

Instructive Cultivation Plan for the Program of Vehicle Engineering

(Grade 2018)

Program code: 081801

1. Cultivation Objectives

The program aims to cultivate engineering technical talents with mechanical engineering and vehicle engineering knowledge who are qualified for the vehicle design, manufacturing, test and quality management work in automobile manufacturing enterprises.

2. Basic Requirements

The students are required to learn basic theory and knowledge of Mechanical and Electronic Engineering, Structure and Theory Of Vehicle, Vehicle Design and Theory, Vehicle Test Technology and Vehicle Electronic Control. They are expected to obtain basic ability in Vehicle Design, Manufacturing, Test and Quality Management. Students will qualify for the position of reserved field engineers in automobile manufactures with good master of automobile assembly technology, knowledge of production line equipment and commissioning technology and large-scale manufacturing technology.

3. Required Knowledge and Abilities

- 3.1 Master basic mechanical engineering theories and knowledge, including Mechanical Engineering, Mechanical Mechanicals, Electrical Engineering and Electronic Technology, Computer Application Technology, Automation, Test Technology, Market Economy and Business Administration;
- 3.2 Master professional knowledge of vehicle structure, theory, design and electronic control and advanced manufacturing methods of vehicle products;
- 3.3 Have basic ability of engineering drawing, computation, experiments, test and computer application and to analyze and solve the design and development, technological upgrade and innovation of vehicle products with the learned knowledge;
- 3.4 Familiar with frontier technology, development and industrial demands of mechanical engineering and vehicle engineering;
- 3.5 Familiar with national technical standards, related laws, regulations and policies in the field of Vehicle Engineering;
- 3.6 Have the ability to do scientific researches, carry out technological R&D, master organization and management in the field of Vehicle Engineering;
- 3.7 Have basic knowledge of Natural Sciences, Humanities, Social Science And Industrial Arts;
- 3.8 Have a global vision and strong communication ability;
- 3.9 Have a sense of life-long learning and the ability of continuous learning.

4. Duration

Generally four years. The shortest duration is not less than three years, and the longest is not more than six years.

5. Credits and Degree

Minimum Credits of Curriculum (required courses, practical trainings & extracurricular classes):
151.

Degrees Conferred: Bachelor of Engineering

6. Major Disciplines

Mechanical Engineering, Vehicle Engineering

7. Major courses

7.1 Technical Drawing

Through the course, the students are required to master engineering diagram drawing, the basic instruction, operational methods and drawing skills of CAD and the ability to read and draw diagram. They are expected to be patient, detailed, rigorous and serious in their work. Students will be able to obtain Junior CAD certificate after learning computer drawing ability of 2D graphs of general components.

7.2 Automobile Engine Structure

This course, taking typical automobile engine as examples, introduces crank and rod mechanism, valve system, lubricant system, cooling system, gasoline engine and diesel engine. Besides, the students are required to master the main subsystems of the engine and the structure or working theory of components, the general rules of engine structure and the installation relationship between different components, laying a good basis for the following specialized courses.

7.3 Structure of Automobile Chassis

Taking typical automobile as an example, the course introduces the transmission system of the chassis, driving system, steering system and braking system, the structure and working theory of main system and components of chassis, the general rules of automobile chassis structure and the installation relationship between different components, laying a good basis for the following specialized courses.

7.4 Automobile Electric Appliance

Taking typical vehicle as an example, the course introduces the engine starting system, ignition system, power system, whole circuit and common automobile appliances, the structure and working theory of different systems and components, the method of reading the circuit drawings and the main functional modules of the automobile appliance system.

7.5 Automobile Electric Control Technology

This course introduces the knowledge of modern automobile electric control system, ABS control system, airbags, electric control steering system, the composition, working theory and basic controlling strategy of different systems, the layout and circuits of different sub-systems, the structure and working theory of sensors and actuators, the measurement of electric control system and the use of main test devices.

