacts its capacity to serve the best interest of its Client. Failure to disclose such situations may lead to the disqualification of the TP or the termination of its Contract and/or sanctions by the Client.
	3.3.	Without limitation on the generality of the foregoing, the TP shall not be hired under the circumstances set forth below: 1. Conflicting projects 2. Conflict among projects: A TP will not setup similar COE's at a vicinity of 200 km of the client.
	3.4.	Conflicting Relationship: Relationship with the Client's staff: a TP (including its Experts) that has a close business or family relationship with a professional staff of the Client, who are directly or indirectly involved in any part of (i) the preparation of the TOR for the assignment, (ii) the selection process for the Contract, or (iii) the supervision of the Contract, may not be awarded a Contract, unless the conflict stemming from this relationship has been resolved in a manner acceptable to the Client throughout the selection process and the execution of the Contract
4. Corrupt and Fraudulent Practices	4.1.	Client requires compliance with its policy with regard to corrupt and fraudulent practices.
	4.2.	In further pursuance of this policy, TP's shall permit and shall cause their Experts, Partners, sub-contractors, services providers, or suppliers to permit the Client to inspect all accounts, records, and other documents relating to the submission of the Proposal and contract performance (in case of an award) and to have them audited by auditors appointed by the Client.
5. Eligibility	5.1.	The Client permits TP's (individuals and firms, including Joint Ventures and their individual members) from India to offer services under this contract unless otherwise blacklisted.
	5.2.	Furthermore, it is the TP's responsibility to ensure that its experts, joint venture members, partners, agents (declared or not), sub-contractors, service providers, suppliers and/or their employees meet the eligibility requirements as established in this document.
	5.3.	Government / Government-owned enterprises or institutions in India shall be eligible only if they can establish that they (i) are legally and

	financially autonomous, (ii) operate under commercial law, and (iii) are not dependent agencies of the Client. To establish eligibility, the government- owned enterprise or institution should provide all relevant documents (including its charter) sufficient to demonstrate that it is a legal entity separate from the government; it does not currently receive any substantial subsidies or budget support; it is not obligated to pass on its surplus to the government; it can acquire rights and liabilities, borrow funds, and can be liable for repayment of debts and be declared bankrupt; and it is not competing for a contract to be awarded by the government department or agency which, under the applicable laws or regulations, is its reporting or supervisory authority. 5.4. Government officials and civil servants in India are not eligible to be included as Experts in the TP's Proposal unless such engagement does not conflict with any of the provisions of this engagement or employment or other laws, regulations, or policies of India.
6. Ownership	6.1 The Ownership of the CoE lies with NITTTR Bhopal.

2.2 Preparation of Proposal

7. General Consideration	7.1. In preparing the Proposal, the TP is expected to examine the RFP in detail. Material deficiencies in providing the information requested in the RFP may result in rejection of the Proposal.
8. Cost of Preparation of Proposal	8.1. The TP shall bear all costs associated with the preparation and submission of its Proposal, and the Client shall not be responsible or liable for those costs, regardless of the conduct or outcome of the selection process. The Client is not bound to accept any proposal, and reserves the right to annul the selection process at any time prior to Contract award, without thereby incurring any liability to the TP.
9. Language	9.1. The Proposal, as well as all correspondence and documents relating to the Proposal exchanged between the TP and the Client, shall be written in English.
10. Documents Comprising the Proposal	10.1. The Proposal shall comprise the documents and forms listed in the Data Sheet given in this RFP (Section-2).
11. Proposal Validity	11.1. The Data Sheet indicates the period during which the TP's Proposal must remain valid after the Proposal submission deadline. 11.2. During this period, the TP shall maintain its original Proposal without any change. 11.3. If it is established that any Key Expert nominated in the TP's Proposal was not available at the time of Proposal submission or was included in the Proposal without his/her confirmation, such Proposal shall be disqualified and rejected for further evaluation.

a) Extension of Validity Period	11.4. The Client will make its best effort to complete the negotiations within the proposal's validity period. However, should the need arise, the Client may request, in writing, all TPs who have submitted Proposals prior to the submission deadline to extend the Proposals' validity. 11.5. If the TP agrees to extend the validity of its Proposal, it shall be done without any change in the original Proposal. 11.6. The TP has the right to refuse to extend the validity of its Proposal in which case such Proposal will not be further evaluated.
12. Clarification and Amendment of RFP	12.1. The TP may request a clarification of any part of the RFP during the period indicated in the Data Sheet before the Proposal's submission deadline. Any request for clarification must be sent in writing, or by standard electronic means, to the Client's address indicated in the Data Sheet. The Client will respond in writing, or by standard electronic means, and will send written copies of the response (including an explanation of the query but without identifying its source) to all TPs. If the Client deems it necessary to amend the RFP as a result of a clarification, it shall do so following the procedure described below: 12.2. At any time before the Proposal submission deadline, the Client may amend the RFP by issuing an amendment in writing or by standard electronic means. The amendment will be posted in the website of NITTTR Bhopal. 12.3. If the amendment is substantial, the Client may extend the Proposal submission deadline to give the TPs reasonable time to take an amendment into account in their Proposals. 12.4. The TP may submit a modified Proposal or a modification to any part of it at any time prior to the Proposal submission deadline. No modifications to the Proposal shall be accepted after the deadline.
13. Proposal Format and Content	13.1. The Proposal shall be as per the formats included in this RFP (Section-4).
14. Commercials	14.1. The minimum contribution from the TP should be 85% of the total project value. The institute contribution will be limited to maximum of 15 % of the total project value. The project value will not include the infrastructure cost provided by the Client.
15. Revenue Sharing	15.1. CoE will be used to conduct different training program, Industry Consultancy and research work. The Institute will only have all the share/rights on the revenue generated and IPR out of these activities.

16. Submission, Sealing, and Marking of Proposal	16.1. The TP may submit a signed and complete Proposal comprising the documents and forms in accordance with Clause 10 (Documents Comprising Proposal). The submission can be done by hand/ courier/ registered post/ speed post. 16.2. The TP can also authorize their EP to submit a signed and complete Proposal comprising of all the documents and forms on their behalf. 16.3. An authorized representative of the TP or the EP shall sign the original submission letter in the required format for the Proposal and shall initial all pages of both. The authorization shall be in the form of a written authorization letter specific to the Proposal. 16.4. Any modifications, revisions, interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Proposal. 16.5. The signed Proposal shall be marked "ORIGINAL", and its copies marked "COPY" as appropriate. The number of copies is indicated in the Data Sheet. All copies shall be made from the signed original. If there are discrepancies between the original and the copies, the original shall prevail. 16.6. The original and all the copies of the Proposal shall be placed inside a sealed envelope clearly marked "PROPOSAL", "[Name of the Assignment]", RFP reference number, name and address of the TP, and with a warning "DO NOT OPEN UNTIL [insert the time and date of the submission deadline indicated in the Data Sheet]". 16.7. The sealed envelope containing the Proposal shall be placed into one outer envelope and sealed. This outer envelope shall bear the submission address, RFP reference number, the name of the assignment, TP's name and the address, and shall be clearly marked "DO NOT OPEN BEFORE [insert the time and date of the submission deadline indicated in the Data Sheet]". 16.8. If the envelopes and packages with the Proposal are not sealed and marked as required, the Client will assume no responsibility for the misplacement, loss, or premature opening of the Proposal. 16.9. The Proposal or its modifications must be sent to the address indicated in the Data Sheet and received by the Client no later than the deadline indicated in the Data Sheet, or any extension to this deadline. Any Proposal or its modification received by the Client after the deadline shall be declared late and rejected, and promptly returned unopened.
17. Confidentiality	17.1. From the time the Proposals are opened to the time the Contract is awarded, the TP should not contact the Client on any matter related to its Proposal. Information relating to the evaluation of Proposals and award recommendations shall not be disclosed to the TPs who submitted the Proposals or to any other party not officially concerned with the process, until the publication of the Contract award information. 17.2. Any attempt by TPs or anyone on behalf of the TP to influence improperly the Client in the evaluation of the Proposals or Contract

	award decisions may result in the rejection of its Proposal and may be subject to the application of prevailing Client's sanctions procedures. 17.3. Notwithstanding the above provisions, from the time of the Proposals opening to the time of Contract award publication, if a TP wishes to contact the Client on any matter related to the selection process, it should do so only in writing.
18. Opening of Proposals	18.1. The Client's evaluation committee shall conduct the opening of the Proposals in the presence of the TPs' authorized representatives who choose to attend (in person). The opening date, time and the address are stated in the Data Sheet. 18.2. At the opening of the Proposals the following shall be read out: (i) the name of the TP or, in case of a Joint Venture, the name of the Joint Venture, the name of the lead member; (ii) any modifications to the Proposal submitted prior to Proposal submission deadline.

