



# National Institute of Technology Kurukshetra (Institution of National Importance)

## SIEMENS CENTRE OF EXCELLENCE

Industry Partners



# SIEMENS CENTRE OF EXCELLENCE - VISION AND MISSION

## VISION

To be a globally recognized and leading centre for skill development, training and translational research for empowering indigenous manufacturing

VISION

## MISSION

To empower the Indian youth with industry relevant skills in manufacturing technologies by education and training securing rewarding employment opportunities

To develop capabilities and building capacity for indigenous manufacturing in collaboration with industry, academia, and government agencies

To provide access to state-of the art machinery and software tools for innovative design and developing new manufacturing technologies

MISSION

## THE VALUES

*We, the Team SCoE, aim*

To foster an inclusive, encouraging and supportive eco-system built on trust and powered by industry expertise and academic excellence

To provide tailored set of skills and hands-on experience through flexible approach by utilizing state-of-the-art machinery and design tools

Led by a team of specialists with relevant expertise and deep understanding of the industry requirements delivering practical benefits to the manufacturing sector in particular, and the society at large

VALUES

# FOREWORD



World is witnessing a paradigm shift in India's stance from a technology borrower to a technology provider. As structural, demographic and technological shifts transform Indian and global economy, it is cardinal that potential workforce shall be trained and equipped with the latest skill set & knowledge to meet the latest technological provisions that stimulates innovation, sustainability and employment. More flexible production, greater productivity, and the development of new business models are all possible today thanks to digital solutions. But the future of industry offers even more potential: Cutting-edge technologies will create new opportunities for both discrete and process industries to fulfill their customers' individual requirements. The term Industry 4.0 encompasses a promise of a new industrial revolution—one that marries advanced manufacturing techniques with the Internet of Things

to create manufacturing systems that are not only interconnected, but communicate, analyze, and use information to drive further intelligent action back in the physical world.

Taken together, this means leaders will increasingly have to manage individuals with disparate backgrounds located in diverse geographies as well as an integrated robotic workforce, such as artificial intelligence (AI) assistants, many of which are potentially not subject to the reward and management disciplines associated with some traditional forms of leadership. Recently, Government of India has also implemented new National Education Policy 2020 to catalyse and energize research, innovation and Skill Development across the country under which National Skill Universities and Technical Institutes are promoted as the Centres of Excellence to nurture innovation and required skill sets. It is envisaged that these institutions become aspirational for candidates like other premier institutes around the world. These institutes apart from coaching, affiliate candidates will also train the trainers and conduct extensive research to enhance the quality & delivery of skill training by keeping in touch with latest development in the skills space around the world. These centres also help to bridge the hiatus between technical education and the technological brilliance by rendering hands-on training on software and

hardware used in real-time world for holistic development of the candidates. I am confident that this will enable them to become successful entrepreneurs and self-reliant in the domestic manufacturing sector, and they shall be able to contribute to Make-in-India campaign.

NIT Kurukshetra Vision 'To be a role model in technical education and research, responsive to global challenges' is aligned to the current technological needs of global marketplace and Government of India initiative to fill the void in the area of skill development. In light of the above, NIT Kurukshetra has collaborated with Siemens to establish a "Siemens Centre of Excellence" in the campus with state of the art facilities comprising 11 labs which covers latest functional aspects of an Industry starting from product design to real part production. The Centre will enable the young engineers to get an access to the benchmark technologies in the field of Automotive, Industrial automation, Industrial machinery, Aerospace, Robotics, Defense and Energy Saving.

The aspired target undertaken by NIT Kurukshetra is definitely dynamic but is surely achievable and will be a breakthrough in generating best-in-class workforce with better employability in the global marketplace.

**Dr. Satish Kumar**  
Director | NIT Kurukshetra

# NATIONAL INSTITUTE OF TECHNOLOGY KURUKSHETRA



National Institute of Technology Kurukshetra - an Institution of National Importance is a premier technical higher education institution of the country. The Institute is presently running 7 B.Tech., 20 M.Tech., MBA, MCA and Ph.D. programmes in all major areas of engineering, technology, sciences, management and humanities.

