

Wuxi University



Cultivation Plan of
Automation

Department of Automation
School of Automation

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Cultivation Plan of Automation

Formulated by: Li Qinghua, Pan Qi et.al

Reviewer: Song Zhiqiang

I Objectives of the Programme

The programme of Automation adheres to the fundamental task of moral education, adapts to the needs of regional economic and social development, and cultivates people with sound personality and social responsibility, all-round development of moral, intellectual, physical, beauty and labor, mastering professional knowledge, and having the ability to solve engineering problems in the field of automation. Applied talents who can engage in technological development, product research, and management in areas such as industrial automation, industrial robots, and intelligent manufacturing.

After four years of study, graduates should have a solid knowledge of mathematics, natural science and professional knowledge, especially principles of automatic control, sensors and detection technology, motor drive and motion control, process control systems, fundamentals of robotics, etc. The graduates are able to propose solutions to engineering problems in the field of automation, and have the ability to learn independently and keep track of cutting-edge technologies. The graduates own humanities and social science literacy and social responsibility. They also have basic foreign language listening, speaking, reading and writing skills, and own a certain international perspective, and can communicate and exchange in a cross-cultural context. They are able to work independently or cooperatively in a team and be able to organize and coordinate team members to achieve goals.

II Program Learning outcomes (knowledge, skill and competence)

The learning outcomes of the program is divided into the following 6 parts:

(1) Basic scientific literacy

- Understanding and applying mathematical and natural science knowledge to analyze practical problems in the field of a utomation, which is the basis of professional competence;
- Be able to use computers and networks, and have the ability to obtain and use information;
- Have a sense of lifelong learning, and can pay attention to the development trend and application prospects of science and technology.

(2) Professional knowledge, independent learning and research ability

- Ability to acquire and apply relevant expertise in the field of automation;

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- Ability to conduct independent research and obtain higher degrees.

(3) Engineering practice ability

- Master the operation and maintenance technology of system software and hardware in electromechanical systems on automation;
- Be able to propose solutions to engineering problems in the field of automation and reflect the sense of innovation;
- Ability to evaluate the impact of technological solutions on people and the environment from a sustainable development perspective.

(4) The ability to expand engineering and related fields

Ability to evaluate technical proposals from a holistic and interdisciplinary perspective;

- Be able to understand and master engineering management and economic decision-making methods, and can be applied in a multidisciplinary environment;
- Be able to adapt to competitive environment and complete challenging tasks.

(5) Ability to communicate internationally

- Basic foreign language listening, speaking, reading and writing skills;
- Have a certain international perspective, able to carry out basic communication and exchange in across-cultural context.

(6) Teamwork ability

- Ability to work as a team member and communicate effectively with other members in a multi-disciplinary background team;
- Capable of working independently or cooperatively in a team, and can organize and coordinate team members to achieve goals.

III Models

Module 1: Mathematics, Physics, and Chemistry

- Learning objective: Master mathematics, natural science and computer related knowledge to lay a solid foundation for subsequent courses. Ability to apply basic knowledge to analyze and solve practical problems.
- Learning outcomes: ability to use mathematics and natural science to understand and appropriately express technical problems; Able to build basic models to analyze and solve practical problems in engineering; Have the ability to observe, analyze and solve practical engineering problems using mathematical methods; It can analyze, calculate and synthesize phenomena in engineering science on the basis of mathematics, natural science and information technology.

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- Related courses: Advanced Mathematics I(1), Advanced Mathematics I(2), Linear Algebra, Probability Theory and Statistics, Complex Function and Integral Transformation, College Physics II(1), College Physics II(2), College Physics Experiment II.

Module 2: Engineering Fundamentals

- Learning objective: Master the basic professional knowledge and lay a solid foundation for the study of professional courses.

- Learning outcomes: Master engineering drawing, electrical and electronic, control engineering and other basic knowledge; Ability to analyze and solve practical engineering problems.

- Related courses: An Introduction to Professions, Engineering Drawing, Circuit Theory, Experiments of Circuit Theory, Foundational of Analog Electronics, Foundational of Digital Electronics, Signals and Systems, Microcomputer Principle and Interface Technology, Automatic Control Theory.

Module 3: Engineering Application

- Learning objectives: Master solid professional knowledge, and have a strong ability to use professional knowledge.

- Learning outcomes: Master the general methods and skills needed to solve practical engineering problems; According to the characteristics of automation, the phenomenon in the engineering can be continuously analyzed, summarized, inspected and concluded.

- Related courses: Fundamentals of Robot Technology, The Base of Artificial Intelligence, Motor Drive and Movement Control System, Process Control System, Computer Control Technology, Sensor Principle and Detection Circuit Application, Digital Signal Processing, Modern Control Theory, Power Electronic Technology.

Module 4: Elective Courses

- Learning objectives: According to students' course interests and career development needs, meet the personalized needs of learning, further expand students' professional knowledge and improve students' knowledge application level.