2.3 Evaluation and Award of contract

19. Evaluation of Proposals	19.1. The TP is not permitted to alter or modify its Proposal in any way after the proposal submission deadline. While evaluating the Proposals, the Client will conduct the evaluation solely on the basis of the submitted Proposals. 19.2. The Client's evaluation committee shall evaluate the Proposals based on their responsiveness to the Terms of Reference and the RFP, applying the pre- qualifying criteria, evaluation criteria, and point system specified in the Data Sheet. Each responsive Proposal will be given a technical score. A Proposal shall be rejected at this stage if it does not respond to important aspects of the RFP or if it fails to achieve the minimum technical score indicated in the Data Sheet.
20. Award of Contract	20.1. After completing the negotiations, the Client shall sign a MoA with the TP as per the instructions in the Data Sheet; and promptly notify the other shortlisted TPs. 20.2. The TP is expected to commence the next steps on the date and at the location specified in the Data Sheet.
21. Delivery Schedule	21.1. From the date of award of contract, the entire CoE related hardware and software items should be supplied to the institute within 150 days. It is expected that the CoE will become fully functional within a maximum period of 180 Days from the date of award of contract.

2.4 Data Sheet

A. General	
ITP Clause	
A.1	**Name of the Client:** National Institute of Technical Teachers' Training and Research, Shamla Hills, Bhopal (M.P.) **Method of selection:** Quality Based Selection

<table>
<tr><td>A.2</td><td colspan="3">The name of the assignment is: Selection of a TP (TP) to set up a Center of Excellence for imparting high-end skill training, performing industry consultancy and research in the field of Advanced Digital Manufacturing. Details of labs mentioned in Section 4 : Scope of Labs</td></tr>
<tr><td colspan="4">B. Preparation of Proposals</td></tr>
<tr><td>B.1</td><td colspan="3">English language.</td></tr>
<tr><td>B.2</td><td colspan="3">Proposals must remain valid for 90 (ninety) calendar days after the proposal submission deadline (i.e. 90 days from 09.11.2020).</td></tr>
<tr><td>B.3</td><td colspan="3">Clarifications may be requested no later than 4 (Four) days prior to the submission deadline.</td></tr>
<tr><td>B.4</td><td colspan="3">The contact information for requesting clarifications is: National Institute of Technical Teachers’ Training and Research, Shamla Hills, Bhopal,- 462002</td></tr>
<tr><td colspan="4">C. Submission, Opening and Evaluation</td></tr>
<tr><td>C.1</td><td colspan="3">The TP or their authorized Execution partner must submit: (a) Proposal: one (1) original and one (1) copy.
In case of the Execution partner, then the TP should submit their authorization letter.</td></tr>
<tr><td rowspan="3">C.2</td><td colspan="3">The Proposals must be submitted no later than: Date and Time:
09/11/2020 upto 3.00 PM</td></tr>
<tr><td colspan="3">The Proposal submission address is:</td></tr>
<tr><td colspan="3">To,
The Director,
National Institute of Technical Teachers’ Training and Research,
Shamla Hills, Bhopal - 462002 (M.P.) India</td></tr>
<tr><td>C.3</td><td colspan="3">The opening shall take place at: same as the Proposal submission address.
Date: 09/11/2020 at 4.00 P.M. in the committee room of the institute.</td></tr>
<tr><td rowspan="6">C.4</td><td colspan="3">Criteria, sub-criteria, and point system for the evaluation of the Full Proposals:</td></tr>
<tr><td>Sl. No.</td><td>Evaluation Metric</td><td>Documentary Proof</td></tr>
<tr><td>1</td><td>TP Authorizing their Executing partner</td><td>Authorization letter from the TP</td></tr>
<tr><td>2</td><td>TP and Executing Partners should be such entities registered in India under the Companies Act/ LLP Act/ Societies Registration Act or as a Trust.</td><td>Certificate of Incorporation / registration Certificate</td></tr>
<tr><td>3</td><td>TP should have been in existence for at least 5 years in INDIA.</td><td>The Certificate of Incorporation of the TP should be submitted. The TP should have minimum annual turnover of Rs. 100 Cr. per year in India in the each of the last 3 years.</td></tr>
<tr><td>4</td><td>TP and Executing partner should not have been blacklisted by any Government/ Department/ Body.</td><td>Self-declaration to be provided by TP and the EP.</td></tr>
</table>

	5	Existing CoE Setups	The TP must have experience of setting up COE's similar to the scope of this RFP. The TP should have executed a minimum of ten such CoE's within India during last 5 years (in Central Govt./Centrally Funded/State Govt. Institutions) with a minimum of two CoEs in Central Government Institutions. The requisite proofs shall be enclosed. Please note that the TP under which the EP is participating must be the same as mentioned in the copies of agreement submitted. TP must have a R&D Facility in India and have their direct and own training centers for some of the proposed labs.
	6	Domain Expertise	The TP should have the domain expertise in at least 60% of the number of labs. Barring general utility lab/technical items, they should be involved in offering items manufactured by them related to these labs.
	7	a. Training Expertise of Executing Partner (if Any)	The EP should be in the area of skill development and training at least for a period of 5 Years.
	8	Certification	The MoA should also allow the client to use the TP's Logo to award training certificates to the trainees. TP or the Executing Partner (EP) should be certified as a Sector Skill Partner from NSDC/ or an equivalent in India.
	9	e-Learning (Courseware)	The e-Learning (Courseware) materials should be a solution/product developed and owned by either the TP or the Executing Partner.
	10	Customer Feedback	Customer feedback on the COE in the format of appreciation letters or public domain information such as website/published report on similar CoE should be submitted. If Website is being provided, then please provide the link to the site in the covering letter along with snapshots of different pages of the website. By similar CoE, it means that the CoE being shown should have established at least 6 out of the labs listed in the scope of supply.

	The bids submitted by the interested parties who clear the pre-qualification round only will be evaluated as per the criteria provided below: **Evaluation Criteria (100 points)** **A. Profile of the TP (10 points)** ● Profile of the TP (maximum two pages). ➢ An additional one-page profile for the Execution partner to be attached. ● Details about the business clients (national and international) that the TP is closely engaged with in various capacities in the different Industries. ● The TP / EP should be able to show a continuous and on-going effort to use state of the art equipment/ machines/ tools as part of routine business activities. ➢ Details about the existing training infrastructure available with the TP or their EP. ➢ Details of curriculum with complete details of its 3 best training programs with a clear indication of modules that are taught practically. Should include details such as the job profile, number of trainees trained, employed and relevance of the courses. *__Note__: Wherever the TP / EP has relevant experience in training and skill development, this can be highlighted. **B. Technical Proposal of TP/EP (50 points)** ● The technical Proposal will be evaluated on the basis of Section 4 requirement. ● The entire scope must be offered by one party – TP and their Authorized EP ● Additional scope will not be considered in the evaluation **C. Past Performance of TP and EP (if Any) (40 points) Section details the selection criteria for the Technical partner** ● All the conditions must be met for the Technical Partner ● All the conditions must be met for the Execution Partner (if any) ● If there is an EP, 5 points will be allotted to the Execution Partner out of the 30 points **The Interested Parties who secure at least 75% of the points in the Evaluation Criteria A, B and C above will only be shortlisted and called for a presentation.** **One bidder will be chosen as the Technology Partner at the end of the Presentation.**

Section 3.0 Proposal – Standard Forms

All pages of the original Proposal shall be initialed by the same authorized representative of the bidder who signs the Proposal.

FORM TECH-1

A. PROPOSAL SUBMISSION FORM

[Location, Date]
To,
The Director,
NITTTR,
Shamla Hills, Bhopal -462002

Dear Sir/ Madam,

We, the undersigned, intend to participate as a TP (TP) for setting up of Center of Excellence in accordance with your Request for Proposal dated [Insert Date].

Our execution Partner will submit proposal and execute it.
{Insert a list with full name and the legal address}.

We have attached a copy {insert: "Authorization letter"} authorizing our Channel partner to execute the project.

We hereby declare that we have read the Instructions to TP included in the RFP, and abide by the same, and specifically to conditions mentioned in Instruction to bidders. [In case of any declaration, reference to concerned document attached must be made]. We hereby declare that all the information and statements made in this Proposal are true and we accept that any misleading information contained in it may lead to our disqualification.

We undertake, if our Proposal is accepted, to sign the MoU and initiate the project as per the timelines prescribed.

Yours faithfully,

Authorized Signature [In full and initials]:
Name and TITPe of Signatory:
Name of Firm:
Address:

{In a consortium either all members shall sign or only the lead member, in which case the power of attorney to sign on behalf of all members shall be attached}.

