New Curriculum Reform and its Impact on the National University Entrance Examination System in China—an Example in Physics

Yibing Zhang[a)]
School of Physics and Electrical Information, Ningxia University, Yinchuan, Ningxia 750021, China

Xiang Gao
Ningxia Tianjiabing Senior High School, Yinchuan, Ningxia 750021, China

Cheng Wang
Ningxia Yinchuan Second High School, Yinchuan, Ningxia 750021, China

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China is experiencing its eighth basic education curriculum reform, and the "curriculum standard" is a symbol of this innovation. One feature of the curriculum standard is to challenge the previous model of unified courses. Students can now select some elective courses to pursue their own learning interests. Along with this innovation, the National University Entrance Examination (NUEE) programs have been appropriately adjusted, so that experimental areas implementing the new curriculum standard may develop NUEE schemes based on local conditions and can also develop their own examination questions. This paper focuses on the implementation of the curriculum standard in physics. We examine the features of the physics NUEE programs among 11 curriculum reform areas in 2009 and analyze the impacts of physics curriculum reform to the physics entrance examination system.

I. CHINA'S CURRENT STATUS OF THE NEW CURRICULUM REFORM

China has undergone system wide curriculum reform seven times during the sixty years since the People's Republic of China was founded. In June 1999, the eighth basic education curriculum reform started, and Chinese education entered a new era. This latest round of basic education curriculum reform is also called "the new curriculum reform." As part of the curriculum, "the teaching syllabus" was replaced by "the curriculum standards;" therefore, the "Curriculum Standards" have become a symbol of innovation in this new round of curriculum reform. The Standards established the teaching pedagogy, the teaching objectives, the curriculum structure, the curriculum implementation, and the program for assessment for each subject. A curriculum was advanced with the three-in-one goals of progressing knowledge and skills, processes and methods, and emotion, attitudes, and values. In order to promote student development, the assessment of curriculum standards suggested that a variety of evaluation methods be implemented. These changes of concept and content are reflected by the schemes and the exam questions of this year's National University Entrance Examination (NUEE).

In 2003, The People's Republic of China's Ministry of Education disseminated the "High School Curriculum Program (experimental version)" and the experimental protocol of full-time high school curriculum standards for all subjects. Corresponding experimental textbooks were also published for trial in various experimental zones. At present, a total of 19 provinces and autonomous regions are implementing these new experimental curriculum standards for high school, and the whole of China will carry them out in their entirety by 2010. The provinces， autonomous regions and municipalities putting the reform of curriculum standards into practice are the first group (2004): Shandong, Guangdong, Hainan, Ningxia; the second group (2005): Jiangsu; the third group (2006): Tianjin, Zhejiang, Anhui, Fujian, Liaoning, the fourth group (2007): Beijing, Shanxi, Heilongjiang, Jilin, Hunan; and the fifth group (2008): Shanxi, Jiangxi, Henan and Xinjiang.

Shanghai, as a separate municipality of curriculum reform, has its own set of curriculum standards and implementation program, and now it is in the second phase of the reform, which is structured on the base of the first phase (1986 - 1997). The second period began in 1997 and advanced the pursuit of the goals of "Chinese characteristics, characteristics of the times, Shanghai's characteristics," which itself was produced and developed in the wake of reform of curriculum in China and abroad as well as the development of Shanghai and other joint action.

Therefore, together with Shanghai, currently there are 20 provinces, municipalities and autonomous regions participating in China's eighth curriculum reform. In 2009, the graduates of high school from 11 provinces, municipalities, and autonomous regions had participated in the National University Entrance Examination (NUEE) after the experimental reform of the high school curriculum standards. The total number of students who participated in the NUEE in 2009 is 10.09 million, while the number of examinees from the experimental curriculum reform areas is 3.6468 million, 36.14% of the total amount[1]. The curriculum reform has broken the previous situation of a nationally unified college entrance examination program, both in the exam subjects and exam content. Under the guidance of the Ministry of Education, the provinces and autonomous regions that participated in the curriculum reform have developed an entrance examination program according to their local conditions. In the rest of this paper, we give a brief introduction of the high school physics curriculum standards and address the guidance that the Ministry of Education gave to the cur-

riculum reform areas with regards to the 2009 college entrance examination program and the physics examination syllabus. We have investigated the forms and scopes of the 2009 College Entrance Examination in 11 curriculum reform regions, and, having detected the differences among the physics examination programs of the various regions, we analyzed how the college entrance examinations reconcile the new curriculum ideas and the needs for universities selecting students in the subject of physics.

