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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

- ✓ 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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Recommended experience

Intermediate level

Manufacturing Technology and Processes

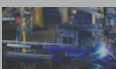
Specialization - 3 courses

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



Robotics Engineering & Applications

Course 2 • 7 hours

Recommended experience

Intermediate level

Manufacturing Technology and Processes

What you'll learn

The "Robotics Engineering & Applications" course is a comprehensive program designed to equip participants with the knowledge and skills necessary for success in the field of collaborative robotics. Comprising three dynamic modules, participants embark on a journey of learning, exploring the intricacies of robotic systems, the integration of vision systems in design, and the application of machine vision. The course is meticulously crafted to cater to the diverse learning needs of undergraduate students of 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 be well-equipped to tackle real-world challenges in industrial fluid systems and smart factory automation. From choosing the right components to designing efficient fluid systems, participants will gain the expertise to tackle real-world challenges in industrial fluid systems and smart factory automation. From choosing the right components to designing efficient fluid systems, participants will gain the expertise to tackle real-world challenges in industrial fluid systems and smart factory automation. From choosing the right components to designing efficient fluid systems, participants will gain the expertise to tackle real-world challenges in industrial fluid systems and smart factory automation.

In conclusion, the "Industrial Fluid System & Smart Factory Automation" course is a comprehensive and practical learning experience for individuals aspiring to excel in the dynamic field of smart manufacturing. 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 be well-equipped to tackle real-world challenges in industrial fluid systems and smart factory automation.

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Skills you'll gain

Automation Hydraulics Internal Circuits and Components Failure Analysis

Emerging Technologies Industrial Engineering Manufacturing Processes Equipment Design Electrical Systems Manufacturing Operations

Real Time Data Manufacturing and Production Mechanical Engineering Production Process Hardware Troubleshooting Automation Engineering

Recommended experience

Intermediate level

Manufacturing Technology and Processes



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Recommended experience

Intermediate level

Manufacturing Technology and Processes

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Frequently asked questions

^ Is this course really 100% online? Do I need to attend any classes in person?

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?

Yes! To get started, click the course card that interests you and enroll. You can enroll and complete the course to earn a shareable certificate. When you subscribe to a course that is part of a Specialization, you're automatically subscribed to the full Specialization. Visit your learner dashboard to track your progress.

^ Is financial aid available?

Yes. In select learning programs, you can apply for financial aid or scholarship. For more information, visit the Financial Aid page. Financial aid or scholarship is available for your learning program selection, you can apply for financial aid or scholarship.

^ Can I take the course for free?

No, you cannot take this course for free. You can apply for financial aid or scholarship. If you cannot afford to take this course, you can apply for financial aid or scholarship, and you earn a certificate when you complete the work. If you cannot afford to take this course, you can apply for financial aid or scholarship.

^ Will I learn university credit for this course?

This Specialization doesn't carry university credit, but some universities may choose to accept Specialization Certificates for credit. Check with your institution to learn more.

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Recommended experience

Intermediate level

Manufacturing Technology and Processes

More questions



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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
Sheets

How to Learn Artificial Intelligence

Popular Cybersecurity Certifications

Preparing for the PMP Certification

Signs You Will Get the Job After an
Interview

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Recommended experience

Intermediate level

Manufacturing Technology and Processes