Spreading over 300- acre lush green and environment friendly campus, it is a fully residential Institute with excellent on-campus accommodation facilities for students, faculty and staff. There are eleven boys and four girl's hostels with total capacity of over 5000 student residents. Excellent sports and games facilities including swimming pool, and technical and cultural clubs contribute to wholesome health and holistic development of the students.

NIT Kurukshetra is committed to fundamental and applied research in frontier areas of engineering,

technology and science streams. The faculty is presently working on around 45 sponsored research projects sponsored by different funding agencies amounting to over Rs. 700 Lakhs. The faculty is providing consultancy services to a large number of government, private organizations and industries on high end projects valued at Rs.706.06 Lakhs (2018-19). The cutting edge research and technology development accomplished by the faculty in collaboration with national and international academia and R&D organizations are steadily bringing laurels to the glory of the institution. Indian Space Research Organization (ISRO) has recognized NIT Kurukshetra as a lead center for carrying out space related R&D and has established Regional Academic Centre for Space (RAC-S) at the Institute.

Teaching and learning processes and R&D activities are supported by state-of-the-art central facilities. The central library houses a collection over 1,90,000 documents with subscription to over 4500 journals and online resources. The Centre of Computing and Networking (CCN) provides IT infrastructure for information access to the students, faculty and staff equipped with supercomputing facility- "PARAM Shavak" for computationally intensive applications. The Institute being a partner Institution in TEQIP-III is making significant contribution to overall capacity building through financial support for laboratory equipments, and teaching and learning processes.

An effective industry-academia interface has been forged to bridge the gap of skill set needed by the contemporary industry. A number of MoUs/agreements with industry of both domains- hardware system design and ICT sector are in force including CSIR-CSIO Chandigarh, C-DAC Mohali and Pune, Renewable Energy Department, Haryana, AEON Learning (P) Ltd. Industry supported research facilities and industry ready skill development centres make an important component of the Institute's fabric.

During its exemplary journey of over five decades, the Institute has been successful in making remarkable strides in teaching, learning, research, innovation and entrepreneurship and outreach activities. The Institute is consistently securing higher position in ranking rising to 41<sup>st</sup> in overall category and 7<sup>th</sup> among all NITs in the country in NIRF 2019.

NIT Kurukshetra is eminently recognized as a center of quality education and impactful research outcomes making significant contribution to indigenous innovation and skilled technical manpower development for the industry and R&D organizations.

# SIEMENS DIGITAL INDUSTRY SOFTWARE (DISW)

Siemens is an integrated technology company. With business activities in 4 sectors: Energy, Healthcare, Industry and Infrastructure & Cities, Siemens is a clear global market and technology leader in its areas of operation. Technology excellence, innovation, quality, reliability and international focus have been Siemens' hallmark for over 160 years.

Present in 190 countries, Siemens association with India dates back to 1867 when it laid the first telegraph line linking Britain and India. Siemens currently has over 21 manufacturing plants in India.

“Siemens Digital Industry Software” provides integrated software solutions for product design, manufacturing planning and lifecycle knowledge management at the enterprise level. The solution integrates entire product information generated across an organization to help build first time right products, and validate the underlying processes required to do so in a digital environment.

The solution expands beyond the boundaries of an extended enterprise to include suppliers, partners, and customers. All of these solutions are further integrated with manufacturing execution systems and plant engineering solutions to provide end-to-end visibility and control.

Siemens unifies product knowledge with process innovation and manages all value creation elements of enterprise processes. Siemens provides digital enterprise platform that underpins a digital enterprise by creating unified product and production lifecycle – the entire lifecycle of product, process and manufacturing, from its conception, through design and manufacturing, to service, renewal and disposal.

Siemens is the only company in the world who can connect intelligent product and production lifecycle with virtual tools used for product and production design, in order to enable physical production planning validate its complete execution environment.





# CoreEL TECHNOLOGIES

The University Program Team (UPT) focus on providing comprehensive solutions to universities and engineering institutions through a combination of leading edge products and quality service. Being a technology company, our expertise in various fields have helped us to positively influence the highest levels of India's higher education sector on improving the quality of delivery, facility and research in Indian academia.

Our team's openness to innovate and be unique has taken us to new heights, where we emphasize on a transformation of the technical education in the country and our initiatives are well supported and guided by our partners. We bring in a collaborative environment with government, industry and academia joining hands to create a model that can address the issues faced by the education sector.