II. INTRODUCTION OF "FULL-TIME HIGH SCHOOL PHYSICS CURRICULUM STANDARDS (EXPERIMENTAL VERSION)"

"Full-time High School Physics Curriculum Standards (experimental version"[2] was issued in April 2003, and the publishers have come out with corresponding trial textbooks. The first experimental group of high school which implemented the new curriculum standards was in Shandong, Guangdong, Ningxia and Hainan in the fall of 2004.

A. The basic concepts of the high school physics new curriculum standards

The basic concepts set forth in the new high school physics curriculum standards is that curriculum objectives focus on improving the scientific literacy of all students. We should prepare the students to respond to the challenges of modern society and to encourage their future development. Curriculum structure emphasizes fundamental knowledge and electives to promote independent and individual student learning. Contents of the curriculum should be linked strongly to the students' life, modern society, and technological development. The curriculum implementation focuses on students engaging in self-regulated learning, taking an active and willing part in exploration, daring to experiment, and thinking diligently. Diversification of teaching methods should be promoted to help students learn physics knowledge and skills, develop abilities of scientific inquiry, and gradually form their scientific attitude and scientific spirit. Updating curriculum evaluation is emphasized so as to promote the students' development.

B. The curriculum structure and modules

(1) The high school physics curriculum structure

The course of study in high school physics is composed of 12 modules with each module taking 2 credits, as described by the curriculum structure in Fig 1. Among them, Physics 1 and Physics 2 are commonly required modules with the rest being optional modules. To complete all 6 required credits, students must continue to study one of the optional modules after finishing their learning of the two required modules. Having obtaining the 6 required credits, students can continue to study optional modules according to their own interests, developing potentials, and career requirements in the future.

(2) The description of curriculum modules

Common required modules—Physics 1, Physics 2: They are the modules that all high school students are required to study. In these two modules, students study core physics content (such as movement, Newton's laws, energy, etc) and experience some scientific research. Students will gain a preliminary understanding of the characteristics and research methods of physics, learn how to apply physics knowledge to the world, and realize the influence of physics on the development of society. At the same time, students are being prepared for their study of elective modules. Elective modules series—Optional Module 1-1, 1-2: this series of courses is based on core physics content, focuses on the interrelation and interaction between physics and society, highlights the cultural characteristics of physics, and pays attention to integrating physics into daily life, social science, and liberal arts, and emphasizes the impact of Physics on human civilization.

Elective modules series Optional Module 2-1, 2-2, and 2-3 are based on the core contents of physics, focus on the technological application of physics, emphasizes the combination of technology and physics, and highlights the practical applications of physics.

Elective modules series Optional Module 3-1, 3-2, 3-3, 3-4, and 3-5 aim to let students learn the basic contents of Physics comprehensively, have a better understanding of its ideas and methods, and develop a deep knowledge of its technological application and its impact on the economy and society.

C. The properties and goals of the curriculum

(1) The general goals

To learn basic physics knowledge and skills necessary for lifelong development, understand the applications of this knowledge and skills in daily life and production, and pay close attention to the current conditions and trends of development;

To learn scientific research methods, develop the ability to learn independently, cultivate good habits of thinking, and acquire the ability to solve problems with physics knowledge and science inquiry methods; To maintain a curiosity and thirst for knowledge, cultivate interest in science inquiry, be equipped with the scientific attitude and scientific spirit of adherence to the truth, be creative and seek the truth from facts, and have the social responsibility of rejuvenation of China and science-based service to humankind;

To understand the interaction of science with technology, the economy, and society, be aware of the relations between human beings and the natural world, remain conscious of sustainable development and global perspective.

