

COURSE SYLLABUS
SMMG 2030
Introduction to Smart Manufacturing
SPRING 2026

COURSE INFORMATION

- Times and Days: 6:00 PM – 8:50 PM, Mondays
- Credit Points: 3
- Course website: Canvas
- Class venue: Face-to-face
Classroom: Rm 102, E1

INSTRUCTOR CONTACT INFORMATION

- Instructor: Yi Cai
- Office Location: Rm 308, W2
- Office Phone: +86-20-8833 5958
- Email Address: yicai@hkust-gz.edu.cn

STUDENT HOURS

2:30 PM – 4:30 PM, Tuesdays, In-person and/or Zoom
Meeting ID: 803 625 9020. No passcode is needed.

COURSE DESCRIPTION

This course introduces core smart manufacturing technologies through integrated lectures and hands-on labs. Aimed at developing foundational understanding of data-driven modern production systems, it covers five essential topics: Design for Smart Manufacturing explores product optimization for digital workflows; Additive Manufacturing examines different 3D Printing processes beyond prototyping; Industrial Robotics teaches programming collaborative robots for automation tasks; Industrial Internet of Things addresses sensor networks and real-time data utilization; and Virtual and Augmented Reality Applications demonstrates immersive tools for design and maintenance. Each topic is integrated with a lab session. By the end of this course, students will be able to articulate key components of smart factories, apply skills learned in labs to real-world scenarios, and critically evaluate the impact of these technologies on manufacturing productivity, flexibility, and customization.

INTENDED LEARNING OUTCOMES (ILOs)

On successful completion of the proposed course, students will be able to:

1. Describe the principles and practices of smart manufacturing;
2. Apply the principles of design for smart manufacturing in computer-aided design (CAD) tools;

- Describe different additive manufacturing processes and use common desktop 3D printers to fabricate parts;
- Explain the features of industrial robots and demonstrate simple robot programming skills;
- Illustrate how Industrial Internet of Things can be applied to different manufacturing scenarios;
- Describe the principles of virtual and augmented reality and evaluate their applications in manufacturing;
- Leverage smart manufacturing techniques to address and solve real-world manufacturing challenge.

ASSESSMENT SCHEME

GRADING PERCENTAGE

Course grades are based on a weighted grading scale of 100%. The breakdown for the course is as follows:

Assessment Task Category	# of Activities	Percentage Grade Weight	Assessing Course ILOs
Homework Assignments	5	50% (10% each)	1 - 6
Final Exam	1	25%	1 - 7
Presentation	1	25%	7
	Total	100%	

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. The homework assignments and final exam will consist of mainly multiple-choice questions, fill-in-blank questions and short-answer questions. The presentation will be based on a mini project where students integrate the five major techniques covered in the course into a smart system (Details will be announced later in the semester). The grading will be straightforward based on the referenced correct answers.

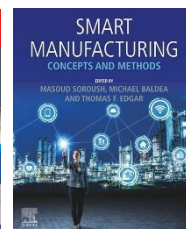
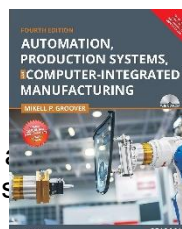
GRADING SCALE

A+	A	A-	B+	B	B-
97-100	94-97	90-94	87-90	84-87	80-84
C+	C	C-	D	F	
77-80	74-77	70-74	60-70	<60	

STUDENT LEARNING RESOURCES

1. Lecture PPT notes

2. (Recommended) Springer Smart manufacturing: Concepts and Methods, Masoud Soroush, Michael Baldea, and Thomas F. Edgar, eds, Elsevier.



3. (Recommended) Automation, production systems, and computer-integrated manufacturing, Groover, Mikell P., 2016, Pearson Education.

4. (Recommended) 智能制造概论, 李培根, 高亮, 2021, 清华大学出版社。



ASSIGNMENTS AND ACADEMIC CALENDAR

Week	Topics	Tasks and Weekly ILOs
01/26-02/01	Introduction to smart manufacturing	ILO #1
02/02-02/08	Design for smart manufacturing: Part 1	HW #1, ILO #2
02/09-02/10	Design for smart manufacturing: Part 2	ILO #2
02/24-02/28	Additive manufacturing (3D Printing): Part 1	HW #2, ILO #3
03/02-03/08	Additive manufacturing (3D Printing): Part 2	ILO #3
03/09-03/15	Industrial robots: Part 1	HW #3, ILO #4
03/16-03/22	Industrial robots: Part 2	ILO #4
03/23-03/29	Industrial Internet of Things: Part 1	HW #4, ILO #5
03/30-04/05	Industrial Internet of Things: Part 2	ILO #5
04/13-04/19	Immersive technologies in manufacturing: Part 1	HW #5, ILO #6
04/20-04/26	Immersive technologies in manufacturing: Part 2	ILO #6
04/27-05/03	Project presentation preparation	ILO #7
05/11	Project presentation	ILO #7
05/18-05/29	Final examination	ILO #1 - #7

* These descriptions and timelines are subject to change at the discretion of the instructor.

COURSE POLICIES

ACADEMIC INTEGRITY

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST(GZ)'s Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Regulations for Academic Integrity and Student Conduct for the University's definition of plagiarism and ways to avoid cheating and plagiarism.

COMMUNICATION AND FEEDBACK

Canvas is the primary online instructional and course communications platform. Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of due dates. Students can access the course syllabus, assignments, grades, and learner support resources. Students are encouraged to protect their login credentials, complete a Canvas orientation and log in daily to course.

MAKE-UP EXAMS

Exams can only be rescheduled due to a university-accepted, excused absence or for arrangements made with the instructor prior to the originally scheduled date.

LATE WORK

All assignments are due at the date and time specified by the instructor or as otherwise noted. Late work will NOT be accepted.

COURSE AI POLICY

AI tools can be used with proper citations and references. Direct copy of AI answers will not be acceptable.