

SSG (www.ssg-wsg.gov.sg) Course

“Robot Motion Planning and Control”

Course Introduction:

We are in the era of industry 4.0 in which robots play an important role of automating various processes in manufacturing such as assembly, welding, painting, material handling, etc. This course's benefits to the learners include: a) the understanding of motion planning in robotics, b) the understanding of motion control in robotics, and c) the ability of applying learnt knowledge to program and operate robots in industry and society, d) (optional) the ability of applying learnt knowledge to develop robots as products for industry and society. Therefore, the learning objective is for learners to become programmers or operators of robots which could be deployed in industry and society.

Course Objective:

The objective of this course is to equip the learners with the basic knowledge of programming and controlling robots in industry and society.

Course Outline:

This short course will cover the following contents:

1. Introduction to robotics
2. Robot Motion Planning: Task planning, Action Planning, Motion Planning, Equations of Path, Equations of Trajectory.
3. Robot Motion Control: Dynamics of robot systems, Control block diagram of robot systems, Joint space control, Task space control.

Trainer's Profile:



Xie Ming received the B.Eng degree in control and automation engineering. Subsequently, as a recipient of the overseas scholarship from Chinese government, he has completed the study for Master degree in the University of Valenciennes (France) as well as the research for PhD degree in the University of Rennes (France). He is Associate Professor of Nanyang Technological University, and was a Fellow with Singapore-MIT Alliance (SMA). He was the General Chair of 2007 International Conference on Climbing and Walking Robots (CLAWAR), the General Chair of 2009 International Conference on Intelligent Robotics and Applications (ICIRA), the Co-founder of the International Journal of Humanoid Robotics (SCI/SCIE indexed), Co-founder of Singapore-China

Association for Advancement of Science and Technology, Co-founder of Robotics Society of

Singapore. He has taught the courses such as Robotics, Artificial Intelligence, Applied Machine Vision, Measurement and Sensing Systems, Microprocessor Systems, and University Physics. In terms of scientific research, he has published two books, two edited books, several book chapters, over 10 patents of invention, over 30 research papers in scientific journals and over 100 research papers in international conferences. He was the recipient of one best conference paper award from World Automation Congress, the recipient of one best conference paper award from CLAWAR, the recipient of one outstanding paper award from International Journal of Industrial Robot, the recipient of one Gold Prize (S\$8K) from CrayQuest, the recipient of one Grand Champion Prize (S\$15K) from CrayQuest, the recipient of one A-Star's Best Research Idea Prize (S\$5K), the recipient of one Silver Medal from Dragon Design Foundation.