One of those initiatives is to create an 'Enabling Environment' for students, faculty, research scholars, industry professionals & evangelists to enhance

their technical knowledge, gain hands-on expertise and utilize the facilities to stimulate research & innovation. We set-up **Centre of Excellence, Competency Centres & Innovation Centres** to make the skilled man-power ready for the industry.

Our major areas of focus are:

- VLSI & Embedded Systems
- Product Digitalization & Process Digitalization
- Advanced Manufacturing
- Electric Vehicle Design & Analysis
- Rapid Prototyping

Going ahead, we would like to expand our offerings in the areas of, Smart Manufacturing, Artificial Intelligence, Internet of Things.

[www.coreel.com](http://www.coreel.com)

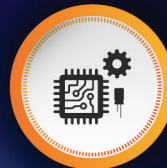
## EMPOWERING INNOVATION    ENABLING EXCELLENCE



Aerospace and Defence  
Product Development



Digital Video Solutions



Electronic System Design  
and Manufacturing



Enterprise Solutions for  
CAE, EDA, PLM and Rapid Prototyping



Industry-Academia  
Development Program

# EMPOWERING EDUCATION TO DRIVE INNOVATION

The Siemens Centre of Excellence, provides a competency based learning forum for empowering education to drive innovation. Industries are at the cusp of massive transformation due to digitalization and use of exponential technologies, and have entered in the world of Industry 4.0. This is resulting in a gigantic change in the future job market and R&D requirements. The rapid pace of emergence of Industry 4.0 requires that Education 4.0 also leapfrog from the existing education system in order to remain competitive, and ahead of the curve. This is a significant initiative for closing the enormous gap between industry and academia.

## Research Experience

To facilitate integration of innovation with market and provide opportunities to faculty and researchers to work on top quality, interdisciplinary, target oriented, cutting edge research environments.



## Services & Solutions

To deliver customized consulting and market specific solutions to the smart factories in the emerging domains of robotics, simulation, optimisation, automation, IoT, and Mechatronics.



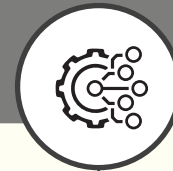
## Skills, Talent & Ability

To prepare learners for an unknown and unseen fast changing future, able to meet the next gen skills and talent requirements including re-up-skilling through train-the-trainer program.



## Technology Driven Learning

To create trained, qualified professionals who are ready for a highly globalised and digital-driven world of work and to prepare students on exponential technologies like CAD, Robotics, 3D scanning, additive and advanced manufacturing etc. for evolving industries 4.0.



## Unlock Innovation

To empower the learners with pragmatic tools and techniques enabling to evolve creative & critical thinking to unlock innovation.



# SIEMENS CENTRE OF EXCELLENCE

## DESIGN & VALIDATION LAB

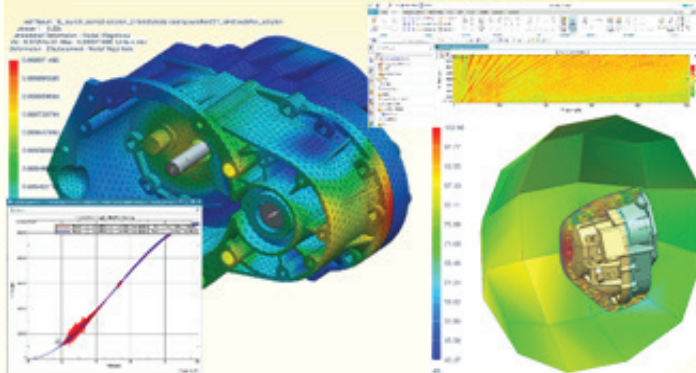
Siemens NX software is a flexible and powerful integrated solution to deliver quality products at faster pace with greater efficiency. It offers the next generation of design solutions enabling us to realize the value of the digital twin.

Design and Validation lab offers customized consulting and market specific solutions aiming to develop highly skilled work force ready for placement in the field of product design and development.

**The Design Tools:** Siemens PLM Solution (NX 1907, Simcenter 2020.1, Teamcenter 12.2, Solid Edge 2020, FeMap 2020.1) capable of undertaking and solving complex industrial design problems along with analysis and manufacturing support.

