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Collaborative Robotics in Industry Specialization

Collaborative Robotics in Industry. Understanding the nuances of Robotic Automation

Instructor: [Subject Matter Expert](#)

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3 course series

Get in-depth knowledge of a subject

4.3 ★

(66 reviews)

Intermediate level

Recommended experience

4 weeks to complete

at 10 hours a week

Flexible schedule

Learn at your own pace

What you'll learn

[OK](#)

✓ Mechatronics systems and their Utilit

✓ Interfacing of Drive systems with Electronics control system

Skills you'll gain

Equipment Design

Image Analysis

Manufacturing Processes

Industrial Engineering

Matlab

Real Time Data

Electronic Components

Simulation and Simulation Software

Internet Of Things

Robotic Process Automation

Hardware Troubleshooting

Control Systems

Human Machine Interfaces

Automation Engineering

Electrical Systems

Mechanical Engineering

Hydraulics

Programmable Logic Controllers

Product Automation

Automation

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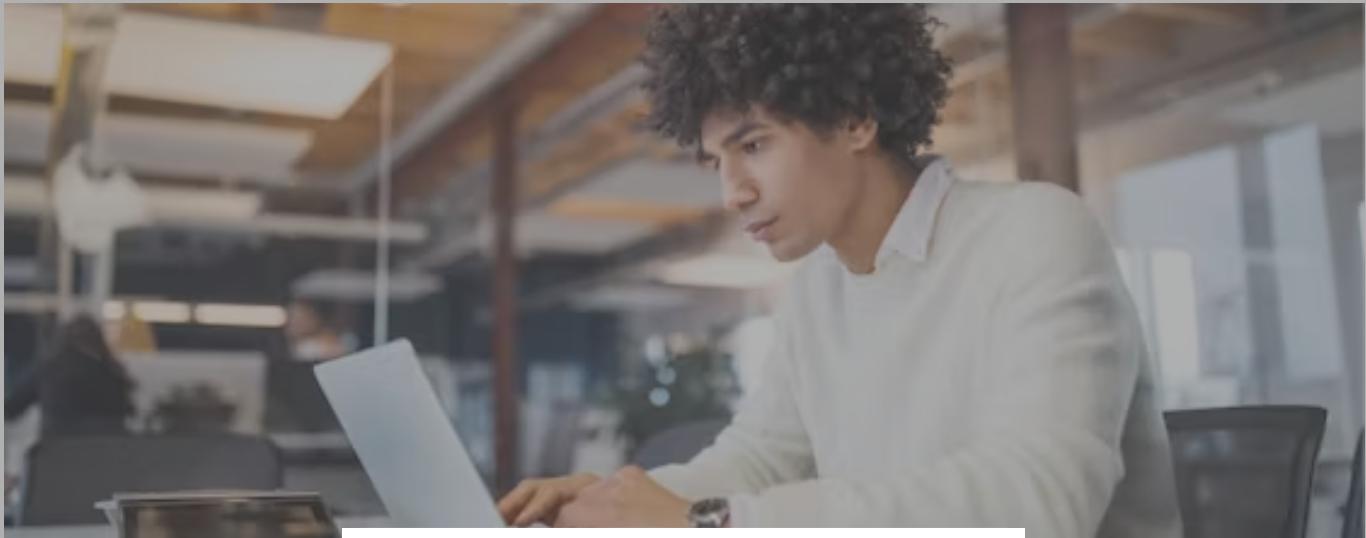
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- Master a subject or tool with hands-on projects
- Develop a deep understanding of key concepts
- Earn a career certificate from L&T Education

