

13<sup>th</sup> International Educational Technology Conference

## An Adaptation of Circuit Analysis Course to Distance Education With Content Development

Fatih Çelik<sup>a\*</sup>, Abdullah Ferikoğlu<sup>a</sup>, Ayhan Kiraz<sup>a</sup>, Zafer Albayrak<sup>a</sup>, Hüseyin Ekiz<sup>b</sup>

<sup>a</sup>Sakarya University, Esentepe Kampüsü, Sakarya 54187, Turkey

<sup>b</sup>Suleyman Sah University, Hayriye Dumankaya Kampüsü, İstanbul 34865, Turkey

### Abstract

In parallel with the recent developments, education has also begun to use internet media. Internet usage has enhanced the quality of the education. This teaching systems have widened up to primary education. In our country, works and applications in this area have also increased and universities have included distance education into their systems. In this study, the contents of the circuit analysis course were developed according to distance education. Multimedia Technologies were exploited heavily in this work.

© 2013 The Authors. Published by Elsevier Ltd. Open access under [CC BY-NC-ND license](https://creativecommons.org/licenses/by-nc-nd/4.0/).

Selection and peer-review under responsibility of The Association of Science, Education and Technology-TASET, Sakarya Universitesi, Turkey.

*Key Words: Circuit Analysis, Distance Education, Multimedia;*

### 1. Introduction

The use of internet technology has rapidly improved due to the use of computer increases. Internet is almost used in every field today.

Internet technology is realized that it can use in training system at the present time and it largely understood to be the facilitator in training system. Outside students of the group being trained in internet-based education is observed to benefit. This also has flexibility in terms of course.

Standardization efforts have started due to the spread of Internet-based teaching model in the whole world. As a result of these studies. For Learning Management Systems and all of components have been created standard. This studies are still continuing.

\* Corresponding author. Tel.: +90-264-2957119

E-mail address: [fatihc@sakarya.edu.tr](mailto:fatihc@sakarya.edu.tr)

The aim of this study, after the technologies used for Internet-based training courses are to be prepared, examining the concepts and materials Electronics and Computer Education content development criteria, taking into account the contents of the distance education courses for Circuit Analysis.

## 2. Distance Education

Distance Education is economic and interactive education form regardless of time and place using information technology. Depending on the situation, it is realized as synchronous (simultaneous) and asynchronous (time-independent / asynchronous) in two ways.

In synchronous presentation, Users and servers are inside the application interactively through a live connection (Internet, satellite, etc.) in classroom environment simultaneously. Users can ask questions, discuss with each other or solve test.

Asynchronous presentations are Web-based educations. The user may participate at any time at any place the courses on the web, take the test and participate in activities. Courses may be repeated as requested. (Isman, 2008).

Some definitions related to distance education are as follows:

Distance education program is the name given to the study performs stand-alone training courses to help you prepare in a certain order of educational institutions and students (Isman, 2008).

Distance education provides access to education with satellite, video, audio, graphics, computer, multimedia technology with the help of electronic devices. USDLA, the teacher and the student are geographically remote from each other and said, this training program, the use of electronic means or written material and underline the need of the printed materials. Distance education consists of two main parts including teachers and students in the field of teaching education. It provides access to education to other persons.

Distance education is to establish direct connection with the students. The distance learning program can be a method that replaces the forefront of the field of education, a program that can be interpreted as reinforcing the other methods (Isman, 2008).

### 2.1. Different time (asynchronous) teaching model

Participants will receive courses from anywhere at any time. In this case, all the activities from sign-examination of the course participants, course content be processed by the participants, subject to final examinations in the notes to be stored or subject teacher can able to make assignments, forums, whiteboard, chat rooms, electronic mail, providing a platform for communication between the participants and the teachers allowing a management program is necessary. This management program is called Learning Management System (ÖYS) and ÖYS program is a must of distance learning.

In this model, the publication of content delivery over the network forms other activities. Learning Management System (ÖYS) is a program that can be purchased in general as well as some institutions have developed their own applications. Today, largest shortcoming in this regard in Turkey and world is matching international standards in a wide range of different issues is the lack of quality content. Development of content fits these definitions are carried out by a team of crowded instructional designers, educators, writers, subject matter experts, audio, graphics, and computer experts. Quality and permanent education is interested with quality of developed content (Al & Orçun, 2004).