### The lab offers:

- Design concept as well as complete parametric model
- Develop skills to meet industry needs and realities
- To facilitate and support development of projects on real-time industrial problems
- Create detail-drafting sheets for manufacturing of product
- To inculcate research-based skills in the learners



## ADVANCED MANUFACTURING LAB

Digital manufacturing plays the key role for integration of PLM and shop floor applications and equipment, enabling the exchange of product-related information between design and manufacturing groups.

**The facilities:** Siemens advanced Industrial Software packages including Tecnomatix Plant Simulation-15, Tecnomatix Robot Expert-15 and Robcad-11 for simulation with Human Ergonomics (Jack-9), Preactor APS with MSSQL-2012 for advanced planning and Scheduling.

### The lab offers:

- Hands-on learning on virtual industrial process and robot handling in manufacturing
- Facilitates collaboration for a holistic view of product and process design
- Forum to create, operate and evaluate plant process simulations for efficient process
- To facilitate and support development of projects on real-time industrial problems in digital manufacturing engineering





## TEST AND OPTIMIZATION LAB

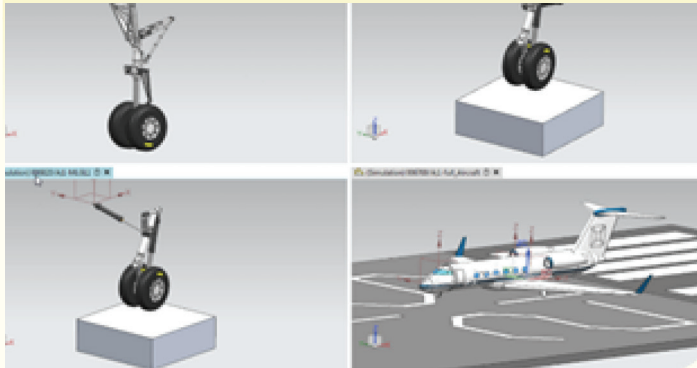
Electromechanical System analysis is an integral part of Computer Aided Engineering being extensively used in the analysis and design of complex life systems ranging from simple linear static problem to highly complex non-linear transient dynamic problems.

This lab provides multi-physics simulation platform having result-oriented features for achieving desired accuracy specifications and reduce the need for physical prototypes in the design process.

**The facilities:** Latest CAE and FEA tools like Simcenter 3D, Simcenter Nastran, Star CCM+ and Simcenter Amesim in addition to the test based engineering solution for a full suite of testing.

### The lab offers:

- Capability for modeling and solving all kinds of scientific and engineering problems based on Finite Element Methods
- Capability to develop multi-physics models that solve coupled physics phenomenon
- Development of projects and conducting research based on real-time industrial problems



## AUTOMATION LAB

Industrial controllers have become the integral part of digital manufacturing, automated & interconnected production, and providing flexibility to achieve complete factory automation.

This lab offers hands-on training on SIMATIC S7 technology/ products and developing industry ready professionals/ solution providers.

**The facilities:** Latest/Advanced industrial controllers of Siemens S7-1200,S7-1500, HMI & SCADA using TIA Portal V.15 Software.

### The lab offers:

- Hands-on learning on Siemens factory automation products
- Ability to identify the components of PLC, develop programmes, and enhance the skills on hardware programming and servicing
- Interface HMI and SCADA with PLC control system via PROFINET
- To conduct research and provide solutions/consultancy in Industrial Automation Engineering



## MECHATRONICS LAB

Mechatronics is the fundamental building block for pioneering initiatives in multiple engineering disciplines, which are major enablers of Industry 4.0.

This lab provides a platform to foster knowledge and working experience of synergistic integration of diverse engineering disciplines amongst the individuals so as to equip them with industry ready skills.

**The facilities:** Advanced mechatronics modular systems and specially compiled SCE packages with Siemens S7-1200.

**The lab offers:**

- Hands-on learning on working and programming of mechatronics modular systems
- Troubleshooting with interpretation of process circuit diagrams and datasheets
- Development of projects and conducting research based on real-time industrial problems



## ELECTRICAL & ENERGY SAVINGS LAB

Energy efficient electrical systems have always been the priority for industries across the verticals. The knowledge on high performance equipments, high standard protective instruments and the best industry practices for energy conservation contribute significantly to facility management & facility engineering.

