

# TOROS ÜNİVERSİTESİ

Faculty Of Engineering  
Electrical And Electronics Engineering (English)

## Course Information

| COMPUTER AIDED CIRCUIT ANALYSIS |          |             |          |                 |             |
|---------------------------------|----------|-------------|----------|-----------------|-------------|
| Code                            | Semester | Theoretical | Practice | National Credit | ECTS Credit |
|                                 |          | Hour / Week |          |                 |             |
| EEE210                          | Spring   | 3           | 2        | 4               | 6           |

|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Prerequisites and co-requisites</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Language of instruction</b>              | English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Type</b>                                 | Required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Level of Course</b>                      | Bachelor's                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Lecturer</b>                             | Prof. Dr. C. Cengiz ARCASOY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Mode of Delivery</b>                     | Face to Face                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Suggested Subject</b>                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Professional practise ( internship )</b> | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Objectives of the Course</b>             | Widely used in industry today, using a simulation program for the circuit elements of the circuit elements and definitions modellerinin, this circuit elements and models of complex circuits with DC , AC , transient circuit analysis and design by Fourier analysis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Contents of the Course</b>               | Circuit Elements and Model Definitions / Definitions of Various Source Parameters / Model Definitions of Voltage Controlled and Current Controlled Sources / DC Analysis of Voltage Controlled and Current Controlled Switches / DC Analysis of Circuits, Operation Point Analysis and Transfer Function Analysis / AC Analysis of Circuits / Analysis of Transient Regime Behavior of Circuits and Fourier Analysis /Simulation of Circuits Containing Voltage Controlled and Current Controlled Switches / Simulation of Ideal Transformer and Multiphase Transformer Circuits / Simulation of Circuits Containing Voltage Controlled and Current Controlled Switches / Simulation of Ideal Transformer and Multiphase Transformer Circuits /Simulation of Nonlinear Magnetic Circuits / Simulation of Non-sinusoidal Sources and Circuits with Non-Linear Loads |

## Learning Outcomes of Course

| # | Learning Outcomes                                                                                     |
|---|-------------------------------------------------------------------------------------------------------|
| 1 | The students describe circuit components and models.                                                  |
| 2 | The students analyse transient, Ac and Dc states of electrical circuits via using simulating program. |
| 3 | The students recognize simulation program.                                                            |
| 4 | The students solve the circuit problems by using simulation programme.                                |

## Course Syllabus

| # | Subjects                                                                      | Teaching Methods and Technics |
|---|-------------------------------------------------------------------------------|-------------------------------|
| 1 | Models Circuit Elements and Definitions                                       | lecture and practice          |
| 2 | Definition of Sub-Circuit Models                                              | lecture and practice          |
| 3 | Source Parameters of Various Definitions                                      | lecture and practice          |
| 4 | Voltage Controlled and Current-Controlled Resource Type Definitions           | lecture and practice          |
| 5 | Voltage controlled and current-controlled switches Model Definitions          | lecture and practice          |
| 6 | DC Circuits Analysis, Operating Point Analysis and Transfer Function Analysis | lecture and practice          |
| 7 | Analysis of AC Circuits                                                       | lecture and practice          |

|    |                                                                                                                                          |                      |
|----|------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 8  | Analysis of Transient Behavior of Circuits and Fourier Analysis                                                                          | lecture and practice |
| 9  | Circuits Design, Operation, Output Variables and Functions Interpretation, Simulation of circuits covering the various sources and loads | lecture and practice |
| 10 | Midterm                                                                                                                                  |                      |
| 11 | Simulation of Circuits Containing Controlled Voltage and Current Controlled Resources                                                    | lecture and practice |
| 12 | Simulation of Circuits Containing Controlled Voltage and Current Controlled Switches                                                     | lecture and practice |
| 13 | Ideal Transformer and Transformer Circuits Simulation of Multiphase                                                                      | lecture and practice |
| 14 | Simulation of Nonlinear Magnetic Circuits                                                                                                | lecture and practice |
| 15 | Simulation of Nonlinear Circuits Containing Resources and Non-Sinusoidal Loads                                                           | lecture and practice |
| 16 | Final Exam                                                                                                                               |                      |

## Course Syllabus

| # | Material / Resources                                                                         | Information About Resources | Reference / Recommended Resources |
|---|----------------------------------------------------------------------------------------------|-----------------------------|-----------------------------------|
| 1 | Muhammed H. Rashid, "Introduction to PSpice Using ORCAD for Circuits and Electronics", 2008, |                             |                                   |
| 2 | Franz J. Monssen, "ORCAD PSpice with Circuit Analysis", 2001,                                |                             |                                   |
| 3 | Walter Bazhaf 1 "Computer-Aided Circuit Analysis Using PSpice", 1992                         |                             |                                   |

## Method of Assessment

| # | Weight | Work Type     | Work Title    |
|---|--------|---------------|---------------|
| 1 | 40%    | Mid-Term Exam | Mid-Term Exam |
| 2 | 60%    | Final Exam    | Final Exam    |

## Relationship between Learning Outcomes of Course and Program Outcomes

| # | Learning Outcomes                                                                                     | Program Outcomes | Method of Assessment |
|---|-------------------------------------------------------------------------------------------------------|------------------|----------------------|
| 1 | The students describe circuit components and models.                                                  | 1                | 1,2                  |
| 2 | The students analyse transient, Ac and Dc states of electrical circuits via using simulating program. | 1                | 1,2                  |
| 3 | The students recognize simulation program.                                                            | 1                | 1,2                  |
| 4 | The students solve the circuit problems by using simulation programme.                                | 1                | 1                    |

PS. The numbers, which are shown in the column Method of Assessment, presents the methods shown in the previous table, titled as Method of Assessment.

## Work Load Details

| # | Type of Work                                                  | Quantity | Time (Hour) | Work Load |
|---|---------------------------------------------------------------|----------|-------------|-----------|
| 1 | Course Duration                                               | 14       | 5           | 70        |
| 2 | Course Duration Except Class (Preliminary Study, Enhancement) | 14       | 3           | 42        |
| 3 | Presentation and Seminar Preparation                          | 0        | 0           | 0         |
| 4 | Web Research, Library and Archival Work                       | 0        | 0           | 0         |
| 5 | Document/Information Listing                                  | 0        | 0           | 0         |
| 6 | Workshop                                                      | 0        | 0           | 0         |
| 7 | Preparation for Midterm Exam                                  | 1        | 8           | 8         |
| 8 | Midterm Exam                                                  | 1        | 1           | 1         |
| 9 | Quiz                                                          | 0        | 0           | 0         |

|    |                            |   |    |            |
|----|----------------------------|---|----|------------|
| 10 | Homework                   | 0 | 0  | 0          |
| 11 | Midterm Project            | 0 | 0  | 0          |
| 12 | Midterm Exercise           | 0 | 0  | 0          |
| 13 | Final Project              | 0 | 0  | 0          |
| 14 | Final Exercise             | 0 | 0  | 0          |
| 15 | Preparation for Final Exam | 1 | 10 | 10         |
| 16 | Final Exam                 | 1 | 9  | 9          |
|    |                            |   |    | <b>140</b> |