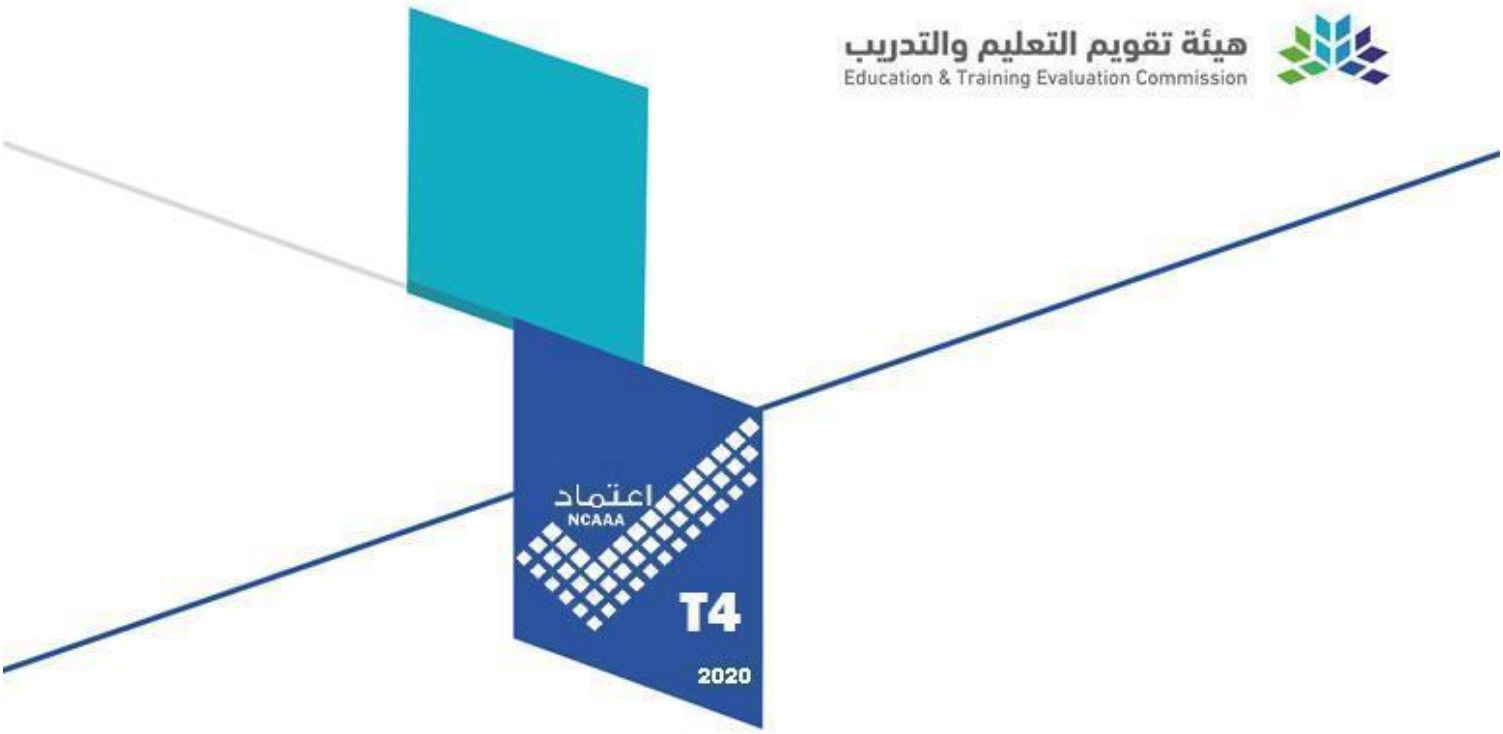
هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission




# Course Specifications

| | |
|---|---|
| **Course Title:** | Electronics |
| **Course Code:** | 503413-4 |
| **Program:** | Bachelor in Computer Engineering |
| **Department:** | Department of Computer Engineering |
| **College:** | College of Computers and Information Technology |
| **Institution:** | Taif University |