This lab offers the opportunity to make in-depth study of the Industrial equipments and explore energy efficient strategies that can be deployed in the industries to deliver customized consulting and market specific solutions.

**The facilities:** Advanced SINAMICS G120 for 3 AC 400V standards drives, DC Drive-6RA80, demo case for L V industrial switchgear set.

**The lab offers:**

- Hands-on learning on industrial AC-DC drives, industrial switchgear, parameterization, motor maintenance/servicing
- Ability to create diagnostic & troubleshooting strategies
- System that automatically processes the electrical energy consumption and visualizes it in real time
- Development of projects and conducting research based on real-time industrial problems in energy management



## PROCESS INSTRUMENTATION LAB

Process Instrumentation is comprised of the sensors and various instruments to monitor and maintain process control equipments for improved production, product consistency, quality management, and workplace safety in manufacturing and processing facilities.

The major focus of the lab is on the application of electronics and associated technology to instrumentation, industrial automation, process control systems and commonly used sensors.

**The Facilities:** SIMATIC PCS 7 V9.0, Totally Integrated Automation Portal and solutions for all levels of industrial automation.

**The lab offers:**

- Hands-on experience of different processes and their measurements
- Real time measurement and control of process variables such as levels, flow, pressure, temperature, pH and humidity
- Project based learning on alarm management, process safety and asset management
- Forum for research, project development and deployment activities in instrumentation engineering



## ROBOTICS LAB

The industrial robot and emerging cobots—the key player in Industry 4.0 are fast creating a niche for their integration in all verticals of industry and human life.

The aim is to prepare skilled manpower ready for placement in the manufacturing and automation industry with enhanced employability.

**The facilities:** Industry grade n-axes robots with assorted reach and low-to-high payload capacity plus use case set-ups.

**The lab offers:**

- Hands-on learning on the working and testing of industrial robots
- Design strategy and programming of the robots to perform different tasks
- Ability to assemble and disassemble of robots
- To develop projects on real-life industrial problems
- To conduct research in robotics engineering



## METROLOGY LAB

The accuracy, reliability, speed of production, measurement techniques and quality control are the critical parameters of smart and flexible manufacturing. Metrology is the enabling technology for achieving these attributes.

We at this lab aim to develop skilled work force ready for absorption in the field of quality engineering, advance precision measurements and reverse engineering.

**The facilities:** Coordinate Measuring Machine (Zeiss Dura max RT) with gear measurement accessories along with 3D Scanner (Zeiss 3D Comet).

### The lab offers:

- Hands on experience on CMM and 3D Scanner
- Apply and interpret concept of GD & T representation
- Support for development of manufacturing projects
- Ability to import and export CAD model for inspection
- Project based learning



## CNC MACHINE & CNC CONTROLLER LAB

CNC Machine and CNC Controllers play key role in the manufacturing industries to deliver quality products and parts in compliance with the customer demand and industry standards.

**The facilities:** Industry grade multi-axis CNC machines with Siemens controllers (808D-Milling& Turning) and 840 DSL Rack.

### The lab offers:

- Practical exposure on the industrial CNC Machines and CNC Controller
- Design of machining and programming strategies to produce quality products
- Formulate standard CNC programming cycles and optimization
- Integration of CAM technology
- Project based learning and R&D on industrial problems



