

# Research on the Deep Integration of Curriculum Politics and Electromagnetic Field Teaching

Lingyan Hao<sup>a,\*</sup>, Xia Dong<sup>b</sup>, Xiaodong Yu<sup>c</sup>, Guozheng Han

*School of Electrical Engineering and Automation, Qilu University of Technology (Shandong Academy of Sciences), Jinan 250353, China*

*<sup>a</sup>haolingyan1213@163.com, <sup>b</sup>dongxia6078@163.com, <sup>c</sup>xiaodongyu2001@163.com*

*\*Corresponding Author*

**Abstract:** *Based on the characteristics of electromagnetic field course, this paper discusses the deep integration paths of curriculum politics and electromagnetic field teaching. First, it shows how to give full play to the key role of teachers in teaching and educating. Then, a number of measures such as designing teaching content, improving teaching strategies and assessment methods, have been taken to integrate the elements of curriculum politics into the teaching of electromagnetic field. The results shows that the organic combination of curriculum politics and professional education can lay the foundation for all-round and whole-process education.*

**Keywords:** *Curriculum Politics, Electromagnetic Field, Deep Integration*

## 1. Introduction

The Book of Rites points out that the way of a university lies in being virtuous, being close to the people, and stopping at the perfection. In his visit to teachers and students at Peking University, General Secretary Xi Jinping emphasized the foundation of education was the ideological and political education, which is the eternal pursuit of educational value of the Chinese nation [1]. In May 2020, the Ministry of Education issued *Guiding Outline of Ideological and Political Construction of Curriculum in Colleges and Universities* and proposed that improving the quality of personnel training was the core task. The document also deployed the construction of curriculum politics education combined with the characteristics of disciplines and specialties in universities. Ideological and political education is not only the matter of ideological teachers and counselors, but also the responsibility of every professional teacher.

“Electromagnetic Field”, which is an important professional basic course in the major of electrical engineering, has its complete theoretical knowledge framework and provides guidance for practices. The course illustrates the field theory of electrical engineering major, while another important theory is the "path" provided by the course of “electric circuit theory” [2]. As the course itself is full of profoundness and challenging, the development of which embodies the innovative wisdom of generations of electromagnetic masters and contains rich ideological and political elements [3-4]. If the ideological and political education is carried out to the teaching of electromagnetic field, multiplier effects will be arrived [5-6]. Therefore, this paper focuses on the deep integration paths of ideological and political education and electromagnetic field teaching.

## 2. Measures to give play to teachers' principal role in teaching

The duty of a teacher is to transmit wisdom, impart knowledge and resolve doubts, which are interrelated and indispensable. College students have grown up with rich knowledge, broad vision, and active thinking. The teachers' behavior will imperceptibly affect students. Consequently, university teachers must be ambitious and brave in exploration, and become the inheritors of knowledge, culture and civilization.

First of all, teachers should improve their political quality, strengthen the study of political theory and the sense of social responsibility, establish a correct view of life, opinion about value and world outlook, temper our own character, accumulate morality and knowledge, and influence students with our words and deeds. Secondly, it is important to improve professional quality. We should deeply understand the theory of educational and have certain teaching ability besides profound professional knowledge. More

importantly, it is conducive to fully mobilize learning enthusiasm by comprehension the characteristics of college students. Finally, we should grasp and reveal accurately the dialectical materialism teaching content of electromagnetics to explore the integration paths between electromagnetic field professional courses and ideological and political education. Combining the history of electromagnetics properly, the creative process of electromagnetics will arouse scientific spirit and creative passion of students. Connecting with the application of electromagnetics and frontier problems, we could also highlight the spirit of patriotism, four confidences, opinion about value and world outlook and scientific literacy to cultivate innovative talents with ideals, morality, culture and discipline that meet the requirements of the times.

### 3. Measures of reforming course contents combined with ideological and political elements

*Table 1 Integration design of curriculum politics and electromagnetic field*

Teaching Content	Curriculum Politics	
History of Electromagnetics	Introduce the deeds of Franklin, Oster, Faraday, Maxwell, Ampere and other scientists in their unremitting pursuit of truth.	Cultivate students' scientific spirit, patriotic spirit and struggle spirit; Let students understand the repeatability and infinity of the cognitive process; The pursuit of truth is an endless process; Do not believe in authority, dare to question and challenge tradition.
Ideal model: point charge, electric dipole, magnetic dipole	Tell the importance of ideal model for solving complex electromagnetic problems.	Understand the methodology of reducing complexity to simplicity in dialectical materialism; Guide students to be good at grasping the main contradictions and clarifying the essence of things when deal with complex problems.
Basic Laws: Coulomb Law, Gauss's Law, circulation theorem	Introduce the intension and extension of the law.	Remind students to avoid out-of-context and copyism in their study and life; Encourage students to dare to innovate and enhance their innovation consciousness; Cultivate students' scientific spirit of seeking truth from facts, adhering to truth and exploring bravely.
Relationship between Electric Field and Magnetic Field	Introduce the positive and negative of electric charge and the principle of electromagnetics.	Explain that things are opposites and unity; Explain the viewpoint of dialectical unity and universal connection of things; Developing Students' Scientific Thinking Ability.
The phenomenon and law of magnetism	Introduce the research results of magnetism in ancient China and the latest research results of magnetic monopole, as well as beidou satellite navigation system.	Enhance Students' Cultural Confidence and Patriotism; Enhance students' national pride and confidence.