B. Authorization letter from the TP to the Execution partner

<<Insert Letter here>>

C. Certificate of registration/incorporation of the TP and execution partner

<<Insert Certificate of registration >>

D. Self-Declaration against blacklisting of TP and the Execution partner

<<Certificate of self-declaration>>

Section 4.0 Technical Scope

4.1 Concept

The overall plan, as part of this programme is to encourage a Technology Partner (TP) to setup a Center of Excellence (CoE). The CoE is being setup to offer an interrelated high technology, modular, skilling facility and offer demand driven courses.

The CoE, to be designed by the TP, is envisioned to be setup as a state - of – the - Art Center of Excellence (CoE) in which the TP brings in their best in class equipment/ tools/ machines/ simulators (commonly referred to as equipment) to be used for training purposes. The COE will be located in an appropriate space offered by the client. The CoE will be managed professionally by the TP. The infrastructure for the CoE will be made ready by the client as per the specifications given by the TP and the EP.

The CoE will run under the overall operational management of the Execution Partner (EP). The EP, under the Guidance of the TP, will be responsible for devising and implementing a three-year rolling plan and ensuring that the CoE is constantly upgraded and provides a high technology ecosystem for skilling/ up- skilling/ re-skilling/ cross-skilling and multi-skilling. The EP, under the Guidance of the TP, will be expected to assist the client to mobilize students for training which will help generate revenues at the CoE which can help offset the overall costs of the CoE.

Overall administrative, quality and financial responsibilities including the management of the CoE, marketing, branding, placement, costing of courses, management of hostels, course content, pedagogy, funding etc. will be the responsibility of the Client. The Client may engage with, invite and sign MoUs with industries (such as equipment manufacturers, tool and device manufacturers that service the Industries) and continuously engage with the service providers to ensure that the CoE remains relevant at all times.

Digital Manufacturing

The proposed Center of excellence focuses at Digital manufacturing. Digitalization is changing our daily lives and revolutionizing the world economy. Successful companies are seizing the opportunities offered by digitalization for lower costs, improved quality, support individualized production, and provide flexibility and faster response to customer/market demands and new business models. We are in the midst of the digital industrial revolution.

Digital Twin

Industries are upgrading phase to Industry 4.0, which originates from the concept of Digital twin. Digital Twin is an accurate virtual representation of products, processes, operations, and performance. For products and assets, a digital twin flows from a geometric model. But it's not a single representation — it's a twin for each product sold, each piece of equipment in a factory, or every item in an installed base. The goal is to provide DVR-like capability — I can rewind to see what happened, play to see what is happening, and fast- forward to see what might happen (a simulation).

The value of the digital twin in manufacturing offers a unique opportunity to virtually simulate, validate and optimize the entire production system. It also lets you test how the product with all its primary parts and sub-assemblies will be built using the manufacturing processes, production lines and automation.

Hence in the center of excellence there should be advanced product design and process design software that can connect to the hardware provided in the other labs to form Digital twin / Digital manufacturing. The proposed list of labs in this Center of Excellence should encompass upcoming manufacturing technologies related to industry 4.0 (Digitalization).

Note: The Digital twin for at least 4 of the hardware labs should be recorded in a video format and submitted along with the proposal in a USB Drive.

4.2 Role of the TP and their Execution Partner:

The role of this TP and their Execution Partner shall include the following:

1. To design the CoE and to develop a three years strategic rolling plan for the CoE along with the client and be responsible for implementing the plan.
2. Identify and formulate training programmes to develop skills in futuristic/ disruptive technologies and associated skill sets required for industry ready.
3. To develop courses, course content, course work, manuals, standard operating procedures and standards, disseminate the same with the overall intent of improving the skill sets of individuals
4. To impart high-end skills (and not generic skills) to Students, unemployed individuals and employed individuals (looking to up skill/ re-skill themselves).
5. To conduct TOT (train the trainer) programmes.
6. To conduct need based/ on-request training programmes to cater to specialized requirements of corporate, and to generate revenues through these programmes.
7. To carry out assessment, certification of trainees.

Scope of the Labs:

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
1	**Product Design and Validation Laboratory**	**1. Computer work stations** **2. Latest networked licensed versions of following computer aided software:** • Computer aided design software • Computer aided Manufacturing software • Sheet metal work design software • Wire Harness & Routing design software • Mechatronics system Designer • Fiber design software The above software should be capable of (but not limited to): • wireframe, surface, solid, parametric, facet modeling. • creating and managing assembly models of any size or complexity and supports both top-down and bottom-up techniques. • freeform shape modeling including synchronous sculpting of surfaces and solids. • creating conceptual layouts quickly from raster images or CAD sketches, using curves and sections to extrude, loft, revolve and extend the geometry. • creating surfaces from meshes of curves. • editing faces with synchronous freeform modeling, sculpting solids by moving iso-parameter curves and poles with push-and-pull simplicity. • efficiently creating sheet metal parts based on industry knowledge of material properties and manufacturing processes • providing solutions to facilitate the entire design process for routed systems, including wire harnesses, cables, piping, tubing, conduit and raceways.	30 30 users	The proposed lab is to be set up for the following objectives: • To provide outcome based training in line with IR4.0 requirements related to CAD, CAM and CAE. • To support every aspect of product development, from concept design to final product through engineering and manufacturing solutions. In order to achieve above objectives, the Centre offer high-end skill training programme in the following areas: • Digital modeling of products using Computer Aided Design software. • Creating assembles using simulated environment. • Digital modeling of textile products using Computer Aided Design software. • Digital modeling and simulation of Mechatronics concept based products • Motion simulation to predict dynamic behavior of system. • Manufacturing simulations before actual production.

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		• reverse engineering feature so that they could be used for 3D printing, mold design, analysis, or other uses • combining facets, surfaces, and solids in one model without converting data. • easily import and optimize scanned data • fiber and composite part design		
2	**Manufacturing - process Digitization Lab**	1. **Computer work stations** 2. **Latest networked licensed versions of following computer software:** • Computer aided Manufacturing (CAM)software: provide wide range of functionality, from simple NC programming to high-speed and multi-axis machining, and validate the Machine Tool cutting operations and parameters. • Digital manufacturing(DM) Solutions Software: assist to understand automated way of manufacturing planning, controlling and managing the manufacturing process in a virtual environment, including Assembly Lines, Plant layout and Line design, Simulation and optimization of production and logistics, Facility Layout, Tooling and Fixture design, Human simulation and Ergonomics, Realistic Robot Simulation (RRS) • Product Lifecycle Management Solution (PLM) software: allows to manage the enterprise solutions of product development from concept design to product manufacture.	**30** 30 users 30 users 30 users	The Manufacturing process digitalization Lab should consist of: CAM software, Digital Manufacturing Solutions, Product Lifecycle Management Solution software. The proposed lab is to be set up for the following objectives: • To provide state-of-the-art manufacturing technologies to match industry 4.0 standards. • To impart training and transfer the skills from proposed lab to the operation and control of Industry 4.0 hardware/ equipment. In order to achieve above objectives, the Centre offer high-end skill training programme in the following areas: • Process Planning, Electronic Work Instructions and BOM Management • Dimensional Quality • Layout and Plant Simulation with integration to Design of Experiments • Design for Assembly, Design for Manufacturing, Design for Maintenance • Ergonomic Analysis • Robotic Simulation, Offline Programming and Realistic Robot Simulation (RRS)

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
				• Product lifecycle management from inception, through engineering design and manufacture, to service and disposal of manufactured products.
3	**Simulation, Optimization and Testing Lab**	1. **Computer work stations** 2. **Latest networked licensed versions of following computer aided software:** • Computer aided interior and exterior acoustic analysis software (including features and facilities but not limited to Boundary Element Acoustics, Finite Element Acoustics, Ray Acoustics, Aero-Acoustics, etc.) • Electrochemistry simulation software • Electromagnetic Simulations software (including features and facilities but not limited to Electric Field Analysis, Low-High Frequency Electromagnetics, Iterative Physical Optics, Plasma Modeling, Electric Machine Design, Thermal Analysis, etc.) • Fluid dynamics Simulation software(including features and facilities but not limited to Dynamic Fluid Body Interaction, Motion Definition And Nesting, Rigid Body Motion For Cfd, Sliding And Non-Conformal Meshes, Multi-Phase Flow, Cavitation, Dispersed Multiphase, Fluid Film, Mixture Multi-Phase, Particle Boundary Types Motion, Reacting Flow, Multi-Phase Surface Reactions, Reaction And Combustion Models, Rheology, Battery Simulation, Engine Simulation, Power Electronics Thermal Management, etc.) • Motion simulation software (including features and facilities but not limited to Co-Simulation with Control Systems, Interference Checking, Rigid Bodies, etc.) • Structural simulation software (including features and facilities but not limited to Linear Analysis, Non-Linear Analysis, Structural Dynamics, etc.) • Thermal Simulation software (including features and facilities but not limited to Boiling,	30 30 users	The proposed lab is to be set up for the following objectives: • To provide outcome based training related to computer based multi-physics simulations. • To provide solution for complex engineering problems by striking balance between technological design options and functional performance through simulated environment. In order to achieve above objectives, the Centre offer high-end skill training programme in the following areas: • Multi-physics simulations of structural, thermal, fluidic, electromagnetic systems etc. • Predicting dominating parameters of a phenomenon through simulated trials. • Motion simulation to evaluate dynamic behavior of the system. • Perform various test related to Acoustics, noise, vibration, structural dynamics etc.