# COURSE DETAILS

COURSE NAME	DURATION (IN HOURS)
<b>DESIGN &amp; VALIDATION LAB</b>	
ESSENTIALS FOR NX DESIGNERS	60
NX – SKETCHER FUNDAMENTALS	16
SYNCHRONOUS MODELLING FUNDAMENTALS	10
SYNCHRONOUS MODELLING & PARAMETRIC DESIGN	25
BASIC DESIGN FOR EXP CAD USERS	40
DRAFTING ESSENTIALS	25
NX - MECHANICAL FREE FORM MODELLING	40
NX - INDUSTRIAL DESIGN USING NX	35
NX - INTERMEDIATE NX DESIGN & ASSEMBLIES	40
NX - LARGE ASSEMBLIES MANAGEMENT	25
NX - MANUFACTURING FUNDAMENTALS	25
NX - TURNING MANUFACTURING PROCESS	25
INTRODUCTION TO TEAMCENTER	35
TCUA - DATA MODEL ADMINISTRATIONTCUA	15
TCUA - APPLICATION & DATA MODEL ADMINISTRATION	40
TCUA - INTEGRATION FOR NX USERS	40
<b>ADVANCED MANUFACTURING LAB</b>	
TECNOMATIX PLANT SIMULATION	150
TECNOMATIX ROBCAD/ROBOT EXPERT	150
JACK FOR HUMAN MODELING	40
TECNOMATIX PROCESS SIMULATE	40
SIEMENS PREACTOR	40
TEAMCENTER MANUFACTURING	40

COURSE NAME	DURATION (IN HOURS)
<b>TEST &amp; OPTIMIZATION LAB</b>	
INTRODUCTION TO SIMCENTER 3D	40
ADVANCED FEM AND CAE ANALYSIS USING SIMCENTER 3D	60
INTRODUCTION TO CAE SIMULATIONS USING SIMCENTER STAR CCM+	40
ADVANCED FLOW ANALYSIS USING SIMCENTER STAR CCM+	60
SIMCENTER AMESIM	40
SIMCENTER TESTLAB	30
<b>ROBOTICS LAB</b>	
USE AND PROGRAMMING OF INDUSTRIAL ROBOTS	40
ROBOTIC APPLICATIONS	40
<b>CNC CONTROLLER &amp; MACHINES LAB</b>	
CNC PROGRAMMING & CNC MACHINE OPERATION: 808D – TURNING	140
CNC PROGRAMMING & CNC MACHINE OPERATION: 808D – MILLING	120
ADVANCED MANUFACTURING SKILLS	90
<b>ELECTRICAL &amp; ENERGY SAVINGS LAB</b>	
AC / DC DRIVES AND INDUSTRIAL SWITCHGEARS	55
<b>AUTOMATION LAB</b>	
AUTOMATION AND INDUSTRIAL NETWORKING	100
<b>MECHATRONICS LAB</b>	
APPLICATION OF MECHATRONICS WITH MECHANICAL, ELECTRICAL AND PNEUMATIC COMPONENTS	40
<b>PROCESS INSTRUMENTATION LAB</b>	
PROCESS INSTRUMENTATION - APPLICATIONS & METHODOLOGIES	50
<b>METROLOGY LAB</b>	
CMM MEASUREMENTS, SCANNING & REVERSE ENGINEERING METHODS	150



# IMPACT

*“Companies are moving beyond screening candidates only on the basis of qualifications but are rather assessing other skills like critical thinking, problem solving, data analysis, analytical reasoning and communication abilities that candidates may possess”*

For both the traditional and non-traditional students the centre envisages experiential and competency-based learning. The Competencies based learning include explicit, measurable and transferable learning objectives that empower students to achieve learning outcomes including applications and creation of knowledge, along with the development of important skills and dispositions. The centre offers industry relevant and open-ended courses in synchronization with technology trends, which upskill/reskill learners to remain relevant with constant industry transformation.

## 01 Socio – Economic Impact

The capacity of infrastructure proposed provides an immense potential for the country, the industry and the people in the State of Haryana, Delhi & Punjab to up-skill and re-skill themselves in relevant marketable technology at the centre for employment in India’s Automotive and allied sector, and also other dual use anchor industries in and around the development areas. Not only this, the international accreditation of courses offered in the centre, would equip the students and working professionals with an opportunity to work in the global industries and allied sectors.

## 02 Research Facilitation

In order to keep up with rapid advances in the field of design and manufacturing, the centre envisages Research with industry needs and create an ecosystem of collaboration to maximize the utilization of research output. The centre shall bestow a professional research environment to the learners and provide them high-quality training on collaborative, interdisciplinary research and end to end innovation. The beneficiaries shall get exposure to international research standards and this would lead to high-quality publications.

