University at Buffalo

Intelligent Machining

This course is part of **Digital Manufacturing & Design Technology Specialization**

Instructor: Rahul Rai

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Starts Dec 2

32,225 already enrolled

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4 modules
Gain insight into a topic and learn the fundamentals.

4.6 ★
(1,384 reviews)

Beginner level
No prior experience required

Flexible schedule
1 week at 10 hours a week
Learn at your own pace

96%
Most learners liked this course

Skills you'll gain

Control Systems | Manufacturing Processes | Machine Controls | Real Time Data | Automation | Software Systems | Artificial Intelligence | Open Source Technology | Machine Learning

Details to know

Shareable certificate
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Taught in English
23 languages available

Assessments
16 assignments

See how employees at top companies are mastering in-demand skills

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Build your subject-matter expertise

This course is part of the **Digital Manufacturing & Design Technology Specialization**
When you enroll in this course, you'll also be enrolled in this Specialization.

- Learn new concepts from industry experts
- Gain a foundational understanding of a subject or tool
- Develop job-relevant skills with hands-on projects
- Earn a shareable career certificate

There are 4 modules in this course

Manufacturers are increasingly utilizing machine tools that are self-aware – they perceive their own states and the state of the surrounding environment – and are able to make decisions related to machine activity processes. This is called intelligent machining, and through this course students will receive a primer on its background, tools and related terminology.

Learn how the integration of smart sensors and controls are helping to improve productivity. You'll be exposed to various sensors and sensing techniques, process control strategies, and open architecture systems that can be leveraged to enable intelligent machining. This course will prepare you to contribute to the implementation of intelligent machining projects.

Main concepts of this course will be delivered through lectures, readings, discussions and various videos.

This is the fifth course in the Digital Manufacturing & Design Technology specialization that explores the many facets of manufacturing's "Fourth Revolution," aka Industry 4.0, and features a culminating project involving creation of a roadmap to achieve a self-established DMD-related professional goal. To learn more about the Digital Manufacturing and Design Technology specialization, please watch the overview video by copying and pasting the following link into your web browser: https://youtu.be/wETK1O9c-CA

Read less

Introduction to Intelligent Machining

Module 1 • 3 hours to complete

Module details

The purpose of this module is to introduce the concepts related to intelligent machining paradigm. The key focus will be discussing two key components of intelligent machining, i.e., sensing and control.

What's included

4 videos 4 readings 4 assignments

Hide info about module content

4 videos • Total 17 minutes

Introduction to Intelligent Machining
•
3 minutes

Machining Basics
•
4 minutes

The Evolution of Intelligent Machining

•
6 minutes

Components of Intelligent Machining
•
3 minutes

4 readings • Total 75 minutes

Resources: Why Intelligent Machining
•
30 minutes

Acknowledgements
•
10 minutes

Resources: What Constitutes an Intelligent Machine?
•
15 minutes

Resources: Components of Intelligent Machining
•
20 minutes

4 assignments • Total 100 minutes

Introduction to Intelligent Machining
•
30 minutes

Self-check
•
10 minutes

Self-check
•
30 minutes

Self-check
•
30 minutes

Sensors and Sensing Techniques

Module details

Module 2 • 2 hours to complete

The purpose of this module is to introduce spectrum of sensors used to implement intelligent machining. The module will also discuss the basics of signal processing and analysis techniques that has brought intelligent machining paradigm closer to industrial realization. Following issues pertaining to sensors and sensing techniques will be elaborated up: (1) Which sensors are to be used in each application? (2) How to acquire and process sensor signals?

What's included

4 videos 3 readings 5 assignments 1 discussion prompt

Hide info about module content

4 videos • Total 15 minutes

Sensors
•
4 minutes

Signal Processing
•
2 minutes

Transforming Data into Information
•
4 minutes

Practical Uses of Machine Learning
•
2 minutes

3 readings • Total 50 minutes

Resources: Types of Sensors
•
15 minutes

Resources: Signal Processing
•
15 minutes

Resources: Machine Learning: Setting the Context
•
20 minutes

5 assignments • Total 54 minutes

Sensors and Sensing Techniques
•
30 minutes

Self-check
•
6 minutes

Self-check
•
6 minutes

Self-check
•
6 minutes

Self-check
•
6 minutes

1 discussion prompt • Total 15 minutes

Let's talk robotics!
•
15 minutes

Process Control Strategies

Module details

Module 3 • 2 hours to complete

The purpose of this module is to introduce the concept of Programmable Logic Controllers (PLCs) that co-ordinate the real-time control functions.