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		Conduction Heat Transfer, Convection Heat Transfer, Energy in Solids, Heat Exchangers, Phase Change, Radiation Heat Transfer, Thermal Stress, Thin Film: De-Icing & De Fogging, Optimization, etc.) • System Simulation (including features and facilities but not limited to Optimize System Performance, Electrified Vehicle Simulation, Battery & Fuel Cell, Hybrid & Electric Vehicle, Aircraft Electrical System Simulation, Electrical System Modeling, Fluid System Simulation, Powertrain Subsystem Simulation, Cooling Systems, Fuel Injection Systems, Lubrication Systems, Valvetrain & Cranktrain, Aircraft Fuel System Simulation, Aircraft Hydraulic System Simulation, Fluid Power System Modeling, Heavy Equipment Actuation System Simulation, Pump And Valve System Simulation, Mechanical System Simulation, Powertrain Transmission System Simulation, Transmission Design, Transmission Drivability, Transmission Noise and Vibration, Transmission Performance and Losses, Vehicle System Dynamics Simulation, Intelligent Chassis Subsystems, Ride and Handling, Flight Control System Simulation, Landing System Simulation, Mechanical System Modeling, Propulsion System Simulation, Internal Combustion Engine System Simulation, Air Path & Charging, Combustion, Engine Controls, Exhaust After-Treatment, Aircraft Engine & Equipment System Simulation, Marine Propulsion System Simulation, Space Propulsion & Subsystem Simulation, etc.) • Deploy model-based design for components and entire systems System Integration (including features and facilities but not limited to Virtual Integrated Aircraft, Analysis Tools, Customization, Optimization, Robustness And Design of Experiments (DOE), Platform Facilities,		

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		Simulator Scripting, etc.)		
		• Acoustic testing equipment and instrument (including features and facilities but not limited to Acoustic Material Testing, Active Sound Design, etc.) • Operational NVH testing • Pass by Noise engineering testing (including features and facilities but not limited to Sound Intensity Testing, Sound Power Testing, Sound Quality Engineering, Sound Source Localization, etc.) • Test data analysis (including features and facilities but not limited to Test Data Correlation, Test Data Management, etc.) • Durability testing- Accelerated Life Testing • Load and fatigue analysis • Road load data acquisition- Dynamic Environment Testing • Multi-axis vibration testing • High channel count data acquisition (including features and facilities but not limited to Sound Intensity 3d Visualization, Real-Time Source Localization, Autonomous Data Recorder, Hand Held Data Acquisition, In-Field Rugged Data Acquisition, Laboratory Data Acquisition, Mobile Data Acquisition, Pass By Noise Hardware, etc.) • Model based system testing (including features and facilities but not limited to Rotating Machinery Testing, Rotating Machinery Testing, Ev Powertrain Testing, Combustion Engine Testing, Operational Data Collection, Signature Testing, etc.) • Torsional vibration testing • Structural dynamics testing (including features and facilities but not limited to Modal Testing, Broad Band Shaker Testing, Impact Testing, Normal Mode Testing, Sweeping Frequency Shaker Testing, Experimental Modal Analysis, etc.)	1 set of each	

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		• Ground vibration testing (GVT) (including features and facilities but not limited to Modal Parameter Identification, Operational Modal Analysis, Vibration Trouble Shooting, etc.) • Transfer path analysis (including features and facilities but not limited to Auralization, Component Based TPA, Road Noise Trouble Shooting, Trouble Shooting and Benchmarking, etc.)		
4	**Robotics Laboratory**	**1. Computer work stations**	**10**	The proposed lab is to be set up for the following objectives: • To provide outcome based training in line with IR4.0 requirements related to Basic of robots and programming. • To support every aspect of product development using high precision automated Pick-Place, Spot TIG, MIG and CMTT welding services and programming.
		2. Robotic kits for creating robots for different applications.	05	
		3. Various robot actuators, sensors, end effectors		
		4. Collaborative Robotic cell with standard accessories for material handling, pick and place, assembly applications.	01	
		5. Robotic Cells for • Spot Welding • MIG Welding • TIG Welding • CMTT Welding • Painting	02	
		6. Welding table with set of fixtures	02	
		7. Welding Power Source	02	
		8. Voltage Stabilizer	02	
		9. Robot pedestal	02	
		10. Safety Light Curtain	02	
		11. Safety fence for Cell Wire Mesh type	02	
		12. Safety PPE	02	
5	**CNC Controller Lab**	**1. Computer work stations**	**30**	The CNC controller lab should have hardware, software, equipment, related tools and accessories that enable learners to understand the concept of CNC programming and to work various real time controllers (which are used by India's major industrial units) for turning and milling applications. The proposed lab should also focus on the usage and
		2. Latest networked licensed version of the software bundle for: • CNC Simulation software: Provide wide range of functionality, from simple 2 axis NC programming to high-speed and multi-axis programming, machining, and validate the Machine Tool cutting operations and parameters.	30 users	

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		3. Offline Control pads / facility / equipment to cater requirements of 30 students and able to create CNC programs and validate the relevant machine operations and parameters.	2 sets	functionality of HMI for diagnostics and troubleshooting and have a feature to explain how CNC programs control the Drives and Motors. This laboratory is to be set up so that the following objectives can be achieved- (a) To interface with the product design lab to learn & create CNC programs and validate the relevant machine operations and parameters. (b) To impart training and transfer the skills from proposed lab to the operation and control of Industry 4.0 hardware/equipment. (c) To conduct skill development courses for job seekers/engineering graduates/diploma pass outs. (d) To promote research in the area of performance of controller, optimization of machining process parameters and other futuristic issues. (e) To undertake consultancy projects/ mini industrial projects.
6	**Additive Manufacturing lab**	Standalone Ultra-fast, industrial 3D printer: Max Resolution 1920 x 1080 pixels Pixel Pitch 65 microns Wavelength 405nm Build material UV curable plastics, Tough-GRY 10, 15, FLEX-BLK 10, ELAST BLK 10 with software Build Volume 124.8 X 70.2 x 196mm	2	Support Industry 4.0 processes. Training, research and prototype printing.
7	**Electric Vehicle Technology**	**Probable items:** 1. Electric vehicle charging infrastructure including management software, panels, breakers, energy meters (for laboratory purpose): Power output: 15 kW capacity	1set complete	The CoE lab on EVT should be capable to achieve following objectives; • Conduct research on electric vehicle technology for the improvement of the system.

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		2. Electric Vehicles Test Rig for Laboratory purpose (for 2/4 wheelers)	1set	• Evaluate the impact of electric vehicles fleet's charging pattern on the power system distribution network operation with power quality analysis. • Train the engineering and diploma graduates in analyzing battery performance, specific requirement of battery and performance of Battery Management System (BMS) for LEV, HEV, PHEV and full electric vehicle applications. • Train the youth in testing and maintenance aspects of Electric vehicle systems. • Prepare youths to match up with the industry 4.0 revolution.
		3. Motors: for Electric Vehicle Applications	1 set	
		4. Voltage Sensors: Volts: 0-12V	3	
		5. Current sensors: Volts: +15V, 0-5V Current: 4-20 mA	3	
		6. Power supply: DC: 0-32V	1	
		7. Power quality analyser: To test the Power characteristics	1	
		8. Interfaces (for A/D or D/A conversion): D space Controller	1	
		9. Bidirectional on-board single phase and three phase charger for V2G and G2V modes operation of plug-in-electric vehicles (PEV) and Hybrid Electric Vehicles (HEV). - Bidirectional Inverter: Multilevel - Bidirectional DC/ DC converter	1 set	
		10. Scope meter: 60 MHz, 1 mV to 100 V/div.	1	
		11. Autotransformer: 3-Phase, 0-400 Volt, 50 A	1	
		12. Battery internal resistance meter: Open circuit voltage & internal battery resistance of each cell	1	
		13. Battery tester: Electrolyte resistance and reaction resistance	1	
		14. Wireless data logger: Voltage, current and leak current, temperature	1	
		15. Battery chemical impedance meter: LCR testing & Sweep measurement	1	
		16. Lithium ion Battery: 24 kWh	2	
		17. Filters	As per the requirement.	
8	**Process Instrumentation lab**	Application software: - The software must be industrial license software and It should combine a unique scalable architecture with powerful engineering tools and a wide variety of additional functions such as alarm management, process safety and asset management, all of which can be integrated seamlessly into the existing environment. It provides completely and safely automate the entire production	30 user license	Opening new avenues for research in process automation field as per Industry 4.0 requirement. Process control through the software (DCS and SCADA) and hardware integration. Hands on experience on state of art industrial grade equipment. Development of Process instrumentation