In order to encourage students to participate consciously in the ideological and political education of the course and promote teachers to pay equal attention to both teaching and education. This part tells the measures of reforming course contents combined with ideological and political elements.

According to the development of electromagnetic field, and the deductive reasoning of a series of laws such as Coulomb's law, the law of electromagnetic induction, Maxwell's equations and so on, the integration scheme of teaching content and ideological and political elements is designed, as shown in Table 1.

Taking the history of electromagnetics as an example, electricity and magnetism were originally

independent until Oersted discovered the magnetic effect of current, which inspired a large number of scientists in physics, electricity, magnetism, mathematics to invest in research. Through a series of rigorous processes such as reasoning, experiment, verification and reasoning again, the relationship and law between them are deeply excavated, so that electricity and magnetism have developed into a complete branch of science electromagnetism. The history is permeated with the spirit of exploration, research, struggle and strong patriotism of scientists, and could make students understand the development of the science is full of repeatability and infinite, and encourage them to question and challenge the traditional scientific spirit.

#### **4. Measures to improve teaching strategies and promote curriculum politics**

##### ***4.1 Design of Blended Teaching Mode***

Nowadays, with the rapid development of the multimedia technology and the wide usage of internet, the blended teaching mode is carried out based on the internet teaching platform of Chinese University MOOC + Duifene online and face-to-face classroom offline.

The teaching process is divided into three parts: pre-class, in-class and after-class. In each process, teachers and students are assigned different tasks, then it is essential to assess students' learning effects according to tasks. According to the teaching content, reasonable distribution of online and offline teaching content is the first to do.

At the stage of pre-class, the contents that need to be uploaded to the platform of Duifene include case stories, videos about ideological and political course, preview list, courseware, and other information related to this course. Then, students should preview in advance, know the objectives and tasks, and understand the ideological and political key points. In class, it is important to make good use of the classroom teaching, which emphasizes the dominant position of students. The class will be divided into two sections. One third of the time will be left to the teacher to teach the focus of this lesson according to the preview, curriculum difficulties and engineering practice. Teachers can explain the theoretical knowledge in depth, thoroughly and systematically, which is conducive to students' systematic and orderly mastery. Two thirds of the time is reserved for students to ask questions, analyze and discuss problems. After class, we should actively guide students to review, summarize, finish the assignment and write reflection on the lesson in time. Much more attentions to the cultivation of students' creativity and the capacity of reason are throughout the whole blended teaching process. In addition, in view of the sensitive and hot topics attention of the students, positive guidance is carried out strategically to cultivate the patriotism, and imperceptibly affect students' a correct view of life, opinion about value and world outlook.

##### ***4.2 Design of teaching Method***

In the teaching process, flexible teaching methods such as inspiration, guidance, case method and group discussion are adopted to encourage students to actively learn. Much more attentions to cultivate students' creativity and reasoning ability are throughout the whole blended teaching process. What's more important is to change roles between teachers and students that is taking students as the center, and transforming teachers from the authority in the classroom to the guide of knowledge. At the same time, in the process of theoretical teaching, the frontier scientific knowledge and the teacher's scientific research results are embedded to stimulate students' thirst for knowledge and exploration, and further cultivate students' innovative consciousness and scientific exploration spirit.

#### **5. Optimization of curriculum assessment considering ideological and political content**

Combining the objectives of the curriculum politics and the characteristics of electromagnetic field courses, this part proposes a comprehensive and diversified assessment method for electromagnetic field courses. It is necessary to highlight the evaluation status of ideological and moral, scientific spirit, logical thinking, and innovative consciousness, besides assessment standards of professional knowledge.

The final assessment of the course include the comprehensive scores of preview test, preview report, classroom performance, participation in discussion, classroom test, assignment, learning reflections, science and technology papers and semi-open-book examination as shown in Table 2. Thus, it is convenient to make a comprehensive and accurate quantitative assessment of students' learning

achievements.

*Table 2 Assessment of course learning effect*

Assess items	Ratio	Assess contents and standards
Preview test	0.1	Assess students' subjective initiative in learning, mastery of preview knowledge, mastery of Ideological and Political Courses
Classroom performance	0.1	Whether to listen carefully, participate in group discussions seriously, speak actively, boldly raise issues different from others, be good at cooperating with others, and express their views clearly and orderly
Classroom test	0.1	Comprehension of electromagnetic field knowledge in class, be honest and trustworthy
Homework after class	0.1	Mastery of the basic theory of electromagnetic field, the analysis method of electromagnetic field problems and the solution method, pay attention to the assessment of learning attitude and logical reasoning ability.
Learning experience	0.2	Examine students' proficiency and application ability of electromagnetic field theory, whether to treat the problem with dialectical materialism
Scientific papers	0.2	Assess learning enthusiasm and innovation, paper quality and result analysis, assess the ideological trends
Semi-Open-Book examination	0.2	Mastery of basic knowledge and principle of electromagnetic field, examine the ability of thinking and innovation

## 6. Conclusion

This paper discusses the deep integration paths of curriculum politics and electromagnetic field teaching. Teaching practices show that the curriculum ideology and politics are integrated into the teaching of electromagnetic field courses fully arouses the enthusiasm of teachers and students. The effect of reform is getting better and better, and the teaching quality is constantly improving. On the one hand, students' professional engineering consciousness, teamwork spirit and innovative thinking ability have been improved obviously. On the other hand, they deeply understood the spirit of scientific exploration, exquisite workmanship and truth-seeking, and enhanced national self-confidence and national pride. The organic combination of ideological and political education and professional education lays the foundation for realizing all-round and full-process education for all employees.

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