7.6 Automobile Manufacturing Technology

Taking the typical automobile component as an example, the course introduces the processing specification design of component processing, the assembly technology of the whole automobile and main components of different sub-systems, including the assembly sequence, use of professional tools, tightening torques of bolts, the adjusting of spaces between different

components, laying an important basis for the field technical work in whole-automobile or component manufacturers.

7.7 Automobile Theory

This course systematically introduces the basic theory of dynamics, fuel economy, braking, operation stability, running smoothness, evaluation index and methods of different performances, construction of related dynamics equation, the influences of structure mode and parameter of automobile and its components on the using performances and the basic methods of performance forecasting.

7.8 Practice of Automobile Structure

The course arranges the corresponding practical operational sessions for “engine structure”, “structure of chassis” and “automobile electric appliances” courses. It also introduces the main structure, composition and working theory of autos from the perspectives of mechanical structure and appliance system through the disassembly and assembly of engine, manual transmission and main automobile components and the measurement and assembly of the whole-automobile appliance system.

7.9 Practice of Automobile Manufacturing Technology

This course requires the students to master the operational methods and programming technology of industrial robots, complete the teaching and preparation of general delivery programs independently, generate and implement the complex tracks with robot simulation software, understand the composition and basic working theory of automatic delivery car and material delivery system and the master the operational methods of the system.

7.10 Automobile Manufacturing Process Control

The course requires the students to learn process control procedures and quality management methods of manufacturer’s automatic production lines, understand the systematical composition and working theory of automatic production lines, and get familiar with the parameter setting, data reading, process setting of related working interfaces, laying a good basis for the students’ mastering of automatic production technologies.

8. Practical Training

Practice of Automobile Structure, Practice of Automobile Assembly Technology, Practice of Automobile Manufacturing Technology, Graduation Design (Thesis).

9. Course Category and Course Hour

| Course Category | Total Credits | % | Total Course Hours | Theoretical Course Hours | Practical Course Hours |
|---|----------------------|----------|---------------------------|---------------------------------|-------------------------------|
| General Education Basic Course | 59 | 39 | 1088 | 992 | 96 |
| Specialized Basic Course | 27 | 18 | 432 | 381 | 51 |
| Specialized Course | 29 | 19 | 464 | 440 | 24 |
| Professional Practice | 35 | 24 | 840 | 0 | 840 |
| Total | 150 | 100 | 2824 | 1813 | 1011 |
| Theoretical Course Hour: Practical Course Hour (%) | 64: 36 | | | | |

10. Teaching Schedule (1)

| Course Category | Course Property | College/School | Course Code | Course | Assessment | Total Credits | Total Course Hours | Theoretical Course Hours | Practical Course Hours | Suggested Semester |
|---------------------------------------|-----------------|------------------------------|-------------|---|------------|---------------|--------------------|--------------------------|------------------------|--------------------|
| General Education Basic Course | Compulsory | School of Marxism | b1080001 | Basic Theory of Marxism | test | 3 | 48 | 42 | 6 | autumn 1, spring 1 |
| | Compulsory | School of Marxism | b1080002 | Outline of Modern Chinese History | non-test | 2 | 32 | 28 | 4 | autumn 1, spring 1 |
| | Compulsory | School of Marxism | b1080003 | Moral Cultivation and Basic Legal Knowledge | non-test | 3 | 48 | 42 | 6 | autumn 1, spring 1 |
| | Compulsory | School of Marxism | b1080004 | Introduction to the Thought of Mao Zedong and Theories of Socialism with Chinese Characteristics I | test | 3 | 48 | 42 | 6 | autumn 2 |
| | Compulsory | School of Marxism | b1080005 | Introduction to the Thought of Mao Zedong and Theories of Socialism with Chinese Characteristics II | test | 3 | 48 | 42 | 6 | spring 2 |
| | Compulsory | School of Marxism | ----- | Social Development (Module 1-4) | non-test | 2 | (32) | (32) | | autumn 1- spring 2 |
| | Compulsory | College of Arts and Sciences | b1020007+ | Calculus A1 | test | 4 | 64 | 64 | | autumn 1 |
| | Compulsory | College of Arts and Sciences | b1020008+ | Calculus A2 | test | 4 | 64 | 64 | | spring 1 |