Recommended experience

Intermediate level

Manufacturing Technology and Processes

Specialization - 3 courses

Collaborative Robotics in Manufacturing merges traditional manufacturing with cutting-edge robotics, equipping learners with skills to navigate modern manufacturing. Foundational Industrial Manufacturing knowledge highlights robotics' role in enhancing efficiency and precision. Introductory Mechatronics integrates engineering principles for robotic system development. Understanding Introductory Electronics aids in comprehending digital control circuitry and sensor technologies. Applied Physics principles furnish analytical tools for robotic system design. Graduates excel in Robotic Manipulator and Gripper Design, integrating Mechanical Components with Digital Control Circuitry for optimized performance. Sensor & Transducer Technology mastery enables real-time monitoring and control, enhancing productivity. Drive Systems expertise ensures adaptability to diverse manufacturing environments. Troubleshooting in Mechatronic Systems and System Design using MATLAB-Simulink enables efficient issue resolution. Robot Programming skills empower precise and efficient control. Robotic Vision Systems and Machine Vision augment automation and quality control. Integration of IIoT technologies drives efficiency in collaborative robotic systems. Graduates find career opportunities as Automation Engineers and Robotic Designers, shaping the future of manufacturing with innovation and efficiency.

Applied Learning Project

The projects proposed in the courses under the specialization, "Collaborative Robotics in Industry" are having a sequence of tasks in each and every project. They need to design a robotic manipulator, design an appropriate end effector, should make the interface with the electronic control system. For heavy load handling purpose utilize the electro-hydraulic systems. Prepare a blue print to carry out this project comprising all the essentials like appropriate sensors, drive systems, electronic circuitry and fluid circuitry. Interface the developed robot with a control system. Find out an appropriate ICs and essential electronic circuit elements. Choose prototyping platforms either Arduino or Raspberry Pi. Apply the IIoT concepts. Choose a relevant gate way and connectivity to monitor its functioning and enhance the productivity.

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Fundamentals of Robotics & Industrial Automation

Course 1 • 9 hours

[Course details ^](#)

What you'll learn

The "Fundamentals of Robotics & Industrial Automation" course is tailored to provide a comprehensive understanding of essential concepts and practical skills necessary for excelling in the field of collaborative robotics. Through three dynamic modules, participants will explore the intricacies of sensors & transducers in machine tools & robots, servo systems, and interfacing and simulation techniques. This course is designed to cater to the learning needs of undergraduate students of Mechanical & Mechatronics Engineering, students specializing in robotics & automation, as well as post-graduate students of Mechanical

Engineering & Computer-Aided Manufacturing Engineering. Additionally, practicing engineers in automation environments will find immense value in honing their skills through this specialized course.

As the backbone of modern industrial automation, robotics engineering holds immense significance in optimizing processes, enhancing productivity, and improving efficiency. Throughout the course, participants will delve into the nuances of robotic engineering, gripper designs, PLC (Programmable Logic

knowledge to fully engage with the advanced concepts presented throughout the modules.

Upon completion of this course, participants will acquire a diverse set of skill sets essential for success in the field of collaborative robotics. From robotic manipulator design to robotic gripper design, participants will gain proficiency in designing and implementing key components of robotic systems.

Furthermore, the course emphasizes the importance of interfacing mechanical components with digital control circuitry, equipping participants with the ability to seamlessly integrate hardware and software components in automation environments.

A deep dive into sensor & transducer technology empowers participants to leverage cutting-edge sensing technologies for precise measurement, feedback, and control in robotic applications. Additionally, participants will develop troubleshooting skills essential for identifying and resolving issues in mechatronic systems, ensuring smooth operation in industrial settings. Mechatronics system design principles are thoroughly explored, enabling participants to conceptualize, design, and optimize complex systems tailored to specific industrial requirements.

The course culminates in simulation using MATLAB-Simulink, providing participants with hands-on experience in designing, modeling, and simulating robotic systems. This practical aspect of the course not only reinforces theoretical concepts but also prepares participants for real-world implementation and problem-solving.

In conclusion, the "Fundamentals of Robotics & Industrial Automation" course offers a transformative learning experience for individuals aspiring to excel in the dynamic field of collaborative robotics. Through a blend of theoretical knowledge, practical skills, and hands-on experience, participants emerge with the expertise and confidence to make meaningful contributions to the future of industrial automation.