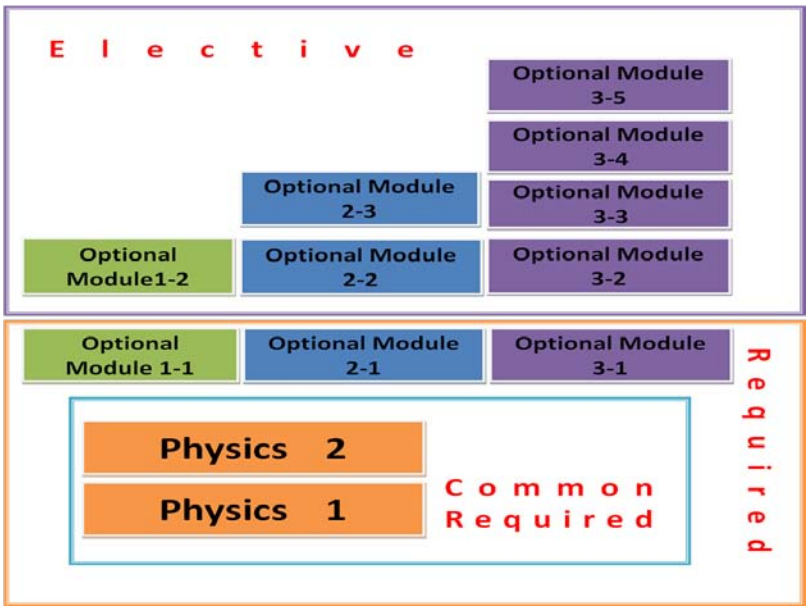

Figure 1: Visualization of the high school physics curriculum structure.

(2) The particular goals of physics courses

a) The knowledge and skills

To acquire basic knowledge of physics, know of some basic concepts and principles (regarding material structure, interactivity, and motion), and understand of basic view points and theories of physics

To realize the important role and influence of experimentation in physics, learn some basic experimental techniques in physics, be able to operate basic instruments and complete some physics experiments independently

To know of the developmental process of physics, including major achievements and the developmental trends of science technology

To understand the impacts of physics on economic and social development, examine the relation between physics and other subjects, know of some fields of applied physics, and be able to try to explain some natural phenomenon and daily life problems with relevant physics knowledge and skills.

b) Processes and methods

To experience scientific inquiry and know of its significance，apply methods of scientific inquiry, explore Physics problems, and verify physical laws. By the process of learning concepts and principles of Physics, the students can acquaint themselves with the research methods of Physics and understand the function of experiments, models, and mathematical tools in the development of Physics. They can arrange and adjust their own learning process and solve some physics problems that they encounter in their learning through their own efforts, being able to learn independently to some extent. They can participate in social practices, such as trying to express their own opinions in reflection, and solve some real world problems linked with production and life by using the principles and research methods of physics. They are able to maintain skepticism and make hypotheses, collect and handle information, analyze and solve problems, and communicate cooperatively.

c) Emotion, attitudes and values

The students are able to enjoy the mystery and harmony of the natural world, maintain their curiosity and thirst for knowledge, be willing to explore the mystery of the natural world, and experience the hardship and happiness of natural laws. They have the passion for participating in extracurricular science activities, the consciousness of applying physical knowledge into life and production, and they daringly probe into physical problems related to daily life. In terms of scientific attitude and spirit, they can insist on truth, be innovative and seek truth from facts. They can consciously judge whether the information of the mass media is scientifically reliable. They have the spirit of taking initiative in cooperating with others and the desire to exchange their own ideas with others. They insist on the best ideas, correct errors, and have team spirit. They know and appreciate the contribution that physics makes to economics and the development of the society; additionally, they may pay close attention to and reflect on hot spots of society. They should have the consciousness of sustainable development and contribute to it as much as they can. They should be concerned with the present situation and development of advanced technology at home and abroad. Also, they should have a sense of mission and sense of responsibility for the rejuvenation of China and science-based service.

