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Reform of Communication System Simulation Course under Background of Engineering Education Accreditation

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Abstract. *Engineering education certification is the basis for realizing mutual recognition of engineering education and engineers.In order to make our engineering education and engineer qualification recognized, international education certification is promoted vigorously China. It is necessary to reform professional courses for the purpose of meeting certification standards. Communication system simulation course is an important part of the training of Communication Major Students. In order to satisfy this requiremen, adjusted course objectives, reconstructed teaching content, improved evaluation method are introduced in the paper.*

Keywords: *Engineering education certification, Course objectives, Content of courses, Assessment*

1. Introduction

System simulation is an important means to verify the theory. Moreover, it is an effective way to evaluate the performance of communication system. Therefore, it is very necessary to master the method of communication system simulation, it is an important part of the process of cultivating students. Through the study of this experimental course, the students' understanding of communication theory is deepened, the students' ability of communication theory analysis and comprehensive application is improved, and the requirements of engineering education certification are met. Engineering education certification is the evaluation of engineering professions by certification bodies. It is an important foundation for international mutual recognition of engineering education and engineer qualification. In August 2016, China officially joined the organization, formulated the general standards for professional certification, and on this basis, formulated the supplementary standards for each profession. In engineering education, the accreditation and assessment of academic programmes is vital in order to maintain the quality and the status of engineering graduates, and hence the technical workforce [1]. In order to meet the

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requirements of the standard, the reform of the course is necessary to improve the quality of personnel training, such as literature [2]. Under background of Engineering Education Accreditation, the reformation of experiment teaching of circuit and computer network course are introduced respectively in literature [3] and literature [4].

2. Course Objectives

There are 12 standards for project certification, they are engineering knowledge, problem analysis, design/develop solutions, research, using modern tools, engineering and society, environment and sustainable, development, professional norms, individual and team, communication project management, lifelong learning. There are five aspects of the course objectives.

1) The students can design solutions to problems according to requirements, and design communication modules or systems according to the solutions.

2) The students can analyze simulation results and draw useful conclusions.

3) According to the experiment scheme, the experiment system can be built by computer simulation software, and the simulation experiment can be completed.

4) The students can complete the assigned tasks independently and work with other members of the group.

5) The students can express the design principle and simulation process in the form of design report and defense, and accurately present the design results.

The realization of curriculum objectives provides guarantee for the achievement of graduation conditions, the relationship between them is shown in the table 1.

Table 1 relationship between course objective and graduation requirements

Course objective	Index points of supported graduation requirement	Supported graduation requirements
Course objective 1	According to the solution, students can design modules or systems and reflect the spirit of innovation.	Design/develop solutions
Course objective 2	Students can obtain experimental data, analyze and interpret experimental results, and get reasonable and effective conclusions through information integration.	Research
Course objective 3	Students can select and use appropriate information technology tools and simulation software to predict and simulate complex communication engineering problems, and understand the limitations.	Using modern tools
Course objective 4	Students can play an individual role in the team and complete the work assigned by the team independently.	Individual and team
Course objective 5	Students can accurately describe complex engineering problems in communication engineering and communicate effectively with others, including writing reports, making statements, expressing clearly or responding to instructions.	Communication

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3. Content of Courses

The contents of teaching activities, stage achievements and supporting course objectives are shown in the table 2 below.

Table 2 Relationship between course objective and course content

Activity	Event items	Stage results	Supported graduation requirements
Preparation	understand design goals	Journals reviewed	Course objective 5
Design	modeling	System model	Course objective 1, Course objective 4
Simulation	simulate system model	System programm	Course objective 3, Course objective 5
Analysis	analyzed the simulation result	Conclusion	Course objective 2, Course objective 4
Submission	submitted works	Project documents and source code	Course objective 4, Course objective 5

The students can choose any topic, but they must follow the following requirements.

1) Students master the principle and modeling method of communication system.

2) Students can use simulation software to complete system simulation.

3) Students have preliminary analytical ability.

4) Students can independently write theoretical and practical course design reports.

In this paper, the optional topics are listed as shown in the table 3.

Table 3 Optional title

Serial number	Title
1	Simulation of analog modulation system based on MATLAB
2	Simulation of baseband modulation system based on MATLAB
3	Simulation of band modulation system based on MATLAB
4	Simulation of channel coding communication system based on MATLAB
5	Simulation of multiplexing system based on MATLAB

Taking the frequency band modulation system as an example, this paper introduces the course requirements. Based on the research of digital frequency band modulation system, QAM, QPSK, BPSK, FSK or ASK and other digital modulation systems are designed and implemented, then the system is realized by MATLAB simulation software, and the simulation process is described, the simulation data is recorded, the simulation results are analyzed , and finally the experimental report is formed.

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4. Assessment

The basic process of the course is divided into three stages: preparation, design simulation and summary.In the preparation stage, students should understand the system principle, experiment content and simulation process.In the design simulation stage, the steps and contents, simulation results, problems and solutions should be recorded. After completion, students should summarize in time and complete the experiment report. Lecture, guidance, discussion, experiment are adopted in teaching process.Finally, according to the completion of the system, the writing of the report and the oral defense, the comprehensive evaluation of students' performance is made.

5. Conclusion

In 2016, China joined the International Engineering Education "Washington Agreement" [5] organization. Since then, in order to be in line with international education, Chinese universities have actively applied for professional certification every year. In this context, how to reform the communication simulation course from the aspects of course objectives, teaching content and evaluation methods to adapt to engineering education certification is explored in this paper.

References

[1] Patil A, Codner G. Accreditation of engineering education: review, observations and proposal for global accreditation [J]. European Journal of Engineering Education, 2007, 32 (6): 639-651.
[2] Houqin Wei, etc. Reform of communication system simulation based on Engineering Education Certification.China CIO News, 2019 (03): 175.
[3] Yong Chen. Reform of Experiment Teaching of Circuit under Background of Engineering Education Accreditation [J]. China Educational Technology & Equipment, 2018 (02): 127-129.
[4] ZHANG Jian-fei, etc. The teaching reform of computer network course oriented to engineering education accreditation [J]. Journal of Science of Teachers' College and University, 2019, 39 (09): 86-89.
[5] Washington Accord. http://www.ieagreements.org/accords/.