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		process and support sensors and automation devices of all leading manufactures.		and control skills to maintain the plants /Field like situation**.**
		Instrumentation Sensor kit Process Transmitter and receiver Racks with Pressure Transmitters, Temperature Transmitter, Level Transmitter (RADAR, Ultrasonic & Capacitive), Flow Transmitters (Electro-magnetic, Coriolis Mass Flow, Ultrasonic) & Electro-pneumatic Valve Positioner Pressure Measurement and the latest sensors for this parameter measurement as per Industry 4.0 standards Level Measurement and the latest sensors for this parameter measurement as per Industry 4.0 standards Temperature measurement and the latest sensors for this parameter measurement as per Industry 4.0 standards Flow Measurement and the latest sensors for this parameter measurement as per Industry 4.0 standards Weight Measurement and the latest sensors for this parameter measurement as per Industry 4.0 standards Humidity measurement Gas analyser Supplementary Components all above sensors as per Industry 4.0 standards , Software and plugins.	10 Units	Develop the skills need of industrial revolution 4.0. Train the workforce in selecting, installing, testing and troubleshooting of sensors and control circuits of the given industrial, commercial and residential applications. Train the workforce in selecting, installing, testing and troubleshooting of the different types of sensors for the given industrial, commercial and residential application. Train the faculty and also Students of Engineering Colleges and Polytechnics. Conduct researches in sensors, controls and Instrumentation studies. Impart training for Managers and Supervisors of Instrumentation Industries. Offer consultancy programs in sensors, controls and Instrumentation studies. Impart Vocational training for skill enhancement in sensors, controls and Instrumentation studies.
		Workstations with latest configuration, windows 10 profession version, Intel Xeon Processor 2.4 GHz/6-core/15 MB/85W/32 GB(4X8GB) DDR4 RAM Memory/Support upto 1 TB DDR4 ECC RDIMM Memory/7XPCie Slots/1 X 1 TB SATA HDD/4 X 3.5”SATA HDD/1 x Nvidia Quadro k2200 4 GB DDR5 PCI-E Graphics Video Card/	35	
		Test and Measuring equipment • Digital Multimeter: (4 and ½ digit or above) • DSO: (50 to 100Mhz, two channel built in function generator) • Function Generator: (25MHz and 10 MHz) Arbitrary function generator with two channel, up to 200MSa/sec sample rate, harmonic waveform generation up to 160 built-in waveforms, better arbitrary wave playback with SiFi technology, provides	20 20 30 (15No. +15No.)	

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		fine resolution and detail in high speed signals, TFT color display, convenient arbitrary waveform editing interface, standard waveform summing function. • Spectrum Analyzer: Up to 6.2 GHz frequency coverage, 40MHz real-time signal acquisition bandwidth, all digital IF technology, full range tracking generator, advanced measurement functions (opt.), PC software (opt.) optional Rf accessories (Cable, adapter, attenuator, brideg) complete, connectivity: LAN (LXI), USB Host & Devices, GPIB (opt)	5	
		Advanced Industrial sensors Kit	6	
		PLC,SCDA and HIM training solution:- Integrated solution consist of hardware and software on which the Industrial application can be developed and capable to support research activity in the field.		
9	**Internet of Things (IoT) Laboratory**	Computer(work stations), latest configuration , Xeon processor with 32GB RAM,2Tb Hard disk, Microsoft windows -10	35	Develop the testbed infrastructure for multidisciplinary experiments for Opening up a host of new opportunities and challenges for companies, governments and consumers. • Connecting Things , Data Analytics , Application Development , Enterprise Development. • Specific application development. • Develop the skills need of industrial revolution 4.0. • Train the workforce in selecting, installing, testing and troubleshooting of sensors and control circuits of the given IOT based industrial, commercial and residential applications. • Train the workforce in selecting, installing, testing and troubleshooting of the different types of IOT solutions for the given industrial, commercial and residential application. • Train the faculty and also Students of
		Printer(Latest configuration) Laser, monochrome	02	
		Cloud based open IOT operating system -	30 Users	
		Gateway for on field application, supports common Field Applications,	02	
		Gateway floor Applications	01	
		Adaptors for	01	
		IOT Kit:- Processor - 64bit ARMv7 Quad Core Processor 1.2GHz, Connectivity-802.11 b/g/n Wireless LAN Bluetooth 4.1, zigbee, USB & Ethernet, RAM-1GB, Memory-16GB (upgradable), OS-Linux, Ethernet-10/100 BaseT Ethernet socket, Video Output-HDMI and Composite RCA, Audio Output-Audio Output 3.5mm jack, USB-4 nos, Camera-15-pin MIPI Camera Serial Interface Memory Card-Push/pull Micro, LCD-Color TFT LCD, Motor Driver-Stepper and DC Motor, Analog Input-8 nos., Relay Output-4 nos. Buzzer Output-1 no. and with other essential peripherals	05	
		OPC Server License	01	
		Communication module:-Bluetooth Module, Zigbee Module, GSM Module, GPS Module, wireless module, RF module, UART Communication interfacing, Serial to USB	02	

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		converter, RS485, Communication I2C Protocol device interfacing SPI Protocol device interfacing, Ethernet configuration and with other essential peripherals		Engineering Colleges and Polytechnics. • Conduct researches in IOT protocols and applications • Impart training for Managers and Supervisors of Instrumentation Industries. • Offer consultancy programs in sensors, controls and Instrumentation studies. • Impart Vocational training for skill enhancement in IOT protocols, services and applications.
		Node MCU:- ESP8266 -12E, USB to micro USB data cable. with other essential peripherals	05	
		Industrial Gateway	1	
		Zigbee module: work on 2.4 GHz (Unlicensed Radio Band) radio frequency. Low data rate (≈250Kbps). Low power consumption (1mW, 6mW, 250mW etc.). Wireless communication over short distances (90m, 750m, 1mile etc.).	2	
		Bluetooth module: BT Version: Bluetooth Specification V4.0 BLE Send and receive no bytes limit. Speed: Asynchronous: 6K Bytes Synchronous: 6K Bytes, with other essential peripherals	05	
		GSM IoT Gateway:- • The device uses Bluetooth5.0 technology • Compliant with unlicensed 2.4 GHz ISM band • Works with either 2G Cellular Networks or WiFi • External Bluetooth and GSM antenna • Frequency Range: 850/900/1800/1900MHz	01	
		Online cloud/ server Amazon cloud server for data saving and analytics	01	
		GSM IoT Gateway: - • The device uses Bluetooth5.0 technology • Compliant with unlicensed 2.4 GHz ISM band • Works with either 2G Cellular Networks or WiFi • External Bluetooth and GSM antenna • Frequency Range: 850/900/1800/1900MHz		
		Other compatible connectors, and cables	As per need	
		Computer Server	01	
10	**Electrical & Energy Studies Laboratory**	**1.Training kit to test the firing angle circuit of three phase half controlled bridge converter.**	**1 No.**	The state-of-art Centre of Excellence(COE) in Electrical and Energy studies will be able to: • Develop the skills need of industrial
		Three phase half controlled bridge converter kit- 415 V, 20 Amp, 50 HZ	1 No.	
		CRO -230v,350mA, 50 HZ	1 No.	