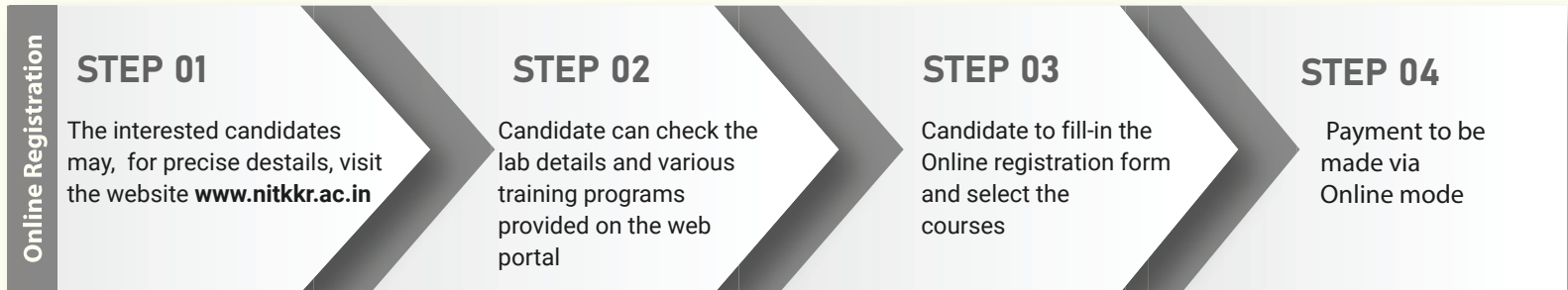
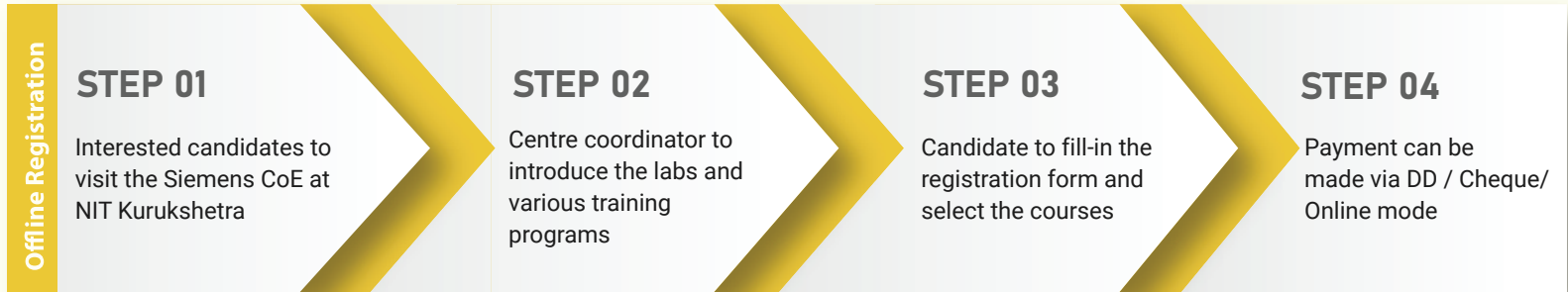
## 03 Enhanced Employability

This is the place where learners get equipped with employability skills that are transferable across a broad range of job opportunities and help them modify their approach to solving business problems in dynamic industry environments. Providing knowledge, soft-skill as well as technical-skill driven training in the identified industry zone broadly in tandem with National Skills Qualifications Framework across various sectors like industrial robotization, industrial contraption, automotive division, aerospace & defence and energy & power etc. to help learners secure gainful employment and become self-reliant on successful completion of the varied courses.

## 04 Technology Creation

Centre eco-system infuses the concept of end to end innovation & integration in all its activities to create technologies with identifiable impact. The beneficiaries shall get exposure to disruptive technologies of Industry 4.0, such as IT-enabled manufacturing, Digital-to-physical conversion like advanced robotics and 3D printing, Human-machine interaction, Analytics and intelligence. The best example could be seen during the COVID-19 period, when the institute along with students and entrepreneur’s created technology to address the needs to the society in difficult times.

# HOW TO APPLY



## Who should Enroll?

- Engineering Graduates (B.E / B.Tech / M.E / M.Tech)
- Research / Project Associates
- Diploma and ITI Graduates
- Industry Professionals
- Ph.D / Research Scholars
- Technology Evangelists and Aspirants

## For Queries :

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