- Learning outcomes: master the cutting-edge knowledge and skills in the field of automation, and be able to comprehensively evaluate technical solutions.

- Related courses: Data Communications and Networking, Application of Engineering Database Technology, Innovative System Design and Engineering Practice, Flexible Manufacturing with MES Systems, Image Processing and Machine Vision, PLC and Its Application, Python Language Programming, Robot Operating System (ROS), Engineering Ethics, Engineering Economy, Theme Series of Automatic New Technology.

Module 5: Foreign Languages

- Learning objective: Have cross-cultural communication skills and skills in international cooperation.

- Learning outcomes: Knowledge required to pass College English Test Band 4 (CET-4); Able to find and read professional English literature, and able to communicate professional problems in English; Have cross-cultural communication skills required for career development.

- Related courses: General English (1), General English (2), General English (3), General English (4).

Module 6: General Courses

- Learning objective: Understand the Chinese social model and social norms; Have good quality, team spirit and humanistic feelings; Achieve all-round development of morality, intelligence, physical fitness, beauty and labor.

- Learning outcomes: master the knowledge of modern Chinese history, basic principles of Marxism, humanistic spirit, sports and military training; Understand social phenomena; Pay attention to and adapt to social development; Communicate and collaborate effectively with others; Have team spirit; Promoting physical and mental health and self-improvement; Have a sound personality and psychological quality; Have a correct outlook on life, values, ethics and law; Have humanistic quality and social responsibility.

- Related courses: Situation & Policy, Labor Studies for College Students, Military Theory, Ideology Morality and Rule of Law, Modern Chinese History, Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, Marxism Basic Theory, Introduction to Mao Zedong Thought and Theory of Socialism with Chinese Characteristics, Career Development, Employment Guidance, Innovation and entrepreneurship Foundation, Physical Education (1), Physical Education (2), Physical Education (3), Physical Education (4), C Language Programming, Psychological Health Education.

Module 7: Practical Courses

- Learning objective: To enable students to consolidate theoretical knowledge, enhance their understanding of applied knowledge, and be able to analyze and evaluate complex engineering problems and propose solutions.

- Learning outcomes: Master the ability to analyze and solve practical problems in automation engineering; Master the basic methods and technologies of engineering design and process development, and understand the various factors that affect technical solutions. Ability to apply engineering knowledge to analyze and evaluate problems and understand their limitations; Ability to innovate design and find valuable solutions.

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- Related Courses: Cognitive Practice, Metalworking Practice, Course Exercise of Embedded Systems, Comprehensive Experiments of Single-Chip Microcomputers Principles and Applications, Subject Experiments of Movement Control, Experiments of Automatic Control Theory, Comprehensive Practice of Innovation and Entrepreneurship, Electronic and Electrical Practice, The Training of Engineering Software, Course Exercise of PLC Application, Monographic Experiments of Industrial Robot, Comprehensive Exercise of Control Systems, Graduation Practice.

Module 8: Bachelor's Degree Thesis

- Learning objectives: Be able to propose solutions on the basis of analyzing practical problems and complete practical topics.
- Learning outcomes: Able to complete the graduation design, bachelor's degree thesis with the help of the instructor and pass the graduation defense.
- Related courses: Graduation Design(Dissertation).

IV Structures

The academic duration of Automation is 4 years. According to the teaching plan, the curriculum system is divided into eight ability modules. Courses in different competency modules are linked chronologically.

The Mathematics, Physics and Chemistry module is offered in semesters 1-3 to prepare students for the following courses.

Courses in the Engineering Fundamentals module are offered in semesters 1-5 to prepare students for the study of applied engineering courses.

The course of the Engineering Application module is offered in semesters 4-7, so that students can master solid professional knowledge and have a strong ability to use professional knowledge.

The courses of Elective module are offered in the 1st to 6th semester, according to students' course interests and career development needs, to meet the personalized needs of learning, to further expand students' professional knowledge and improve students' knowledge application level.

The courses of Foreign Language module are offered in semesters 1-4 to enable students to communicate professional issues in English and to develop the intercultural communication skills required for career development.

Practical modules are offered in semesters 1-7. The bachelor's thesis is carried out in the 8th semester. The topic of the bachelor's thesis mainly comes from the scientific research project of the instructor and the practical technical problems of the cooperative enterprise.

According to the teaching plan, after 8 semesters of study, students will earn 200 credits.

V Bachelor's Degree

Students who have completed all the courses prescribed by the program and obtained the required credits can be awarded a bachelor of Engineering Degree.

