Control Science and Engineering Program

■ **Program Overview**

Established by the eminent figure of the discipline, Zhang Zhongjun, the Department of Automation is the supporting unit for the first-level discipline—Control Science and Engineering. The discipline was granted the key first-level discipline nationwide in 2007 and has occupied a leading position in every national evaluation among first-level disciplines. Control theory and control engineering and pattern recognition and intelligent system have been granted the national key disciplines in 1987 and 2001 respectively. Moreover, its two secondary disciplines—Control Theory and Engineering, Pattern Recognition and Intelligent System have been both recognized as the State key disciplines. The main research areas include complex systems and control theory, control and optimization of industrial process, intelligent robots, pattern recognition and computer vision, bio-information, and intelligent traffic etc.

The department has Key Laboratory of System Control and Information Processing, Ministry of Education, and Shanghai Research Center for Optimization and Control Software Engineering. It was also honored as the Innovative Research Team by NSFC. In addition, the department also undertakes a number of national key projects such as the State 973 and 863 projects, and many others financed by NSFC or Shanghai Municipal Scientific Center. Besides, papers of high ESI index have been published in international renowned journals, such as IEEE journals. The department obtained several honors like the second Prize of National Technology Invention Award, the First Prize of Shanghai Natural Science Award, and Shanghai Peony Natural Science Award. It also won the Best Paper Award of IEEE Transactions in the field of circuits and Systems and fuzzy systems.

There are 65 faculty members and researchers in the department, including 2 Cheung Kong scholars, 2 scholars from National Hundred, Thousand and Ten Thousand Talent Project, 4 Recipients of National Science Funds for Outstanding Youth, 5 winners of Program for New Century Excellent Talents in University, 6 scholars of the Dawn Program of Shanghai Education Commission, 3 scholars sponsored by Shanghai Rising-Star Program, and 1 innovative research team of MOE.

■ **Research Directions**

Control Theory and Control Engineering

Detection Technology and Automatic Equipment

Systems Engineering

Pattern Recognition and Intelligent Systems

Navigation, Guidance and Control

■ **Main Courses**

Course name	Semester	Credit Hours	Departments	To whom
The Experimentations of FACTS	fall	2	Electrical Engineering of SEIEE	Master
Applied science of Superconductivity	Spring	2	Electrical Engineering of SEIEE	Master
Applications of Large System Optimization Theory to Power Systems	Spring	2	Electrical Engineering of SEIEE	Master
Modern Power Supply Technology	Spring	2	Electrical Engineering of SEIEE	Master
Computer Vision	Spring	3	Automation of SEIEE	Doctor
Information Fusion	Spring	2	Automation of SEIEE	Doctor
Adaptive Control	fall	2	Automation of SEIEE	Master
Advanced research writing	summer	2	Automation of SEIEE	Master
Presenting scientific ideas – case studies from embodied intelligence	summer	1	Automation of SEIEE	Master
Linear System Theory	fall	3	Automation of SEIEE	Master
Machine Learning - Fundamental and Practice	Spring	3	Computer Science of SEIEE	Master
Image Processing and Machine Vision	fall	3	Computer Science of SEIEE	Doctor
Theory and Methods for Statistical Learning	fall	3	Computer Science of SEIEE	Doctor
Intelligent Speech Technology	Spring	3	Computer Science of SEIEE	Master
Network Computing	Spring	3	Computer Science of SEIEE	Master

Digital Image Processing	fall	3	Computer Science of SEIEE	Master
Advanced Computer Architecture	fall	3	Computer Science of SEIEE	Master
Computer Graphics	Spring	3	Computer Science of SEIEE	Master
Advanced Computer Networks	fall	3	Computer Science of SEIEE	Master
Programming Language	Spring	3	Computer Science of SEIEE	Doctor/Master
Statistical Learning and Inference	fall	3	Computer Science of SEIEE	Master
Bioinformatics	Spring	3	Computer Science of SEIEE	Master
Security Engineering	fall	2	Computer Science of SEIEE	Master
Coding and Information Theory	fall	3	Computer Science of SEIEE	Master
Algorithm analysis and Theory	Spring	3	Computer Science of SEIEE	Master
Applied Algebra	fall	3	Computer Science of SEIEE	Master
Parallel Computing and Algorithms	Spring	2	Computer Science of SEIEE	Master
Computer Animation Design And Data Visualization	fall	3	Computer Science of SEIEE	Master
Modern Mobile Communications and Computing	Spring	3	Computer Science of SEIEE	Doctor
Advanced Topics on Internet of Things	fall	3	Computer Science of SEIEE	Doctor
Introduction to Web Search and Mining	Spring	2	Computer Science of SEIEE	Master
Digital Image Processing	fall	3	Electronic Engineering of SEIEE	Master

Stochastic Processes and Queuing Theory	fall	2	Electronic Engineering of SEIEE	Master
Design and Performance Analysis	Spring	3	Electronic Engineering of SEIEE	Master
Communication Theory and Systems	fall	3	Electronic Engineering of SEIEE	Master
Modern Signal Processing	fall	3	Electronic Engineering of SEIEE	Master
Visual Computing Theory and Engineering	Spring	2	Electronic Engineering of SEIEE	Master
Thery and Technology of Information security	fall	2	Electronic Engineering of SEIEE	Master/Doctor
Array Signal Processing and Space-Time Signal Processing	Spring	3	Electronic Engineering of SEIEE	Master
Waveguide optics	Spring	3	Electronic Engineering of SEIEE	Master
Electrumagnetic in Modern Communication	fall	2	Electronic Engineering of SEIEE	Master
Advanced Theory of Wave Propagation and Antenna	fall	2	Electronic Engineering of SEIEE	Doctor
Semiconductor Physics and Devices Physics	Spring	3	Electronic Engineering of SEIEE	Master
Advanced Theory of Electro magnetic Field	fall	3	Electronic Engineering of SEIEE	Master
Organic Electroluminescent Display and Lighting	Spring	3	Electronic Engineering of SEIEE	Master
Theory of Microwave and speed circuits	Spring	3	Electronic Engineering of SEIEE	Master
Low-noise electronic Design & Detection of Signal in Noise	Spring	3	Instrument Science and Engineering of SEIEE	Master
Chinese	fall/spring	2	International School of Education	Doctor/Master
Chinese Culture	fall/spring	2	International School of Education	Doctor/Master

Matrix Theory	fall	3	Mathematics	Master
Algorithmic method	fall	3	Mathematics	Master