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Skills you'll gain

Automation Simulation and Simulation Software Mechanical Engineering Electronic Components Manufacturing Processes Automation Engineering
Equipment Design Internet Of Things Control Systems Programmable Logic Controllers Industrial Engineering Human Machine Interfaces
Robotic Process Automation Matlab

Recommended experience

Intermediate level

Manufacturing Technology and Processes



Robotics Engineering

Course 2 • 7 hours

What you'll learn

The "Robotics Engineering & Applications" course is designed for undergraduate students of Mechanical Engineering, Computer Science, and related fields. By combining theoretical knowledge with practical, hands-on experience, participants learn how to design, program, and implement robotic systems. The course covers fundamental concepts such as kinematics, dynamics, and control theory, as well as more advanced topics like sensor integration and machine learning. Participants will work on projects involving various robotic platforms, including mobile robots, manipulators, and grippers. By the end of the course, students will have developed a comprehensive understanding of the engineering principles behind robotics and be equipped with the skills needed to pursue further studies or careers in the field.

Mechanical Engineering & Computer-Aided Manufacturing Engineering, as well as practicing engineers in automation environments. At its core, the course emphasizes a hands-on approach to learning, ensuring participants are equipped with practical skills and theoretical knowledge essential for success in the field of collaborative robotics. The prerequisites of the course lay a solid foundation, covering basics on industrial manufacturing, fundamentals of introductory mechatronics, introductory electronics, and applied physics. Armed with this knowledge, participants are prepared to dive into the intricacies of robotic engineering and applications.

The first module, "Robotic Engineering Essentials," serves as the cornerstone of the course, providing participants with a comprehensive understanding of robotic manipulator design, gripper designs, and the fundamentals of robot programming. Participants will explore the intricacies of designing and configuring robotic systems tailored to specific industrial requirements, laying the groundwork for subsequent modules.

The second module, "Robot Programming and Vision Systems," delves into advanced programming techniques and the integration of vision systems in robotic applications. Participants will learn to harness the power of cameras, image processing, and object recognition techniques to enhance robot perception and decision-making capabilities. The module also explores the application of machine vision in industrial processes, equipping participants with the skills to analyze and interpret visual data for a wide range of applications.

In the final module, "Design & Robot Building and Applications," participants will put their newfound knowledge into practice, undertaking the challenge of designing and building their own robots for real-world applications. From conceptualization to implementation, participants will learn to navigate the intricacies of robot design, integrating components seamlessly to achieve optimal performance. Furthermore, the module explores the implementation of Industrial Internet of Things (IIoT) in robotics, empowering participants to leverage interconnected devices and sensors to enhance automation and efficiency in industrial settings.

Upon completion of this course, participants will emerge with a diverse set of skill sets essential for success in the field of collaborative robotics. From robotic manipulator design to robot programming, participants will gain proficiency in designing, programming, and implementing robotic systems tailored to specific industrial requirements. Furthermore, participants will be equipped with the knowledge and expertise to integrate vision systems and IIoT technologies, revolutionizing automation and efficiency in industrial processes.

In conclusion, the "Robotics Engineering & Applications" course offers a transformative learning experience for individuals aspiring to excel in the dynamic field of collaborative robotics. Through a blend of theoretical knowledge, practical skills, and hands-on experience, participants emerge as innovators poised to make meaningful contributions to the future of industrial automation.

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Skills you'll gain

Control Systems Robotic Process Automation Internet Of Things Computer Vision Automation Electronics Image Analysis Engineering

What you'll learn

The "Industrial Fluid System & Smart Factory Automation" course represents a pivotal opportunity for individuals seeking to delve into the cutting-edge intersection of fluid dynamics, electrical drives, and smart automation technologies. With three comprehensive modules, participants embark on a transformative journey, exploring the intricacies of fluid and electrical drive systems, fluid circuit design, and the implementation of smart factory automation solutions. This course caters to a diverse audience, including undergraduate students of Mechanical & Mechatronics Engineering, students specializing in robotics & automation, post-graduate students of Mechanical Engineering & Computer-Aided Manufacturing Engineering, as well as practicing engineers in automation environments.