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		CRO Probes	1 set	revolution 4.0. • Train the workforce in selecting, installing, testing and trouble-shooting of constant and variable speed drives for the given industrial, commercial and residential applications. • Train the workforce in selecting, installing, testing and troubleshooting of the different types of LV switchgears for the given industrial, commercial and residential application. • Train the faculty and also Students of Engineering Colleges and Polytechnics. • Conduct researches in Electrical drives, switchgear and Energy studies. • Impart training for Managers and Supervisors of Electrical Industries. • Offer consultancy programs in Electrical drives, switchgear and Energy studies. • Impart Vocational training for skill enhancement in Electrical and Energy studies.
		Connecting wires	1 set/As required	
		2.Training kit to test the firing angle circuit of three phase full controlled bridge converter	**1 No.**	
		3-phase full controlled bridge converter kit-415V, 20Amp, 50Hz	1 No.	
		CRO -230v,350mA, 50 HZ	1 No.	
		CRO Probes	1 set	
		Connecting wires	1 set/As required	
		Trainer kit is used to study the Regenerative / Dynamic braking operation of AC motor	1 No	
		Trainer kit is used to study the Regenerative / Dynamic braking operation of DC motor	1 No	
		3. Microcontroller based three phase Induction motor drive Trainer kit is used for Sinusoidal Pulse Width Modulated(SPWM) as well as Space Vector Modulated(SVM) inverter fed Variable Frequency drive	**1 No**	
		4.Vector Control of Three Phase Induction Motor Drive System The kit should consist of 3 phase induction motor, Evaluation board, Interface board, 3 phase Ac/BLDC high voltage power stage, inline optoisolation box which is connected between host computer and the controller board,Quadrature encoder, Power supply for evaluation board and power supply for 3 phase ac induction motor	**1 No.**	
		5.V/F control of three phase induction motor using dsPIC micro controller	**1 No.**	
		Three Phase Induction motor-415V, Delta connected, 3.7 kw,7Amps,1440 RPM, Power factor o.8	1 No.	
		Intelligent Power Module	1 No.	
		dsPIC Controller training kit	1 1No.	
		QEP Sensor interface chord	1 No.	
		PC-PC serial port cable	2 Nos.	
		Power Patch Chords-1 phase, 3 pin chord	4 Nos	
		26 Pin FRC Cable	1 No.	
		34 Pin FRC Cable	1 No.	

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		Autotransformer – 440V, 15 Amps,50 HZ, three phase	1 No.	
		Connecting wires	1 set	
		Personal Computer	No. (Optional)	
		6. 3 Phase AC Integrated Motor Specification: Speed control of 3 phase wound rotor induction motor with dc generator setup • Voltage: 415 V AC, 50 Hz • Capacity: 300 W / 4 pole / 1500 RPM • Rotor construction: Star connected, 4 terminals including star point brought out on 4 slip rings mounted on shaft • Stator construction: 6 terminals are brought out to start the machine using star-delta starter • Frame / mounting: 100 frame, chassis mounted • Loading arrangement: Friction brake pulley for loading arrangement with 20 Kg spring balance for torque measurement • Speed Measurement: Using hand held tachometer **Control Panel Specifications:** • Aluminium profile modular flat table top demo panel carrying various high voltage components housed in plastic enclosures to minimise shock possibility • Input 3 Phase DOL Starter Panel • Integrated AC 3 Phase Multifunction Measurement Panel • FWD-OFF-REV Switch Panel • 3 Phase Wound Rotor and Synchronous Motor Panel • DC Voltmeter and DC Ammeter Panel • SCR Actuator (variable DC) cum sensor signal conditioning panel • Instrumentation Power Supply cum Multichannel DPM Panel • Hand Held Tacho Meter	1 No.	
		7**. Speed Control of Single Phase Induction Motor using AC voltage controller** Technical Specifications: 1. Digital Meters: Voltage & Current Measurement 2. Digital RPM counter	1 No.	

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		3. Double Pole MCB 4. LED Indicators 5. A.C. MOTOR: AC Induction Motor 0.5HP, Capacitor start 1phase 230V AC, 50Hz, 1440rpm, TEFC, IP44, IC01, Class-B, and Single Shaft Extension. 6. FIRING CIRCUIT: Micro Controller based Firing circuit for precise control. Step Down Transformer Firing Circuit. Firing Angle Display. Facility for firing angle control using a potentiometer 7. POWER CIRCUIT Two SCR's (600V/12A) in Back to Back configuration 8. LOAD Motor Mounted on MS Base with mechanical loading arrangement with pulley, belt, Spring Balance.		
		8.Speed control of synchronous (PMSM) motor coupled with dc generator setup using cycloconverter Trainer designed for sensored and sensorless control of Synchronous motor(PMSM) drive operation	1 No.	
		9.Speed control of permanent magnet synchronous motor using FPGA Spartan 6 controller	**1 No.**	
		Permanent Magnet Synchronous Motor -230V,2.5 Amp, 5000RPM	1 NO.	
		SRM Power Module1	1 No.	
		FPGA Controller – SPARTAN 6	1 No.	
		PC-PC serial port cable	2 Nos.	
		Power Patch Chords-1 phase, 3 pin chord	4 Nos	
		26 Pin FRC Cable	1 No.	
		34 Pin FRC Cable	1 No.	
		Autotransformer – 440V, 15 Amps,50 HZ, three phase	1 No.	
		Connecting wires	1 set	
		Personal Computer1	No.(Optional)	
		10.Speed Control Of DC Shunt Motor Using three Phase Fully Controlled bridge Converter.	**1 No.**	
		DC Shunt Motor -230V, 1500rpm, 2.3Amp	1 No.	
		Full controlled converter- Motor control kit-200V, 15Amp, 50Hz	1 No.	

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		Connecting Leads	1 set/As required	
		Digital multimeter		
		Digital Tachometer		
		Auto-Transformer – 415V, 15 A, 13 phase, 50 HZ	NO.	
		11.Speed control of DC motor with single phase Dual Converter	**1 No.**	
		DC Shunt Motor -230V, 1500rpm, 2.3Amp	1 No.	
		Dual converter- Motor control kit	1 No.	
		Connecting Leads	1 set/As required	
		Digital multimeter		
		Digital Tachometer		
		Auto-Transformer – 415V, 15 A, 3 phase, 50 HZ	1 NO.	
		12.FPGA based dc motor control using dc-dc chopper	**1 No.**	
		DC Shunt Motor – Rated Power -0.5 HP Rated Voltage- 180V Rated Current -5.1 Amps Rated Speed-1500 RPM	1 No.	
		Intelligent Power Module1	1 1No.	
		FPGA Controller trainer kit- SPARTAN 6	1 No.	
		QEP Sensor interface chord- DC Motor	1 No.	
		PC-PC serial port cable	2 Nos.	
		Power Patch Chords-1 phase, 3 pin chord	4 Nos	
		26 Pin FRC Cable	1 No.	
		34 Pin FRC Cable	1 No.	
		Autotransformer – 440V, 15 Amps,50 HZ, three phase	1 No.	
		Connecting wires	1 set	
		Personal Computer1	1 No.	
		13.Speed Control of FPGA based Permanent Magnet Brushless Motor Drive System	**1 No.**	
		Permanent Magnet Brushless Motor	1 No.	
		Intelligent Power Module1	1 1No.	
		FPGA Controller trainer kit- SPARTAN 6	1 No.	
		QEP Sensor interface chord-	1 No.	
		PC-PC serial port cable	2 Nos.	

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		Power Patch Chords-1 phase, 3 pin chord	4 Nos	
		26 Pin FRC Cable	1 No.	
		34 Pin FRC Cable	1 No.	
		Autotransformer – 440V, 15 Amps,50 HZ, three phase	1 No.	
		Connecting wires	1 set	
		14.Speed control switched reluctance motor using DSP controller	**1 No.**	
		Switched Reluctance Motor- 300V DC, 2.5 Amp,0.75 kw(1 HP), 4000RPM	1 No.	
		SRM Power Module	1 No.	
		DSP controller	1 No.	
		PC-PC serial port cable	2 Nos.	
		Power Patch Chords-1 phase, 3 pin chord	4 Nos	
		26 Pin FRC Cable	1 No.	
		34 Pin FRC Cable	1 No.	
		Autotransformer – 230V, 50 HZ, single phase	1 No.	
		Connecting wires	1 set	
		Personal Computer1	1 No. (Optional)	
		Servomotor	1 No.	
		DSP	1 No.	
		Connecting Probes – Male/Female	1 set/ As required	
		Digital Multimeter	2 Nos.	
		15.Trainer kit to Control of Hybrid Stepper Motor Drive System	**1 No.**	
		Hybrid stepper motor	1 No.	
		Hybrid stepper motor control kit	1 NO.	
		Digital Multimeter	1 No.	
		Digital Tachometer	1No.	
		Connecting wires	1 set/As required	
		16.Trainer kit for Speed control of universal motor using AC voltage regulator.	**1 No.**	
		Universal Motor	1 No.	
		Universal motor control kit- 415 V, 3 Amp, 50 HZ	1 No.	
		Digital Multimeter	1 No.	

