

***HIGHER TECHNICAL INSTITUTE***

**ELECTRICAL ENGINEERING DEPARTMENT**

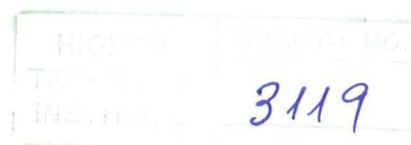
**DIPLOMA PROJECT**

***TEACHING AID FOR  
ELECTRONICS LAB WORK BASED  
ON CIRCUIT SIMULATION  
SOFTWARE***

**BY: ACHILLEOS ACHILLEAS**

***E/1207***

***JUNE 2000***



## 2 SUMMARY

The idea of this project was primarily originated and brought to my attention during the **Software Engineering** lecture. The entire idea of executing experimental work, without the necessity of getting into practical work producing the wiring connections for an experiment, seemed and proved to be very lucrative. It provides a safer way of experimenting due to the fact that we don't work with high voltages. Is just working on a simple computer.

Laboratories simulation is a way to create difficult and complex electronic circuits without having the need of buying expensive and complicate devices. It provides us with the possibility of experimenting and at the same time becoming more familiar with the theoretical objectives of the experiment, which is actually the main objective of any experiment performed. This leads you in understanding the operation of each electronic device and the circuit entirely.

Mr. Theopemptou has reproduced this thought, at the time that I visited his office to talk about projects. We agreed to proceed with this project; it is actually a nice concept due to the fact that the simulation technology is one of the highly advanced and leading technologies of nowadays. It is rapidly developing in almost any part of **Engineering** giving accurate results for gigantic firms. Most of the training of astronauts and the testing of the spaceships of NASA are done by using a kind of highly advanced simulation mode. This resolves to accurate results and abjuring any mistakes that could cost in real life.

Set out to accomplish and develop this project I had to set some objectives in order to achieve appreciable result. I had to create something that will attract the students and make them get involved in order to get more knowledge out of it and not getting bored performing it.

# CONTENTS

<b>1</b>	<b>ACKNOWLEDGMENTS</b>	<b>1</b>
<b>2</b>	<b>SUMMARY</b>	<b>6</b>
<b>2.1</b>	<b>OBJECTIVES OF THE PROJECT:</b>	<b>7</b>
<b>2.2</b>	<b>PROCEDURE FOLLOWED:</b>	<b>7</b>
<b>3</b>	<b>INTRODUCTION TO THE PROJECT</b>	<b>8</b>
<b>4</b>	<b>MAIN BODY OF THE REPORT</b>	<b>11</b>
<b>4.1</b>	<b>HOW TO USE MICROSOFT FRONTPAGE</b>	<b>12</b>
4.1.1	<b>USER'S GUIDE:</b>	<b>12</b>
<b>4.2</b>	<b>What is a hyperlink?</b>	<b>16</b>
<b>4.3</b>	<b>What is a URL?</b>	<b>17</b>
<b>4.4</b>	<b>Ways to use hyperlinks</b>	<b>18</b>
<b>4.5</b>	<b>THEORETICAL HELP MATERIAL GUIDE</b>	<b>19</b>
4.5.1	<b>FILE VIEW</b>	<b>19</b>
4.5.2	<b>EDIT MENU</b>	<b>21</b>
4.5.3	<b>VIEW-MENU</b>	<b>21</b>
4.5.4	<b>FORMAT MENU</b>	<b>21</b>
4.5.5	<b>TABLE MENU</b>	<b>22</b>
4.5.6	<b>FRAMES</b>	<b>22</b>
<b>4.6</b>	<b>LEARNING FRONT PAGE USING MY WEB SITE</b>	<b>23</b>
<b>5</b>	<b>LABORATORIES MAIN THEORY PAGES</b>	<b>26</b>
<b>5.1</b>	<b>Experiment No. 1:</b>	<b>27</b>
<b>5.2</b>	<b>Experiment No: 2</b>	<b>30</b>
<b>5.3</b>	<b>Experiment No: 3</b>	<b>31</b>
<b>5.4</b>	<b>Experiment No: 4</b>	<b>34</b>

<b>5.5</b>	<b>Experiment No: 5</b>	<b>37</b>
<b>5.6</b>	<b>Experiment No: 6</b>	<b>38</b>
<b>5.7</b>	<b>Experiment No: 7</b>	<b>40</b>
<b>6</b>	<b>THEORETIC MATERIAL PUBLISHED ON MY WEB SITE</b>	<b>42</b>
<b>6.1</b>	<b>THEORY 1: ELECTRONIC BASICS</b>	<b>42</b>
<b>6.2</b>	<b>THEORY 2: DEVICE THEORY &amp;POWER ELECTRONICS</b>	<b>48</b>
<b>7</b>	<b>TOOLBAR QUICK REFERENCE – CIRCUIT MAKER</b>	<b>50</b>
<b>8</b>	<b>USING CIRCUIT MAKER PROGRAM</b>	<b>53</b>
<b>9</b>	<b>REAL LIFE TEST OF MY PROJECT WORK</b>	<b>64</b>
<b>10</b>	<b>LABORATORIES REPORTS</b>	<b>67</b>
<b>10.1</b>	<b>Experiment No 1:</b>	<b>67</b>
<b>10.2</b>	<b>Experiment No: 2</b>	<b>73</b>
<b>10.3</b>	<b>Experiment No: 3</b>	<b>76</b>
<b>10.4</b>	<b>Experiment No: 4</b>	<b>78</b>
<b>10.5</b>	<b>Experiment No: 5</b>	<b>82</b>
<b>10.6</b>	<b>Experiment No: 6</b>	<b>85</b>
<b>11</b>	<b>CONCLUSIONS</b>	<b>91</b>
<b>12</b>	<b>REFERENCES</b>	<b>92</b>
<b>13</b>	<b>LAB WORK BASED ON CIRCUIT SIMULATION SOFTWARE:</b>	<b>95</b>
<b>14</b>	<b>EXPERIMENT NO: 1</b>	<b>96</b>
<b>15</b>	<b>EXPERIMENT NO:2</b>	<b>99</b>
<b>16</b>	<b>EXPERIMENT NO:3</b>	<b>103</b>

17	EXPERIMENT NO:4	107
18	EXPERIMENT NO:5	110
19	EXPERIMENT NO:6	113
20	EXPERIMENT NO: 7	116