## Table of Contents

## A. Course Identification

| |
|---|
| **1. Credit hours: 4** |
| **2. Course type**<br>**a.** University ☐ College ☐ Department ■ Others ☐<br>**b.** Required ■ Elective ☐ |
| **3. Level/year at which this course is offered: 7/4** |
| **4. Pre-requisites for this course** (if any)**: 503310-4** |
| **5. Co-requisites for this course** (if any)**: None** |

**6. Mode of Instruction** (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|---|---|---|---|
| 1 | **Traditional classroom** | 5 | 100% |
| 2 | **Blended** | 0 | 0 |
| 3 | **E-learning** | 0 | 0 |
| 4 | **Distance learning** | 0 | 0 |
| 5 | **Other** | 0 | 0 |

**7. Contact Hours** (based on academic semester)

| No | Activity | Contact Hours |
|---|---|---|
| 1 | **Lecture** | 45 |
| 2 | **Laboratory/Studio** | 30 |
| 3 | **Tutorial** | |
| 4 | **Others** (specify) | |
| | **Total** | 75 |

## B. Course Objectives and Learning Outcomes

**1. Course Description**

This course focuses on analysis and design used throughout the electronic devices and circuit theory. Semiconductor diodes. Diode applications. BJT transistor modeling. BJT Small signal. Theory of operational amplifiers, Inverting and noninverting operational amplifier, feedback theory, frequency response, Applications of operational amplifier, voltage summation, subtraction and comparator, integration, and differentiation circuits, comparators, Oscillators Active filters and Multistage amplifier.

**2. Course Main Objective**

1. Identify Semiconductor diodes and their applications.
2. Analysis and modeling Bipolar junction transistors.
3. Analysis of BJT small signals.
4. Analyze and design of inverting, noninverting op Amp, summing, subtraction amplifier circuits, and comparators.
5. Analyze and design of comparators, differentiators, Integrators, and oscillators.
6. Analyze and design of active filters (L.P.F., H.P.F., B.P.F.)
7. Analysis of multistage amplifiers.

### 3. Course Learning Outcomes

| CLOs | | Aligned PLOs |
|---|---|---|
| 1 | **Knowledge and Understanding** | |
| 1.1 | Identify Semiconductor diodes and their applications | K1 |
| 1.2 | Formulate the principles of inverting noninverting op-amp summing subtraction amplifier circuits, Integrators and differentiators comparator sand oscillators. | K1 |
| 1.3 | Identify the principles of design of active filters L.P.F.H.P.F. B.P.F. | K1 |
| **2** | **Skills :** | |
| 2.1 | Apply engineering design to produce solutions that meet specified needs with consideration of analysis and modeling Bipolar junction transistors. | S1 |
| 2.2 | Apply engineering design to produce solutions that meet specified needs with consideration of analysis of BJT small signal | S1 |
| 2.3 | Analyze Integrators and differentiators comparators and oscillators and multistage amplifiers. | S3 |
| **3** | **Values:** | |

## C. Course Content

| No | List of Topics | Contact Hours |
|---|---|---|
| 1 | Semiconductor diodes ideal and practical diodes, diode equivalent circuits, load line analysis. | 5 |
| 2 | Diode applications series diode, parallel and series parallel configurations, Sinusoidal inputs Halfwave and full wave rectification. Chap 1 | 5 |
| 3 | Diode applications clippers and clampers, and zener diode. | 5 |
| 4 | BJT Transistor modeling. | 5 |
| 5 | Small signal BJT transistor. | 5 |
| 6 | operationl Amplifier Theory and Inverting and Noninverting operation amplifier | 4 |
| 7 | Feedback theory, and Frequency response Voltage summation | 3 |
| 8 | Subtraction circuits, Integration operational amplifier. | 3 |
| 9 | Differentiation circuits, Comparator circuits | 3 |
| 10 | Oscillator circuits | 3 |
| 11 | Active filters High pass filter and Band pass filter | 2 |
| 12 | Multistage amplifier | 2 |
| | Lab | 30 |
| **Total** | | **75** |