D. The suggestions regarding credit management, assessment, and university entrance examination

All students desiring the senior high school certificate are required to finish the study of Physics 1 and Physics 2.

Meanwhile, they are required to choose between Optional Module 1-1, Optional Module 2-1, and Optional Module 3-1. Then, they can finish the 6 credits of compulsory physics courses. After that, based on individual interest, developing potential, and future occupational needs, students can choose some elective physics courses from Optional Modules 1, 2 and 3.

It is the comprehensive evaluation of the study in respective course modules that decides whether the student earn credits. In the study of physics in senior high, students should be permitted to choose courses crossing grades and groups, retake elective courses, and retake exams of any one module.

For students who apply for universities or colleges, content of the examination should include required courses, Physics 1 and Physics 2 and some of the elective modules. Exam content from the elective modules is decided by the category of university and requirements of majors. Formative evaluation, such as students' growing records, should also be the basis of colleges' enrollment decisions. It is emphasized that reform of college enrollment should match the implementation of the new curriculum standard.

III. THE GUIDANCE OF MINISTRY OF EDUCATION IN THE NUEE PROGRAM AND THE PHYSICS EXAMINATION SYLLABUS IN 2009

Through the curriculum standard, we can see that the main purpose of the new curriculum reform is to build the 21st curriculum system of basic education on quality education. The main purpose of physics education is not just elite education for the part of students who want to accept higher education in the future, but to improve the scientific literacy of all students. The choice to enroll in a university, after taking the entrance examination, is made by some students in pursuit of future studies. In addition to required credits, it is important for this group of students to elect courses that prepare them for entry into colleges or universities. Therefore, the Ministry of Education issued the guidance and examination syllabus.

The College Entrance Examination program in the curriculum-standard experiment was established according to "Guidance about Deepening University Recruitment Examination Innovation in Provinces of General High School New Curriculum Reform (Education, 2008, NO.4)" [3], which was formulated by the Ministry of Education in 2008. "Guidance" clearly stated: "establish and improve the comprehensive, integrated, and diversified examination and evaluation system gradually on the basis of national unification in examination and admission." The examination reform demands that the "test contents must be aligned with the new high school curriculum contents; closer to the times, the society, and examinees' real situation; and attentive to the ability of analyzing problems and problem-solving skills by applying what they have learned. Examination subjects include Chinese, mathematics, foreign languages and related subjects, which are divided between integrated liberal arts or integrated sciences; the "related subjects" can also be other subjects established according to local situations in the province. The range of every subject should abide by the "Examination syllabus" of the new curriculum. The final decision to increase the optional test as well as the proportion of it is made by the individual provinces according to the reality of its high school curriculum reform and the characteristic of each subject." Thus, it is observed that the Ministry of Education offers sufficient freedom to the experimental curriculum areas. However, the range of tests should conform to "Examination Syllabus" issued by the Ministry of Education. According to "Guidance" and "Examination Syllabus," provinces and municipalities and autonomous regions work out their own college entrance examination program and "Examination Description" of each subject that should be reported to the Ministry of Education for approval. After approval, each province either designs the test papers in accordance with the "Examination Description" or the Ministry of Education is commissioned to design test papers. Either way, the examination is conducted in accordance with a unified national examination time.

In the "2009 University Entrance Examination Syllabus (Curriculum standard experimental version)—Physics"[4], the required range for examinees is: "Mechanics, Thermodynamics, Electricity and Magnetism, Optics, Atomic physics, Nuclear physics and some other." Considering both physics curriculum standards and the basic requirements for future colleges and university students, the examination contents in the "Examination Syllabus" consist of two types: a compulsory part of the exam and an elective part of the exam. There are four modules in each part, which are shown in Table 1. The students must complete all required modules and select two modules from elective test modules as their examination contents, but they cannot choose modules 2-2 and 3-3 at the same time. Taking into account the basic requirements for science and engineering college enrollment, the experimental areas cannot reduce the required contents of the examination for each module.