## 2.2. Simultaneous (synchronous) teaching model

In this method, in consequence of a teacher's course participants to tell and different places for targeted monitoring and participation in the course, the teacher told the course pursued by the participants in the course, the necessary equipment should be installed. While a teacher expresses courses in a class or in a studio, videos that broadcast live are delivered over the Internet with the appropriate software and hardware to the participants. Similarly, participants that watch courses in places have sufficient software and hardware and they can ask questions to teacher and can take answers. As you can see, in this method software and hardware infrastructure in monitored environments and presented courses compose main element. Here, the most important factor affecting learning content is described by the teacher in the classroom may not show much change the content of face-to-face training. Of course, plenty visual material of content will be more permanent (Al & Orçun, 2004).

## 2.3. Blended teaching model

In blending teaching, classroom education that will be used at a face-to-face education need to add with both methods above mentioned (Nicholson, 2002).

Different time teaching model from these teaching models form the basis of the study that we have done. The aim of this study, as well as this teaching model, student performs the learning process using Internet technologies.

## 3. Content Development Used Technologies and Concepts

Multimedia in the broadest sense, a computer-based application, the normal text, audio, images, graphics, animation, video, and supported the use of visual aids is the face of a user interface (Bourne, Harris, & Harris, 2005).

Traditional education in recent years, overhead projector, video, and etc. tools were used. One of the most striking developments is WWW in information technology today; normal text, graphics, images and sound are transmitted over the Internet is a network of multi-media. Web is capable of integrating from the materials in different formats in variety of environments. It allows trainers to prepare an effective and efficient course (Bourne, Harris, & Harris, 2005).

### 3.1. Html

Hypertext Markup Language (HTML) documents how to connect to each other and determines how settle the text and images in the document and determines how settle the text and images in the document ve a system consisting of pieces of code called tag.

<BODY> .... </BODY> information between the post / commands (HTML code / source program) is created.

<CENTER>, <FONT>, <B> Sample HTML tokens / commands. HTML code is of no significance in the gaps left. The main thing, the formatting of HTML markers and environments.

### 3.2. Php

PHP is a scripting language and it is saved as PHP, PHP3 file extension after code is written in PHP editör. files written in PHP don't compile. A PHP interpreteris is only in Web Server to interpret scripts written in this language programs are available. This interpreter convert PHP scripts a format understood by the Web Server and sends.

```
1 <html>
2   <head> <title> This is my first Php Page </title></head>
3   <body>
4   <?php
5     echo ("Hi Evren");
6   ?>
7 </body>
8 </html>
```

Figure. 1. Php writing codes

### 3.3. Dreamweaver web design software

For programming languages such as HTML, Visual (visual) programming using the property editor programs which have been developed and ready-made objects. These programs are further simplified by using the HTML language, ready-made objects instead of program code used as images. Dreamweaver is one of the best of these programs. This program is a large, complex and interactive web pages, can be prepared. Dreamweaver is a professional web design package that is designed for web designers.

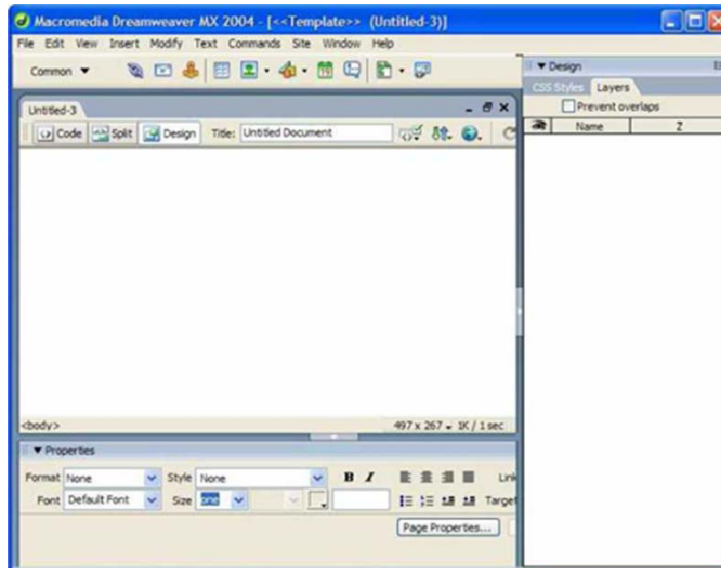


Figure. 2. Dreamweaver user interface

#### 4. An Adaptation of Circuit Analysis Course to Distance Education

Using the above-mentioned instruments, circuit analysis course notes that contain textual expressions is made more fun and intuitive for distance education students. Therefore animations are created and this animations will be able to watch again topics which do not understand gradually advanced.

