

# DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

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**SENIOR DESIGN PROJECT: Automatic Transistor Characterizatinator (A.T.C-inator)**

**PROJECT PEROID:** Fall 2023 – Spring 2024

**SENIOR STUDENT 1**: Jose Amaro **STUDENT ID**: 20261742

**SENIOR STUDENT 2**: Omar Barbosa **STUDENT ID**: 20272961

**SENIOR STUDENT 3**: Caleb Garza **STUDENT ID**: 20411058

**SENIOR STUDENT 3**: Laura Leal **STUDENT ID**: 20530474

**SUPERVISOR**: Carlos Rodriguez-Betancourth **CO-SUPERVISOR (if any)**: Jorge Castillo

**PROJECT DESCIPTION:**

This project will be an automatic transistor characterizer. Users will be able to insert any transistor into the A.T.C-inator and view important information about the transistor in a matter of seconds. Some information that will be displayed includes the Vt of the transistor, the saturation current, the Bode plot, etc. The derivation of these characteristics will come from the microcontroller. Apart from displaying the information of the transistors, it will be uploaded to a database so that users can see how it compares to other transistors as well as the corresponding datasheet.

**PROJECT OBJECTIVES & DELIVERABLE:**

The prototype of the A.T.C-inator is scheduled to be ready by around November.

It will be capable of accepting a MOSFET and calculating its characteristics, outputting them, and sending this information to the database. The database will be able to store all data related to different transistors and compare this information to the datasheet provided by manufacturers as well as themselves.

**INDIVIDUAL PROJECT RESPONSIBILITY BREAKDOWN FOR EACH TEAM MEMBER:**

Jose Amaro: My main role for this project involves building the code that will manage the microcontroller. This code will have to process all of the data that is received and send it to the database. The language for this part of the project will be C++ or python depending on the microcontroller that best fits our needs. Additionally, I will be assisting in the creation of the schematic for the circuit as well as the designing of the PCB. I will also be assisting with the backend development of the database.

Omar Barbosa: : My main role and tasks in this project will include working on the hardware and designing the control system for the characterization of the MOSFET’s. This would include analyzing the triode and saturation regions, studying parameters such as Id v VGS, sqrt(Id), and conducting measurements for parasitic capacitances. Furthermore, the derivation of RDS, Lambda, Gm, K, and other characteristic operations will be analyzed and worked into the design of the control system. If all these characteristics are met, completed, and working correctly, we may also consider working with Bipolar Junction Transistors(BJT’s).

Caleb Garza: My main role and tasks in this project will include working on the backend software of the project. This means getting the hardware and software aspects of the project to work together and connect. I will be helping build the database in python using mySQL database service. Some tasks will include making sure that the database has the appropriate fields for all of the data that will be sent to it and ensuring that it works smoothly as to provide a better experience for the users.

Laura Leal: My main role and tasks in this project will include helping with the microcontroller aspect of the project as well as the hardware and control system. I will be assisting in the creation of the code for the microcontroller and ensure that it is receiving accurate information from the voltage and current sensors to maintain a working environment. I will also be working on making sure that the hardware is connected correctly to the microcontroller, is computing the characteristics of the MOSFETs correctly, and is transmitting the information to the database with ease.

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| JOSE AMARO SIGNATURE |  | DATE |  |
| OMAR BARBOSA SIGNATURE |  | DATE |  |
| CALEB GARZA SIGNATURE |  | DATE |  |
| LAURA LEAL SIGNATURE |  | DATE |  |
| SUPERVISOR SIGNATURE |  | DATE |  |
| CO-SUPERVISOR SIGNATURE (if applicable) |  | DATE |  |