IV. THE ANALYSIS OF THE 2009 UNIVERSITY ENTRANCE EXAMINATION SCHEME IN THE NEW CURRICULUM STANDARD EXPERIMENTAL AREAS OF CHINA

Through analysis of the college entrance examination scheme in the experimental curriculum standards areas and physics examination in 2009, we find that this year's physics examination is flexible and all curriculum reform experimental areas show the new concept of curriculum reform though with different aspects. Some experimental areas embody the "emphasis on foundation, reflect selectivity" principle in the examination program; others focus on "close to the students' life, the modern society and the technological progress" in the examination questions. The entire curriculum-reform areas attach great importance to examining the students' ability to apply the scientific methods to inquiry-based physical problems and verifying physical laws.

By analyzing 2009 physical examination program of

each province in Table 2 (in appendix), the examination programs can be divided into three categories.

In the first category, physics is one part of the integrated sciences. These provinces are Anhui, Tianjin, Shandong, Ningxia, Liaoning, Fujian and Zhejiang. However, integrated science examination is divided into two types. In one, the contents of the examination consisted of required modules and elective modules in accordance with the "Examination Syllabus of Physics" of Ministry of Education. They are the four provinces of Shandong, Ningxia, Liaoning and Fujian. The required and elective modules set by these four provinces are not only consistent with the Ministry of Education Syllabus, but also consider the local situation. Ningxia and Liaoning used the same examination papers, for which questions were designed by the Ministry of Education according to the description of Ningxia and Liaoning. Under the examination syllabus, the compulsory examination contents are the four modules Physics 1, Physics 2, Optional 3-1, and Optional 3-2, and the elective examination contents are Optional 2-2, Optional 3-3, Optional 3-3, Optional 3-4, and Optional 3-5. There is one question in each optional module. It is different from the examination syllabus that students only need to choose one question to answer. The proportion of elected examination is 15/110. Shandong removes the Optional 2-2 and retains the other three optional modules from which students select two of them to answer. The elective examination accounts for 16/89. In Fujian, the Optional 3-4 is put into the required examination and Optional 3-3 and Optional 3-5 make up the elective examination part. Students choose one of them to do, and the proportion is 12/120. Among Anhui, Tianjin and Zhejiang, the integrated science examination only has required examination questions, and it includes the compulsory examination modules and some elective examination modules in the examination syllabus of Ministry of Education. These provinces actually insist their students take the same examination contents. The scope of required examination of integrated science tests in Tianjin and Zhejiang are Physics 1, Physics 2, Optional 3-1, Optional 3-2, Optional 3-4 and Optional 3-5. However, in Zhejiang, the concept of self-selection is embodied in the form of an "elective modules examination," which consists of nine subjects, Chinese, Mathematics, Foreign Languages, Politics, History, Geography, Physics, Chemistry and Biology. There are 18 elective modules within nine subjects. Each module has one question and students choose any six of those to answer. The physics accounts for two optional modules. The contents are from Optional 1-2 and Optional 3-3. In Anhui, the scope of the compulsory examination is Physics 1, Physics 2, Optional 3-1, Optional 3-2 and Optional 3-5.

In the second category, physics is required as a separate test for science candidates and includes Hainan and Jiangsu. However, there are differences among the two provinces. In Jiangsu, the examinees are demanded to select one subject within physics and history. In Hainan, the science examinees must select physics, and the physics examinations are divided into two parts, compulsory and elective examinations. The required examination contents include Physics 1, Physics 2, Optional 3-1, Optional 3-2 and the elective examination contents include Optional 3-3, Optional 3-4, Optional 3-5. The elective examination accounts for 24/100 in Hainan and 24/120 in Jiangsu.