| | | | | | | | | | | |
|----------|---------------------------------------|------------------------------|----------------------------|--|----------|-----|----|----|----------|----------------------------|
| | Compulsory | College of Arts and Sciences | b1020012 | Linear Algebra | non-test | 2 | 32 | 32 | | autumn 2 |
| | Compulsory | College of Arts and Sciences | b1020062 | College Physics A (Module 1) | test | 3 | 48 | 48 | | spring 1 |
| | Compulsory | College of Arts and Sciences | b1020065 | College Physics B | test | 2 | 32 | 32 | | autumn 2 |
| | Compulsory | College of Arts and Sciences | B1020066 | College Physics C | non-test | 1 | 32 | | 32 | spring 1, autumn 2 |
| | Compulsory | College of Arts and Sciences | b1020035 | College Chemistry | test | 1 | 32 | 28 | 4 | autumn 1, spring1, summer1 |
| | Compulsory | College of Arts and Sciences | b1020019 | Practical Writing A | non-test | 2 | 32 | 32 | | autumn 1, spring 1 |
| | Compulsory | College of Arts and Sciences | b1020021 | Military Theory (including Safety Education) | non-test | 0.5 | 16 | 16 | | autumn 1, spring 2 |
| | Compulsory | Others | b1110001 | Military Training (including Entrance Education) | non-test | 0.5 | 32 | | 32 | autumn 1 |
| | Selective 10 Credits (1 Module) | Module A | b1020003 | General English III | test | 3 | 48 | 48 | | autumn 1 |
| | | | b1020004 | General English IV | test | 3 | 48 | 48 | | spring 1 |
| | | | b1020005 | General Academic English A | test | 2 | 32 | 32 | | autumn 2 |
| | | | ----- | English Extension | non-test | 2 | 32 | 32 | | spring 2 |
| | | Module B | b1020003 | General English II | test | 3 | 48 | 48 | | autumn 1 |
| | | | b1020004 | General English III | test | 3 | 48 | 48 | | spring 1 |
| b1020005 | | | General Academic English B | test | 2 | 32 | 32 | | autumn 2 | |
| ----- | | | English Extension | non-test | 2 | 32 | 32 | | spring 2 | |

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|--|--|-------------------|--|---------------------|------|-----------|-------------|------------|-------------------|----------|
| | | Module C | b1020003 | General English I | test | 4 | 64 | 64 | | autumn 1 |
| | | | b1020004 | General English II | test | 3 | 48 | 48 | | spring 1 |
| | | | b1020005 | General English III | test | 3 | 48 | 48 | | autumn 2 |
| Compulsory | Department of Physical Education | ----- | Physical Education I-VI | non-test | 3 | 160 | 160 | | autumn 1-autumn 4 | |
| Selective | Others | General Course | Humanities (6 credits) Natural Sciences (4 credits) | non-test | 10 | 160 | 160 | | autumn, spring | |
| Total (General Education Basic Courses) | | | | | | 59 | 1088 | 992 | 96 | |