VI Curriculum of the Programme

Curriculum of Automation								
(Note: CP-Credit Point, S-Semester, L- Lecture, P-Practice)		Type	Chinese CP	ECTS CP	Work Load		S	Remark
Competence fields	Module				Contact Hours	Self-Study Hours		
Mathematics, Physics and Chemistry	Advanced Mathematics I(1)	L	6	6	96	84	1	
	Advanced Mathematics I(2)	L	6	6	96	84	2	
	Linear Algebra	L	3	3	48	42	2	
	Probability Theory and Statistics	L	3	3	48	42	3	
	Complex Function and Integral Transformation	L	2	2	32	28	3	
	College Physics II(1)	L	3	3	48	42	2	
	College Physics II(2)	L	3	3	48	42	3	
	College Physics Experiment II	P	1.5	3	48	42	3	
Engineering Foundations	An Introduction to Professions	L	1	1	16	14	1	
	Engineering Drawing	L&P	2	2	32	28	1	
	Circuit Theory	L	4	4	64	56	2	
	Experiments of Circuit Theory	P	1	1	16	14	2	
	Foundational of Analog Electronics	L&P	4	4	64	56	3	
	Foundational of Digital Electronics	L&P	3	3	48	42	3	
	Signals and Systems	L&P	3	3	48	42	4	

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	Microcomputer Principle and Interface Technology	L&P	4	4	64	56	5	
	Automatic Control Theory	L&P	4	4	64	56	4	
Engineering Application	Fundamentals of Robot Technology	L	4	4	64	56	5	
	The Base of Artificial Intelligence	L	3	3	48	42	7	
	Motor Drive and Movement Control System	L&P	4	4	64	56	6	
	Process Control System	L&P	3	3	48	42	6	
	Computer Control System	L&P	3	3	48	42	5	
	Sensor Principle and Detection Circuit Application	L&P	4	4	64	56	4	
	Digital Signal Processing	L&P	3	3	48	42	5	
	Modern Control Theory	L	3	3	48	42	5	
	Power Electronic Technology	L&P	3	3	48	42	5	
	Electives	Data Communications and Networking	L&P	2	2	32	28	
Innovative System Design and Engineering Practice		L&P	2	2	32	28	6	
Flexible Manufacturing with MES Systems		L&P	2	2	32	28	6	
Image Processing and Machine Vision		L&P	2	2	32	28	6	

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	PLC and Its Application	L&P	2	2	32	28	4	
	Python Language Programming	L&P	2	2	32	28	3	
	Robot Operating System(ROS)	L&P	2	2	32	28	4	
	Engineering Ethics	L	1	1	16	14	2	
	Engineering Economy	L	1	1	16	14	6	
	Theme Series of Automatic New Technology	L	1	1	16	14	1	
Foreign Languages	General English (1)	L	3	3	48	42	1	7 ECTS credits of other general elective courses are required
	General English (2)	L	2	2	32	28	2	
	General English (3)	L	2	2	32	28	3	
	General English (4)	L	2	2	32	28	4	
General Courses	Situation & Policy	L	2	2	32	28	1,2,3,4,5,6,7,8	
	Labor Studies for College Students	L&P	1	2	32	28	1,3,5,7	
	Military Theory	L	2	2	36	24	1	
	Ideology Morality and Rule of Law	L	3	3	48	42	1	
	Modern Chinese History	L	2	2	32	28	2	
	Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	L	3	3	48	42	4	

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	Marxism Basic Theory	L	3	3	48	42	5
	Introduction to Mao Zedong Thought and Theory of Socialism with Chinese Characteristics	L	2	2	32	28	6
	Career Development	L	1	1	16	14	1
	Employment Guidance	L	1	1	16	14	7
	Innovation and Entrepreneurship Foundation	L&P	2	2	32	28	3,4
	Physical Education (1)	L&P	1	2	36	24	1
	Physical Education (2)	L&P	1	2	36	24	2
	Physical Education (3)	L&P	1	2	36	24	3
	Physical Education (4)	L&P	1	2	36	24	4
	C Language Programming	L&P	3	4	48	72	1
	Psychological Health Education	L	2	2	32	28	1,2
Practice Courses	Cognitive Practice	P	1	2	30	30	1
	Metalworking Practice	P	1	2	30	30	2
	Course Exercise of Embedded Systems	P	2	4	60	60	3
	Comprehensive Experiments of Single-Chip Microcomputers Principles and Applications	P	1	2	30	30	3
	Subject Experiments of Movement Control	P	1	2	30	30	4

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	Experiments of Automatic Control Theory	P	1	2	30	30	4	
	Comprehensive Practice of Innovation and Entrepreneurship	P	2	4	60	60	4	
	Electronic and Electrical Practice	P	2	4	60	60	4	
	The Training of Engineering Software	P	2	4	60	60	4	
	Course Exercise of PLC Application	P	1	2	30	30	5	
	Monographic Experiments of Industrial Robot	P	1	2	30	30	6	
	Comprehensive Exercise of Control Systems	P	2	4	60	60	7	
	Graduation Practice	P	4	8	120	120	7	
Bachelor's Thesis	Graduation Design(Dissertation)	P	12	28	240	600	8	
Total ECTS: 218, ECTS/PER SEMESTER:27.25								