In the third category, Physics is not only a separate exam subject but also a part of an integrated examination, and this category includes Guangdong province and Shanghai. The examination over integrated liberal arts or integrated science each reflects the contents for basic credits that arts and science students should acquire in accordance with the "Full-time High School Physics Curriculum Standards (Experimental Version)," issued by the Ministry of Education. The scope of physics in the integrated science test is Physics 1, Physics 2 and Optional 3-1; and in arts, it is Physics 1, Physics 2, and Optional 1-1. In Guangdong, the separate physics examination consists, in line with the Physics Examination Syllabus in the University Entrance Examination 2009 (Experimental version for Curriculum Standards), of two parts: one required and one optional. The former includes Physics 1, Physics 2, Optional 3-1 and Optional 3-2; and the latter involves Optional 3-3(including Optional 2-2) and Optional 3-4. In Shanghai, the integrated liberal arts or science papers are created based on the basic requirements of Curriculum Standards for the High School of Shanghai in order to test the students' ability to analyze and solve problems with knowledge and skills learned and to apply them comprehensively. While the only required part in the examination, the test reflects thoughts, concepts, and methods of teaching and learning that are stated in the second Period of the New Curriculum Reform in Shanghai, and thus integrating the evaluation of knowledge and skills, process and methods, and emotion, attitude and values.[5]

IV. CONCLUSIONS

The New Curriculum Reform has made tremendous changes to the previous situation in which the physics examination of the National University Entrance Examination could only be set at the national level. First, under the direction from "Guidance about Deepening University Recruitment Examination Innovation in Provinces of General High School New Curriculum Reform," "Physics Examination Syllabus of NUEE in 2009 (Experimental Version for Curriculum Standards)," and "Full-time High School Physics Curriculum Standards (Experimental Version)," the areas of experimental curriculum reform lay out the examination program of NUEE and the examination description for each subject. If approved by the Education Ministry, the provinces can, on the basis of the examination description, create their tests either independently or by entrusting this task to the Examination Center of the Education Ministry. Second, the essence of the New Curriculum Reform is reflected either in the programs for the University Entrance Examination or in the exam itself. As stated above, some provinces or municipalities have, such as Shanghai, Jiangsu, Zhejiang, and Guangdong, made many efforts to increase the reform by making the selective examination subjects, while others made the optional structure of examinations, such as Ningxia (Liaoning), Hainan, Guangdong, Shandong, Jiangsu and

Fujian. No matter what kind of selectiveness is practiced, the students' study burden will be lighter because they can, according to the Examination Syllabus of Physics in the University Entrance Examination, choose part of the physics optional models instead of taking all of the physics models. However, the Program Reform of University Entrance Examination may also bring new challenges to the curriculum reform of universities. The problem remains as to what kinds of courses should be offered to freshmen from different experimental provinces in order to meet the requirements of physics knowledge of those in different majors, and thus to make up for the physics contents they did not select in high school.

APPENDIX: PRE-COLLEGEPHYSICS

Table 1 the Exam Contents of Physics Examination Syllabus

Modules	The Required Contents Of The Examination	The Elective Contents Of The Examination
Physics 1	Linear motion of a particle Interacting objects and Newton's Law	
Physics 2	Mechanical energy Projectile motion Circular motion Law of gravity	
Optional 3-1	Electric field Electric Circuits Magnetic field	
Optional 3-2	Electromagnetic induction Alternating Current	
Optional 3-3		Molecular kinetic theory and statistical theories Solid, liquid and gas The laws of thermodynamics and Energy Conservation
Optional 3-4		Mechanical oscillations and Mechanical wave Electromagnetic vibration and Electromagnetic wave Optics Relativity
Optional 3-5		Collisions and Conservation of Momentum Atomic Structure Nucleus
Optional 2-2		Force and mechanical Heat and heat engines