10. Teaching Schedule (2)

| Course Category | Course Property | College/School | Course Code | Course | Assessment | Total Credits | Total Course Hours | Theoretical Course Hours | Practical Course Hours | Suggested Semester |
|---|-----------------|-----------------------------|-------------|--|------------|---------------|--------------------|--------------------------|------------------------|--------------------|
| Specialized Basic Course | Compulsory | College of Engineering | b2011137 | Technical Drawing I | test | 3 | 48 | 40 | 8 | autumn 1 |
| | Compulsory | College of Engineering | b2011138 | Technical Drawing I | non-test | 3 | 48 | 32 | 16 | spring 1 |
| | Compulsory | College of Engineering | b2011240 | Introduction to Vehicle Engineering | non-test | 1 | 16 | 16 | | autumn 1 |
| | Compulsory | College of Engineering | b2011049 | Engineering Mechanicals I | test | 3 | 48 | 48 | | autumn 2 |
| | Compulsory | College of Engineering | b2011050 | Engineering Mechanicals II | test | 3 | 48 | 44 | 4 | spring 2 |
| | Compulsory | College of Engineering | b2011079 | Mechanical Theory | test | 3 | 48 | 44 | 4 | spring 2 |
| | Compulsory | College of Engineering | b2011077 | Mechanical Design | test | 3 | 48 | 45 | 3 | autumn 3 |
| | Compulsory | College of Engineering | b2011080 | Basic Machinery Manufacturing | test | 3 | 48 | 42 | 6 | autumn 3 |
| | Compulsory | Engineering Training Center | b2090001 | Electrical Engineering and Electronic Technology | test | 3 | 48 | 42 | 6 | autumn 2 |
| | Compulsory | College of Engineering | b2011152 | Hydraulic and Pneumatic Power Transmission | test | 2 | 32 | 28 | 4 | autumn 2 |
| Total (Specialized Basic Course) | | | | | | 27 | 432 | 381 | 51 | |
| Specialized Course | Compulsory | College of Engineering | b2011100 | Automobile Engine Structure | test | 2 | 32 | 32 | | autumn 2 |
| | Compulsory | College of Engineering | b2011097 | Structure of Automobile Chassis | test | 3 | 48 | 48 | | spring 2 |
| | Compulsory | College of Engineering | b2011099 | Automobile Electric Appliance | test | 2 | 32 | 32 | | spring 2 |
| | Compulsory | College of Engineering | b2011037 | Motor Theory | test | 2 | 32 | 32 | | spring 2 |
| | Compulsory | College of Engineering | b2011102 | Automobile Theory | test | 3 | 48 | 48 | | autumn 3 |
| | Compulsory | College of Engineering | b2011103 | Automobile Design | non-test | 2 | 32 | 32 | | spring 3 |
| | Compulsory | College of Engineering | b2011098 | Automobile Electric Control Technology | test | 3 | 48 | 48 | | autumn 3 |

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|--------------------------------------|------------|------------------------|--|--|----------|-----------|------------|------------|-----------|----------|
| | Compulsory | College of Engineering | b2011106 | Automobile Manufacturing Technology | test | 2 | 32 | 32 | | autumn 3 |
| | Compulsory | College of Engineering | b2011105 | Automobile Testing | non-test | 2 | 32 | 16 | 16 | spring 3 |
| | Compulsory | College of Engineering | b2011104 | Automobile Manufacturing Process Control | non-test | 2 | 32 | 32 | | spring 3 |
| | Compulsory | College of Engineering | b2011096 | Automobile CAD/CAM | non-test | 2 | 32 | 32 | | autumn 3 |
| Total | | | | | | 25 | 400 | 384 | 16 | |
| Selective 4 credits | Module A | b2011055 | Industrial Robot and Application | non-test | 2 | 32 | 24 | 8 | autumn 3 | |
| | | b2011101 | Introduction to Auto Laws and Regulations | non-test | 2 | 32 | 32 | | autumn 4 | |
| | Module B | b2011111 | Production Line Equipment and Commissioning Technology | non-test | 2 | 32 | 32 | | autumn 3 | |
| | | b2011144 | Introduction to New Energy Automobile | non-test | 2 | 32 | 32 | | spring 3 | |
| | Module C | b2011263 | Insurance and Compensation of Motor Vehicle | non-test | 2 | 32 | 32 | | autumn 4 | |
| | | b2011264 | Modern Automobile Marketing | non-test | 2 | 32 | 32 | | spring 3 | |
| Total | | | | | | 4 | 64 | 56 | 8 | |
| In Total (Specialized Course) | | | | | | 29 | 464 | 440 | 24 | |

Notes for the selective modules:

1. Module A: introduces industrial robots and laws and regulations of automobile industry
2. Module B: introduces operation and maintenance of vehicle production equipment and new energy automobile
3. Module C: introduces relevant regulation, laws and application of automobile insurance and marketing