What's included

4 videos 4 readings 5 assignments

Hide info about module content

4 videos • Total 17 minutes

Programmable Logic Controllers (PLC)
•
4 minutes

Closed Loop Process Control Systems
•
4 minutes

Introduction to Adaptive Control
•
5 minutes

Commercially Available Software
•
3 minutes

4 readings • Total 55 minutes

Resources: Introduction to Machining Process Control
•
20 minutes

Resources: Adaptive Control with Optimization

10 minutes

Resources: Machining Force Control

10 minutes

Resources: Manufacturing Process Control: Commonly Used Software

15 minutes

5 assignments • Total 106 minutes

Process Control Strategies

30 minutes

Self-check

6 minutes

Self-check

30 minutes

Self-check

30 minutes

Self-check

10 minutes

Future Directions in Advanced Machining

Module details

Module 4 • 2 hours to complete

The purpose of this module is to introduce the background related to open architecture software systems to implement intelligent machining.

What's included

3 videos 5 readings 2 assignments 1 discussion prompt

Hide info about module content

3 videos • Total 10 minutes

Intelligent Machining and the Future

3 minutes

Tech Talk on Metrology

5 minutes

Your 4.0 Roadmap to Success

1 minute

5 readings • Total 80 minutes

Resources: Future Directions in Advanced Machining

15 minutes

Your 4.0 Roadmap to Success -- Resources

10 minutes

Your Roadmap Project: Step 5

30 minutes

Intelligent Machining- Key Takeaways

15 minutes

Intelligent Machining- Course References

•

10 minutes

2 assignments • Total 50 minutes

Future Directions

•

30 minutes

Self-check

•

20 minutes

1 discussion prompt • Total 10 minutes

Your 4.0 Roadmap to Success in Digital Manufacturing and Design Technology

•

10 minutes

Earn a career certificate

Add this credential to your LinkedIn profile, resume, or CV. Share it on social media and in your performance review.

Instructor

Instructor ratings **4.5** ★ (287 ratings)

Rahul Rai
The State University of New York
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"To be able to take courses at my own pace and rhythm has been an amazing experience. I can learn whenever it fits my schedule and mood."

★ **4.6** 1,384 reviews

5 stars	71.82%
4 stars	22.10%
3 stars	4.11%
2 stars	1.01%
1 star	0.93%

PS
★ 4 · Reviewed on Jul 8, 2020

The course had given me lots of information about future manufacturing system and how I can improve the digital market and manufacturing. The course was best and helpful for me.

KM
★ 5 · Reviewed on May 29, 2020

It was a good experience in their course which is very useful also give the information how the used of intelligent machining in industry

KD
★ 5 · Reviewed on Jun 8, 2020

Very good and Interesting course Intelligent Machining .Gives you greatly overall knowledge about machining and manufacturing.

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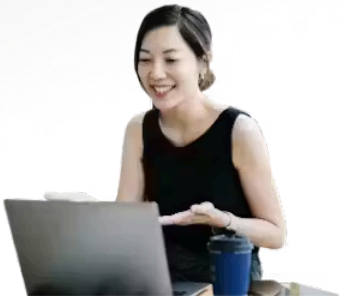

Frequently asked questions

When will I have access to the lectures and assignments?

To access the course materials, assignments and to earn a Certificate, you will need to purchase the Certificate experience when you enroll in a course. You can try a Free Trial instead, or apply for Financial Aid. The course may offer 'Full Course, No Certificate' instead. This option lets you see all course materials, submit required assessments, and get a final grade. This also means that you will not be able to purchase a Certificate experience.

What will I get if I subscribe to this Specialization?

When you enroll in the course, you get access to all of the courses in the Specialization, and you earn a certificate when you complete the work. Your electronic Certificate will be added to your Accomplishments page - from there, you can print your Certificate or add it to your LinkedIn profile.

Is financial aid available?

Yes. In select learning programs, you can apply for financial aid or a scholarship if you can't afford the enrollment fee. If fin aid or scholarship is available for your learning program selection, you'll find a link to apply on the description page.

More questions

Visit the learner help center

Financial aid available, learn more

Skills

- Artificial Intelligence (AI)
- Cybersecurity
- Data Analytics
- Digital Marketing
- English Speaking
- Generative AI (GenAI)
- Microsoft Excel
- Microsoft Power BI
- Project Management
- Python

Certificates & Programs

- Google Cybersecurity Certificate
- Google Data Analytics Certificate
- 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

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
- What Is Artificial Intelligence?

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