## D. Teaching and Assessment

### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|---|---|---|---|
| **1.0** | **Knowledge** | | |

| | | | |
|---|---|---|---|
| 1.1 | Identify Semiconductor diodes and their applications | Lecture<br>Discussion<br>Problem Solving | Written Exams<br>Quizzes<br>Assignments |
| 1.2 | Formulate the principles of inverting noninverting op-amp summing subtraction amplifier circuits, Integrators and differentiators comparator sand oscillators. | Lecture<br>Discussion<br>Problem Solving | Written Exams<br>Quizzes<br>Assignments |
| | Identify the principles of design of active filters L.P.F.H.P.F. B.P.F. | Lecture<br>Discussion<br>Problem Solving | Written Exams<br>Quizzes<br>Assignments |
| **2.0** | **Skills** | | |
| 2.1 | Apply engineering design to produce solutions that meet specified needs with consideration of analysis and modeling Bipolar junction transistors. | Lecture<br>Discussion<br>Projects | Written Exams<br>Quizzes<br>Assignments<br>Oral Test<br>Project<br>Practical Test |
| 2.2 | Apply engineering design to produce solutions that meet specified needs with consideration of analysis of BJT small signal | Lecture<br>Discussion<br>Projects | Written Exams<br>Quizzes<br>Assignments<br>Oral Test<br>Project<br>Practical Test |
| 2.3 | Analyze Integrators and differentiators comparators and oscillators and multistage amplifiers. | Lecture<br>Discussion<br>Projects | Written Exams<br>Quizzes<br>Assignments<br>Oral Test<br>Project<br>Practical Test |
| **3.0** | **values** | | |
| 3.1 | | | |
| 3.2 | | | |
| … | | | |

## 2. Assessment Tasks for Students

| # | Assessment task* | Week Due | Percentage of Total Assessment Score |
|---|---|---|---|
| **1** | Lab Exam | 15 | 15% |
| **2** | Midterm Exam | 7 | 20% |
| **3** | Assignments | Continues | 5% |
| **4** | Quizzes | Continues | 10% |
| **5** | Project | Continues | 10% |
| **6** | Final Exam | 16 | 40% |

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

## E. Student Academic Counseling and Support

**Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:**

Teaching staff provide at least 6 office hours for students to help them in the course as well as in any other academic issues.

- Consultation can also be done 24 hours/ 7days through university Edugate (Tawasol)
- Consultation can also be done through email which is available at blackboard system.
- academic advice can be done through blackboard system facilities.

## F. Learning Resources and Facilities

### 1.Learning Resources

| | |
|---|---|
| **Required Textbooks** | Robert L. Boylestad and Louis Nashelsky, Electronic Devices and Circuit Theory, Pearson, 10th Ed, 2000. |
| **Essential References Materials** | Theodore F. Bogart, Jr., Electronic Devices and Circuits, Prentice Hall, 4th Ed, 1990. |
| **Electronic Materials** | |
| **Other Learning Materials** | |

### 2. Facilities Required

| Item | Resources |
|---|---|
| **Accommodation** (Classrooms, laboratories, demonstration rooms/labs, etc.) | Traditional Classrooms, Laboratories |
| **Technology Resources** (AV, data show, Smart Board, software, etc.) | White Board. Data show, software |
| **Other Resources** (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) | |

## G. Course Quality Evaluation

| Evaluation Areas/Issues | Evaluators | Evaluation Methods |
|---|---|---|
| Extent of achievement of course learning outcomes | Students | Indirect (Survey) |
| Effectiveness of teaching and assessment | Students | Indirect (Survey) |

| | | |
|---|---|---|
| Extent of achievement of course learning outcomes | Faculty | Course Report |

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
**Assessment Methods** (Direct, Indirect)

## H. Specification Approval Data

| | |
|---|---|
| **Council / Committee** | |
| **Reference No.** | |
| **Date** | |