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		Digital Tachometer	1 No.	
		Autotransformer – 415v, 3 Phase, 15 Amp, 50 HZ	1 No.	
		Connecting wires	1 set/As required	
		17.Three phase Current source inverter trainer comprising of the following: 1. Digital Meter: Voltage & Current Measurement 2. Digital RPM counter 3. TPN MCB 4. LED Indicators 5. A.C. MOTOR: Three Phase, 415V 1.0 HP squirrel cage induction motor drive by Micro Control Based Firing angle along with motor-generator set. Consisting of AC Induction Motor 1HP 415V, 1440RPM coupled to DC Shunt Generator 230V with Lamp Bank load. 6. POWER CIRCUIT It consist of 6 Thyristors connected in anti-parallel (2SCRs in each phase) by controlling the firing angle of the thyristors connected in anti-parallel in each phase, the rms value of the stator voltage can be regulated. As a consequence, motor torque and thus speed of the drive is controlled. 7. CONTROL CIRCUIT FCR-100 (8051) microcontroller based SCR Bridge controller is used for controlling the firing circuit. Soft push buttons provided for increasing or decreasing the firing angle. 3-phase MCB. LCD display of the firing angle. 10:1 Attenuator with Isolation Transformer for observation of wave form on CRO. CRO 10Hz-1Mhz for AC, 0-1Mhz for DC	**1 No.**	
		18.Three phase AC Voltage source inverter trainer comprising of the following: 1. Digital Meter: Voltage & Current Measurement 2. Digital RPM counter	1 No.	

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		3. TPN MCB 4. LED Indicators 5. A.C. MOTOR: AC Induction Motor 1 HP, 3 Phase, 415V AC, 50Hz, 1440rpm, TEFC, IP44, IC01, Class-B, and Single Shaft Extension. 6. FIRING CIRCUIT: Bridge Rectifier for working as DC Source. IGBT Driver Circuit. Three Phase Bridge Circuit. A Digital Circuit Controller to provide pulse to the IGBT Driver Circuit. Three Phase Induction Motor TFC Enclosure is connected as load across the three phase bridge circuit. 7. POWER CIRCUIT Six MOSFET/IGBT (600V/25A)		
		19.Demo kit for LV switchgear comprising of following multiple items: Direct Online(DOL) starter, Star-Delta Starter, soft starter training kit Air Circuit breaker Over Load Relay Contactor HRC Fuses Triple Pole Molded Case Circuit Breaker(TPMCCB) training kit Double Pole Miniature Circuit Breakers(DPMCB)ELCB, RCCB	6 Nos.	
		20.Intelligent motor management system	1 set	
		21.PAC Meter – Energy Meters	1 set (1 set consists of 6 equipment)	
		22.Energy saving training equipment with motor(2 Unit) - 1	1 set consists of 2 units	
		23. Real time power system simulator Capable of analysing the performance of Microgrid / Smart Grid / Fast switching components /Distributed Energy Resources (DER) & Renewable Integration	1 No.	

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		It should also be capable of using for evaluation of the impact of electric vehicles fleet's charging pattern on the power system distribution network operation with power quality analysis".		
		24. Electrical Drives Lab: • DC drive training equipment with DC Master with DC Motor: 1 set (1 set consist of 2 kits) along with associated software. • AC Drive training equipment with AC master and 3 phase Induction Motor: 1 set (1 set consist of 5 equipment) along with associated software. • SERVO Drive Training Equipment with 3 phase Induction Motor: 1 Set (1 set consist of 5 Equipme nt) along with associated software.	1 No.	
11	**Industrial Automation Lab**	1. Latest Industrial version of PLC with HMI and PLC Software -TIA Portal	06 Nos. and 10 users software	The CoE lab on EVT should be capable to achieve following objectives; ✓ To make students and industrial personnel's competent by providing skill training in the area of PLC SACADA, ROBOTICS, HMI and FMS hydraulics and pneumatics etc. ✓ Training of Trainers programmes for various Institute and industries ✓ Promote research on futuristic issues in the different areas of industrial automation ✓ Train the students and industrial personnel's in testing and maintenance of various equipments of industrial automation ✓ Prepare students to match up with the industry 4.0 revolution
		2. Static and Real Applications for PLC System 20-25 Static Application panels such as Elevator, Washing Machine, and Traffic Intersection etc. Real applications Conveyor belt, Elevator, Rotary Transfer Unit etc . Air compressor should be included Door Bell Operation, Switching of lights, Silo Control, Seven Segment Display, Starter Control, Sequential Control of Motors, Star Delta Control Resistance Welding, Tank Level Control, Bottling Plant, Drink Dispenser, Reaction Vessel, Oven, Parking Garage, Combination Lock, Elevator Simulator, Process Control Trainer	15-20 Static Real Experiments	
		3. SCADA Applications for PLC-15-20No's SCADA Experiments for interfacing to PLC System - Door Bell Operation , Switching of Lights, Silo Control , 7 Segment Display, Starter Control , Sequential Control of Motors , Star Delta Control, Resistance Welding, Tank Level Control , Traffic Light Control, Bottling Plant , Drink Dispensers, Reaction Vessel , Micro-Wave-Oven , Car Parking	15-20 Static Real Experiments	

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		Garage , Combination Lock , Elevator Simulator, Process Control Trainer, Washing Machine		
		4. INDUSTRIAL SCADA (Supervisory Control & Distributed Acquisition) with SCADA Software -TIA Portal WinCC -10 users	02	
		5. INDUSTRIAL HMI (Human Machine Interface)	02	
		6. PLC NETWORKING (Profibus, Profinet, etc.)	02 Nos.	
		7. **Pneumatic Trainer Kit-** industrial version with profile plate and work bench and simulation software	02 Nos.	
		8. **Hydraulics trainer kit-**industrial version with profile plate and work bench and simulation software	02 Nos.	
		9. **Advanced Electro - Hydraulic and Electro – Pneumatic-** Hardware systems industrial version with PLC kits work stations and simulation software	02 pneumatic 02 Hydraulic	
		10. Transparent working models of different types of Actuators	02 sets	
		11. Proportional / Servo PID Feedback Hydraulic trainer with SCADA Monitoring- Proportional / Servo PID Feedback Hydraulic System for SCADA Monitoring	02	
		12. Robotic kit- Containing all the components to develop a small robot	10 Kit	
		13. Industrial Grade Small Robot Training System-6 Axis Articulated Industry grade robot with programming software, controller and teach pendant. Includes Robot experiments	01	
		14. Offline 3D Robot Programming Software-3D Offline Robot Programming software for Hardware Robot. Classroom Multi-user version.	30 user	
		15. **Application software: -** The software must be industrial license software and Single Integrated Circuit Design, Simulation and Animation Package consisting of the following modules in Single Software Environment Hydraulics & Proportional Hydraulics, pneumatics , PLC, Allen Bradley™, Siemens™, IEC 1131-3,Component Sizing Module, Electrical Controls, Electro technical (A.C. & D.C.) ,HMI 2D/3D	30 user	

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		& and Control Panels ,SFC Grafcet IEC 61131, Digital Electronics, Diagnostics and Troubleshooting , Bill of Materials (BOM) & Report Module, OPC Client with Interface Kit- minimum 19 Input and 16 Output Digital Interface Kit with OPC Server for Interfacing Simulation Software to Hardware .		
		16. Workstations with latest configuration, windows 10 profession version, Intel Xeon Processor 2.4 GHz/6-core/15 MB/85W/32 GB(4X8GB)DDR4 RAM Memory/Support upto 1 TB DDR4 ECC RDIMM Memory/7XPCie Slots/1 X 1 TB SATA HDD/4 X 3.5"SATA HDD/1 x Nvidia Quadro k2200 4 GB DDR5 PCI-E Graphics Video Card 17.	35no	
12	**Mechatronics Laboratory**	1. **Advanced Mechatronics Sensors Trainer**- having different types of sensors training panels. Aluminum profile modular flat demo panel rack system (table top) carrying various components housed in plastic enclosures (panels) -Instrumentation Power supply cum Multi- channel DPM panel (a) +/-12 V, 500 mA (b) +5V, 300mA, -Sensor signal conditioning panel, Speed Sensing Transducers, 24VDC Power Supply Panel Input 230VAC, output 24VDC/2A.with extenders for connections -Dual Timer Panel (DTP) [14 Shrouded Banana], Lamp Load Panel [12 Shrouded Banana, Windows Safety Sensor Panel , Proximity cum Limit switch Panel [6 Banana + 3 Shrouded Sockets], Relay Output Panel(16 banana sockets, Fiber Optic Sensor Panel, Computer Interface Panel	02	The CoE lab on EVT should be capable to achieve following objectives: ✓ To make students and industrial personnel's competent by providing skill training in the area of sensors, microcontrollers, table top conveyor system, 3D Printer, 3D scanner, embedded system Advanced drives , FMS etc. ✓ Training of Trainers programmes for various Institute and industries ✓ Promote research on futuristic issues in the different areas of industrial automation ✓ Train the students and industrial personnel's in testing and maintenance of various equipments of Mechatronics ✓ Prepare students to match up with the industry 4.0 revolution
		2. **Advanced Industrial Sensor Kit**-Temperature Sensor, Light Sensors, IR Sensors, Pressure Sensor, LVDT Coil, Load Cell , Strain Guage, Piezo Electric	02 set	