11. Teaching Schedule (3)

| Course Category | Course Property | College/School | Course Code | Course | Assessment | Total Credits | Total Course Hours | Theoretical Course Hours | Practical Course Hours | Suggested Semester |
|--------------------------------------|-----------------|-----------------------------|-------------|--|------------|---------------|--------------------|--------------------------|------------------------|------------------------|
| Professional practice | Compulsory | Engineering Training Center | b4090001 | Basic Engineering Training A | non-test | 3 | 72 | | 72 | spring 1, summer 1 |
| | Compulsory | College of Engineering | b4011105 | Factory Internship | non-test | 1 | 24 | | 24 | spring 3 |
| | Compulsory | College of Engineering | b4011088 | Technical Drawing | non-test | 2 | 48 | | 48 | summer 1 |
| | Compulsory | College of Engineering | b4011056 | Course Design of Mechanical Design | non-test | 2 | 48 | | 48 | spring 2 |
| | Compulsory | Engineering Training Center | b4011070 | Course Design of Auto Theory | non-test | 1 | 24 | | 24 | autumn 3 |
| | Compulsory | College of Engineering | b4011068 | Course Design of Auto CAD | non-test | 1 | 24 | | 24 | autumn 3 |
| | Compulsory | College of Engineering | b4011071 | Course Design of Auto Design | non-test | 1 | 24 | | 24 | spring 3 |
| | Compulsory | College of Engineering | b4011069 | Practice of Auto Structure | non-test | 4 | 96 | | 96 | spring 2 |
| | Compulsory | College of Engineering | b4011073 | Practice of Auto Assembly Technology | non-test | 4 | 96 | | 96 | spring 3 |
| | Compulsory | College of Engineering | b4011072 | Practice of Auto Manufacturing Technology | non-test | 4 | 96 | | 96 | summer 3 |
| | Compulsory | College of Engineering | b4011140 | Graduation Internship and Graduation Design (Thesis) for the Program of Traffic and Transportation | non-test | 12 | 288 | | 288 | spring 4 |
| Total (Professional Practice) | | | | | | 35 | 840 | | 840 | |
| Extra-curricular Class | Compulsory | Others | b5110001 | Extracurricular Class | non-test | 1 | - | - | - | autumn, spring, summer |
| Total | | | | | | 151 | 2824 | 1813 | 1011 | |

12. Sequence of Course

| No. | Course | Prerequisite Courses | No. | Course | Prerequisite Courses |
|-----|--|-------------------------------------|-----|--------|----------------------|
| 1 | Automobile Theory | Automobile Engine Structure | | | |
| | | Structure of Automobile Chassis | | | |
| | | Engine Theory | | | |
| 2 | Automobile Electric Control Technology | Automobile Engine Structure | | | |
| | | Structure of Automobile Chassis | | | |
| | | Automobile Electric Appliance | | | |
| 3 | Automobile Design | Automobile Engine Structure | | | |
| | | Structure of Automobile Chassis | | | |
| | | Automobile Theory | | | |
| 4 | Automobile Testing | Automobile Engine Structure | | | |
| | | Structure of Automobile Chassis | | | |
| | | Automobile Theory | | | |
| 5 | Automobile Manufacturing Technology | Automobile Engine Structure | | | |
| | | Structure of Automobile Chassis | | | |
| 6 | Automobile Manufacturing Process Control | Automobile Engine Structure | | | |
| | | Structure of Automobile Chassis | | | |
| | | Automobile Manufacturing Technology | | | |
| 7 | Production Line Equipment and Commissioning Technology | Automobile Engine Structure | | | |
| | | Structure of Automobile Chassis | | | |
| | | Automobile Manufacturing Technology | | | |

13. Extracurricular Class

Through taking extracurricular classes, students are encouraged to take part in academic lectures, social practice activities, campus cultural and sports activities, innovative and entrepreneurial activities, voluntary activities, etc. to improve their social adaptability and enhance the competitiveness in the job market. Details are specified in Students' Manual.