##### 4.1. Adapting sinusoidal function

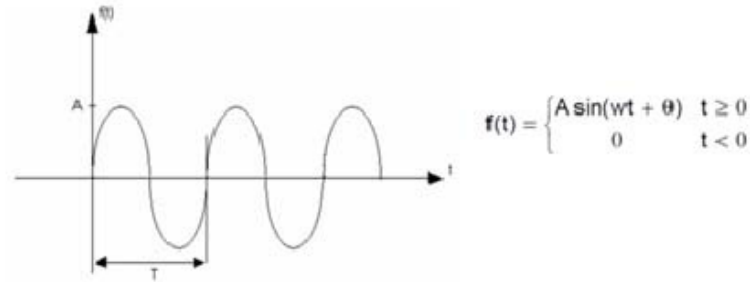


Figure. 3. Sinusoidal function graph

The following definitions are made for the sinusoidal function:  $f(t)=f(t+nT)$ ,  $n$  is about to be a constant, so sinusoidal function is periodic.  $T$  sinusoidal function's period, in contrast to the period is called the frequency. (A., Ferikoğlu, 2003).

$$T = \frac{1}{F} = \frac{2\pi}{w}$$

$w$  is the angular frequency and the relation between with the frequency  $w=2\pi f$ .  $\theta$  is called the phase angle of a sinusoidal function.  $A$  which is a constant shows the amplitude of the function.  $T$ 's unit is second (s),  $f$ 's unit is Hertz (Hz),  $w$ 's unit is radian/second (rad/s),  $\theta$ 's unit is radian(rad) (A., Ferikoğlu, 2003).

The following periodic functions are also commonly used, as well as sinusoidal function (A., Ferikoğlu, 2003).

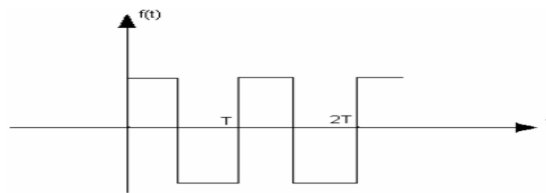


Figure. 4. Square wave

In study, distance education students select average and effective values. Sinusoidal and square waves is shown after textboxes are entered the required values.