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		Sensor , Gas Sensor , Alcohol Sensor, PIR Sensor, Humidity Sensor , Magnetic Sensor (Hall Sensor), color sensor, Capacitive Proximity Sensor, Inductive Proximity Sensor, Opto coupler sensor, Reed switch, Level Sensor, Clap Sensor, Fire Sensor, Flow Sensor, Smoke Sensor, Acclerometer Sensor, Heart Rate Sensor ,Optical Proximity Sensor, Potentiometric Displacement sensor, Temperature Sensor, Galvanic skin response, Capacitive Displacement Sensor, Touch Sensor, Current Sensor, ECG Sensor Module, RFID.		
		3. Transparent working models of different types of sensors	02 set	
		4. **Industrial advanced Microcontroller & Embedded** Programming Kit like 8051, 8085, 8086 Microprogramming Kit	06 Nos.	
		5. Applications for Microcontroller Kit- minimum Applications such as A/D, D/A, Traffic Intersection, Elevator, etc. 15-20 No's	06 Nos.	
		6. **Table top transfer and conveyor system** Table top Sorting System with PLC and HMI • Distributing stations – • Testing and Processing stations Sorting and separating station • Hydraulic punching station	01	
		7. Complete set of Advanced Industrial Drives like Drives experiment bench trainer consisting of Ac servomotor trainer, DC servomotor trainer , stepper motor trainer	02 set	
		8. Complete Equipment set for Fieldbus/Profibus Technology	02 set	
		9. 3D printer	01	
		10. 3D scanner	01	
		11. Flexible Production System with Integrated Pick Place Robot and Storage Bay	01	
		12. Workstations with latest configuration, windows 10 profession version, Intel Xeon Processor 2.4 GHz/6-core/15 MB/85W/32 GB(4X8GB)DDR4 RAM Memory/Support upto 1 TB DDR4 ECC RDIMM	35 no	

Sl. No.	Name of CoE Lab	Lab related items with major features	Quantity	Scope of Lab
		Memory/7XPCie Slots/1 X 1 TB SATA HDD/4 X 3.5”SATA HDD/1 x Nvidia Quadro k2200 4 GB DDR5 PCI-E Graphics Video Card		

Scope of Services:

S. No	Description
1	**Project Management** Once when the MoU is signed and PO is released, the Partners should work closely with Institute in planning and execution of the CoE. - Should define the delivery timelines. - Should work closely with the Client for the site readiness - Responsible for commissioning of all the items and ensure the entire lab is up and running. - Conduct Train the Trainer - Conduct One Industry Seminar every Semester
2	**E-learning courseware** A complete list of interactive E-Learning covering the below topics should be also provided along with the entire setup. The courses should be clearly broken down into Number of hours, designed it in a structural way allowing the trainees to pick courses at different levels. These courses should be compatible to the NSDC aligned programs as well. All the courses should be online version. An evaluation login or access should be submitted along with the Proposal for evaluation for Robotics, CNC and EV Technology. The Digital library should be a collection of Reference, Learning and Training material in Digital Manufacturing Technology. The technologies covered are CNC, Robotics, Process instrumentations, Industrial Automation and Mechatronics etc.. This library should be applicable to all engineering levels – Universities, Institutions, Polytechnics, Training Centers and Corporate learning centers. Many institutions have already begun the task of converting their traditional collections of books and educational materials to electronic format: HTML, PDF formats or eBooks. Features of the Digital Library should be: **Comprehensive Coverage** The Digital Library should offer a wide range of content in Digital Manufacturing Technology. The content should align with current industry demands and oriented to build skills while enhancing learning. Students can access the content across different branches of engineering and application. **Access at your Fingertips** It should give access to multiple contents accessible from any computer in our institute and access must be through the internet. Students should be able to learn at their pace. Multiple student should be able to access the same content from a Digital Library unlike a book which will have limited number of copies. **Interactive Content** The content should be highly interactive and interesting. Using this Multimedia Digital Library students should be able to understand various concepts with the help of rich Graphics, Animations, Videos and Voice over.

	The courses should be managed by Learning Management System (LMS). **Learning Management System – Features required are** ● Friendly and attractive user interface with a 3-tier architecture for managing clients ● Dashboard for viewing all relevant information on the platform in one glance (for each tier above) ● Comprehensive reports, based on users, courses, and enrolments ● Ability to add varied types of content, including PPT, PDF, videos, assignments, etc. ● Availability on mobile and tablet devices ● Batch user import (for adding a large number of users to the LMS in one go) ● Support for learning best practices such as spaced retrieval It should be possible to generate the following reports from the MIS: ● MIS on number of courses conducted. ● Course wise enrolment. ● Preferred Courses ● Enrollment Vs Successful Completion ● Categorization of trainees – students/ faculty / industry / specialization eLearning Content to be offered for the following technologies: ● Industry 4.0 - Manufacturing –process digitalization ● Automation ● CNC ● Robotics ● Electrical Motors and Drives ● Mechatronics ● Sensors and instrumentation ● EV Technology ● Process Instrumentations ● IoT
3	**Lab Management** • The COE should work in the BOT Model (Build, Operate and Transfer Mode) for a period of 3 years. • At least one qualified engineer with mix of experience must be deputed for this period for each labs who will be the technical resource for the respective labs. • The Engineer's activities are to conduct training activities, support our faculties technically in the research and industrial consultancy. • The engineers should have good written & oral communication, domain expertise, flair for teaching & conversant with engineering software. • Senior Trainers should have minimum graduate or post graduate qualification in engineering and minimum 3-4 years of experience. • Trainers should have minimum Graduate qualification in engineering and 2-3 years of experience. • There should also be a center manager deputed by the TP /EP who would be supervising the activities like enrollment of students, certification for students, Seminars and conferences being conducted, Maintenance of reports of the center Activity.

- The Center Manager should have minimum a graduate or Post graduate qualification in Engineering with minimum 6-8 years of experience and 2-3years of experience in Project management.

SCOPE OF WORK –

Supplier should provide the following –

- Managing the equipment in the lab and conducting the skill training programs
- Ensuring trainer availability for the training programs
- Provide update course material.
- Maintain the equipment for the duration of the BOT period
- The Center Head appointed by the TP will mobilize the students from institutes other than NITTTR Bhopal. The TP should provide training to a minimum of 15,000 students over a period of 3 years during the period of MoU.

TP and their Execution partner will manage the labs assigned by performing the following activities -

COURSES SCHEDULING AND IMPLEMENTATION OF TRAINING PLAN

TP/EP shall be responsible for scheduling, conducting Training. Supplier will present the schedule to the Project Manager of the institute and get it approved and declare it.
INSTITUTE will market the course and enroll the participants and schedule participants and other activities essential to training.
Training plan, including procedures for course enrolment, reporting of course progress, course completion and certification, monitoring of the training program, training records.

TRAINING METHODOLOGY

TP/EP should use digital material to teach theory, to make the understanding easy. TP/EP will follow theory in learning and simulation for practical and usage of equipment to complete the effective learning and completion of the course. Knowledge checks will be used effectively to monitor the process during the training.

EVALUATION PROCESS & CERTIFICATION

There should be pre and post course test will be conducted for the participant to monitor the learning and understand the knowledge level prior to the course.
The eligible participant should be given certificates. The evaluation process can be determined by the TP/EP and process it accordingly.
The certification should be a tripartite agreement between Institute, the TP and the service provider partner (if any).

AUDITING

Institute may conduct periodical audit of the center.
The audit includes both academic, and general, one senior executive (from the Institute) will be visiting the center and go through the activities carried out in terms of courses conducted, performance of the students and feedback given by the participants. The process also involves collecting the feedback on faculty, course, course ware and suggestions separately, so that clear complete relevant data is collected to work towards improvement. This information will be analyzed, and suggestions will be given to the tenderer to work towards improvement of the center. The suggestion should be documented and

	implemented within a mutually agreed timeframe. This will not include replacement of any hardware / software / content. **REPORTS** TP/EP will provide the following reports every quarter. The below reports are not exhaustive. MIS on number of courses conducted. Course wise students' enrolment. Course wise skills gained List of successful students. Footfall to the Center.