A solid foundation is laid through the prerequisites of the course, covering basics on industrial manufacturing, fundamentals of introductory mechatronics, introductory electronics, applied physics, and fundamentals of fluid mechanics & machinery. Armed with this multidisciplinary knowledge, participants are primed to delve into the complexities of industrial fluid systems and smart factory automation.

The first module, "Fluid and Electrical Drive Systems," serves as the cornerstone of the course, offering participants a comprehensive understanding of electrical drives and control systems for machine tools and robots. Participants will explore the selection and implementation of electrical drives, along with troubleshooting techniques to ensure optimal performance. Additionally, the module delves into industrial hydraulics and pneumatics for automation, equipping participants with the skills to design electro-hydro-pneumatic systems tailored to specific industrial requirements.

In the second module, "Fluid Circuit Systems," participants dive deeper into the design and implementation of fluid circuit systems essential for efficient operation in industrial environments. Through a combination of theoretical concepts and practical exercises, participants gain proficiency in designing and optimizing fluid systems to meet the demands of diverse applications.

The final module, "Smart Factory Automation," explores the integration of advanced automation technologies to create intelligent, interconnected manufacturing environments. Participants will delve into topics such as industrial remote monitoring, smart material flow, IIoT (Industrial Internet of Things) in smart factories, digital twins, and industrial data analytics. Through hands-on projects and case studies, participants will learn to design and implement smart factory automation solutions, revolutionizing efficiency and productivity in industrial settings.

Upon completion of this course, participants will have a deep understanding of industrial fluid systems and smart factory automation. From choosing the right components to troubleshooting complex systems, participants will possess the expertise to tackle real-world challenges in monitoring and predictive maintenance.

In conclusion, the "Industrial Fluid System & Smart Factory Automation" course is a gateway to the dynamic field of smart manufacturing. It is designed for innovators poised to make meaningful contributions to the future of industry.

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Skills you'll gain

Recommended experience

Intermediate level

Manufacturing Technology and Processes

Upon completion of this course, participants will have a deep understanding of industrial fluid systems and smart factory automation. From choosing the right components to troubleshooting complex systems, participants will possess the expertise to tackle real-world challenges in monitoring and predictive maintenance.

In conclusion, the "Industrial Fluid System & Smart Factory Automation" course is a gateway to the dynamic field of smart manufacturing. It is designed for innovators poised to make meaningful contributions to the future of industry.

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Recommended experience

Intermediate level

Manufacturing Technology and Processes

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Frequently asked questions

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This course is completely online, so there's no need to show up to a classroom in person. You can access your lectures, readings and assignments anytime and anywhere via the web or your mobile device.

^ Can I just enroll in a single course?

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^ Is financial aid available?

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Recommended experience

Intermediate level

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Skills

Artificial Intelligence (AI)

Cybersecurity

Data Analytics

Digital Marketing

English Speaking

Generative AI (GenAI)

Microsoft Excel

Microsoft Power BI

Project Management

Python

Google IT Support Certificate

Google Project Management Certificate

Google UX Design Certificate

IBM Data Analyst Certificate

IBM Data Science Certificate

Machine Learning Certificate

Microsoft Power BI Data Analyst
Certificate

UI / UX Design Certificate

Industries & Careers

Business

Computer Science

Data Science

Education & Teaching

Engineering

Finance

Healthcare

Human Resources (HR)

Information Technology (IT)

Marketing

Recommended experience

Intermediate level

Manufacturing Technology and Processes

Career Resources

Career Aptitude Test

Examples of Strengths and Weaknesses
for Job Interviews

High-Income Skills to Learn

How Does Cryptocurrency Work?

How to Highlight Duplicates in Google
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How to Learn Artificial Intelligence

Popular Cybersecurity Certifications

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Recommended experience

Intermediate level

Manufacturing Technology and Processes



Certified