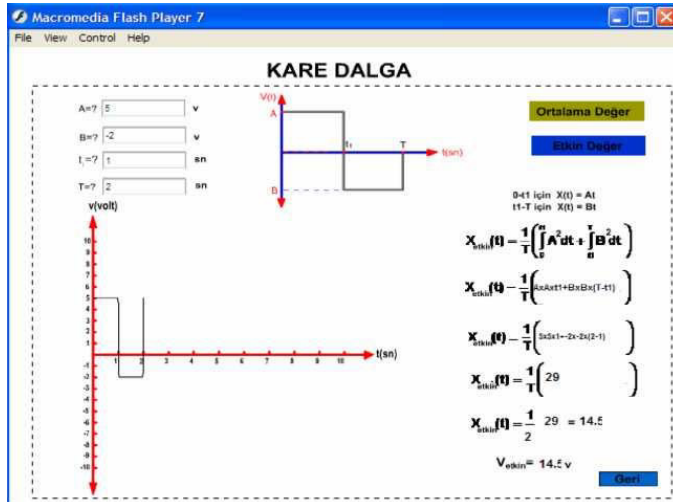


Figure. 5. Square wave is plotted

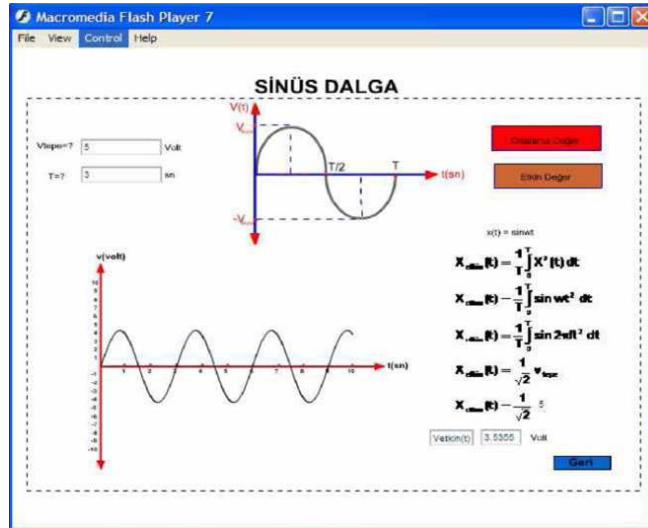


Figure. 6. The sinusoidal wave plotted after values have been entered

Animation is used to observe sinusoidal steady-state analysis's phase movement and angularly combined movement.

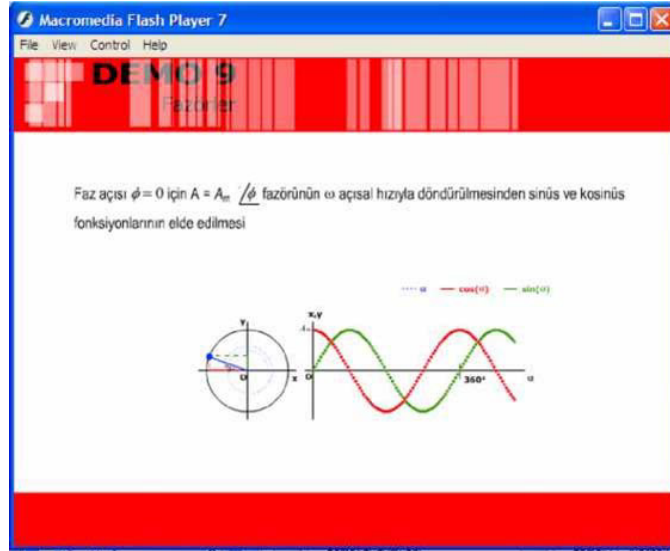


Figure 7. Phase motion animation

#### 4.2. Adapted to the application in the Internet environment

Our lessons were prepared to publish on the Internet. The application is a web page and can be used.

Figure 8. Circuit Analysis course web page

## 5. Conclusions and Recommendations

In this study, A website that is easy usage, flexible and funny are designed to teach circuit analysis course over internet. this application also can be advanced by other methods. An example of this as ASP, PHP programs can be given. In the future, if ASP ,PHP etc. are used, it can be more interesting.

Aim of this study is to enjoy students and teach as interactive. Frame was used so that the user easily to reach the information. The right side section opens when the user clicks on the button on the left side. In addition, Student can return to the homepage from everywhere wherefore each page have homepaga button. In this way, leaving the user to navigate the main topics on the page provided. design is given important in order to keep the user within the website. Forum is crated in order to discuss some of the issues among users. Subsequently users to be able to write their ideas on the web site put a guestbook. These are provided through the website to be more interesting.

Consequently, Circuit Analysis course at the beginning of the computer easy to understand and enjoyable for anyone who wants to learn how to Circuit Analysis Dersi'nin presentation via the web application has reached the desired goals and the application is fully reached the stage of completion. The imagination of the person who designed the site using the Web site way he wants can make it more fun by adding visuals. This entirely depends on the horizon of the person who designed the site.

## References

- A., İřman, (2011). Uzaktan Eđitim (4. baskı). Ankara: Öđreti Yayınları.
- U. Al, and M., Orçun, (2004). Web Tabanlı Uzaktan Eđitim Sistemleri: Sahip Olması Gereken Özellikler ve Standartlar. Bilgi Dünyası, vol. 5, n. 2, pp. 259-271.
- A., Ferikođlu, (2003). Devre Analizi 1-2, Deđişim Yayınları.
- S., Nicholson, (2002). Socialization in the “virtual hallway”: Instant messaging in the asynchronous Web-based distance education classroom, Volume 5, Issue 4, 2002, Pages 363–372.
- J., Bourne, D., Harris, D., Harris, (2005). Online Engineering Education: Learning Anywhere, Anytime, Volume 94, Issue 1, pages 131–146.