Table 2 The Physics Exam Structure of Experimental Areas in 2009 NUEE

The Provinces Of Reform	The Physics Exam Structure	The Proportion Of Physics	The Range Of Physics Exam	Explanation	Memo
Shandong	Integrated science course	89/240	Required exam: physics 1,physics 2, 3-1, 3-2		Science students choose integrated science courses. It includes physics, chemistry and biology.
			Elective exam: 3-3, 3-4, 3-5	There is one question in each module. Students choose two of them to do. Each question is 8/89.	
Guangdong	Physics	150/150	Required exam: physics 1, physics 2, 3-1, 3-2, 3-5		Science students choose one from physics, chemistry and biology.
			Elective exam: 3-3 (include 2-2), 3-4	There is one question in each module. Students choose one of them to do. Each question is 10/150.	
	Basic knowledge of	36/150	Physics 1,physics 2, 2-1 or 3-1		Science students must choose basic knowledge of science which includes physics, chemistry and biolo-

	science				gy, politics, history, geography
	Basic know-ledge of liberal arts	14/150	Physics 1, physics 2, 1-1		Arts students must choose basic knowledge of arts, which includes politics, history, geography, physics, chemistry and biology.
Hainan	Physics	100/100	Required：physics 1, physics 2, 3-1、3-2		Science students must choose phys-ics.
			Elective exam: 3-3, 3-4, 3-5	There is one question in each module. Students choose one to do. Each question is 12/100 .	
Ningxia	Integrated science course	110/300	Required exam: physics 1, physics 2, 3-1, 3-2		Science students choose integrated science courses. It includes physics, chemistry and biology.
			Elective exam: 2-2, 3-3, 3-4, 3-5	There is one question in each module. Students choose one of them to do. Each question is 15/110.	
Liaoning					It was same with Ningxia.
Fujian	Integrated science course	120/300	Required exam: physics 1, physics 2, 3-1, 3-2, 3-4		Science students choose integrated science courses. It includes physics, chemistry and biology.
			Elective exam：3-3, 3-5	There is one question in each module. Students choose one of them to do. Each question is12/100.	
Tianjing	Integrated science course	120/300	Required exam: physics 1, physics 2, 3-1, 3-2, 3-4, 3-5		Science students choose integrated science courses. It includes physics, chemistry and biology.
			No elective exam		
Anhui	Integrated science course	110/300	Required exam: physics 1, physics 2, 3-1, 3-2, 3-5		The exam contents don't include thermodynamics, optics and me-chanical oscillations and mechanical wave. (Anhui)
			No elective exam		
Jiangshu	Physics	120/120	Required exam: physics 1, physics 2, 3-1, 3-2		Students must choose one from history and physics. The sciences' choose physics.
			Elective exam: 3-3, 3-4, 3-5	There is one question in each module. Students choose two of them to do. Each question is 12/120.	
Zhejiang	Integrated science course	120/300	Required exam: physics 1, physics 2, 3-1, 3-2 , 3-4, 3-5		Science students choose integrated science courses. It includes physics, chemistry and biology.
			no elective exam		
	Integrated optional modules	20/180	Required exam：1-2, 3-3	There is one question in each module. Students may choose one of them to do. Each question is 10/180.	There are 18 questions from 9 op-tional modules; each module has two questions, which includes Chi-nese, math, foreign language, poli-tics, history, geography, physics, chemistry and biology. Students must choose 6 questions of those to answer.
Shanghai	Integrated science	32/150	Required exam: mat-ter, mechanical mo-	These contents belong to the basic courses content of the shanghai	Sciences students must choose inte-grated science courses which in-

	course		tion, electromagnetic motion and energy.	high school physics courses standard.	clude politics, history, geography, physics, chemistry and biology.
	Integrated arts course	17/150	Required exam: matter, mechanical motion, electromagnetic motion and energy.	These contents belong to the basic courses of the shanghai high school physics courses standard.	Arts students must choose integrated arts courses which include politics, history, geography, physics, chemistry and biology
	Physics	150/150	Required exam: matter, mechanical motion, electromagnetic motion, energy.	These contents belong to the basic courses and developed courses of the shanghai high school physics courses standard.	Science students choose one from physics, chemistry and biology.

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a) Email: chnxzhangyb@gmail.com

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