Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Section\_\_\_\_\_\_\_\_\_\_

Alpha Experiments and Omega Lab Explorers Proof of Skills

Introduction to ECSE

[Professional Accountability](#_Professional_Accountability)

[Circuit Simulation](#_Circuit_Simulation_(LTSpice)

[Experimental Measurement and Personal Instrumentation](#_Experimental_Measurements_and)

[MATLAB and Simulink Basics](#_MATLAB_Basics_and)

[Community, Communication, Asking for Help, Helping Others](#_Community,_communication,_asking)

You should rotate each day to a to a new category and try to submit your Proof of Skills category for that day on Gradescope before the next class to stay on track. If needed, resubmit skills to get maximum scores – you will have three opportunities throughout the semester to submit improvements! Your goal is to be 100% proficient at these BASIC skills BEFORE Lab Proof of Concepts begin!

Click here for editable [Self-Directed Skills Documentation](https://docs.google.com/document/d/1bLno7aaQSeynwgN2l2YUZHFocEe0X1me/edit?usp=sharing&ouid=103328592823046102953&rtpof=true&sd=true), which will guide you in completing your Proof of Skills Objectives.

Improving this document to include more detail/links organization is a part of this semester’s exercise. You get points for it!

**Submission Format**:

1. Please upload this sheet on the due date for each Proof of Skills Day by the next Proof of Skills Day (See Gradescope deadlines). Please indicate for each submission day, which skills you attempted. If you have already received a graded score, include this as well. This will be important for recordkeeping when you iterate on Proof of Skills later in the semester.
2. Each Skill is listed in Gradescope with a place to add a .docx, .pdf, video or other file. PDF is preferred but we will accept equivalent files. Be sure to address ALL criteria before submitting (the skill AND format list if supplied at the end of each section….)

To find a couple of examples of a submission, see the [course website](https://sites.ecse.rpi.edu/courses/F23/ECSE-1010/resources.html#proof_of_skills).

**Professional Accountability (19 Points)**

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| **Skill to be Proven** | **First Submission** | **Optimization #1** | **Optimization #2** | **Optimization #3** | **Best Score from All Submissions** |
|  |  |  |  |  |  |
| **1. I know the ABET Engineering Student Outcomes (Criterion 3). There are 7. Comment on one that you are most excited to accomplish while at RPI. Comment on the one that will be the most challenging for you to accomplish while at RPI.** | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | **/3** |
| **2. I know the IEEE Code of Ethics (list them all). Choose one to write a few sentences that seems most important to your lived experience or your future experience!** | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | **/2** |
| **3. I know the difference between A Good Failure and a Bad Failure (Consequences): I have a plan for “Good Failures”. What to do when it doesn’t go well? Who takes responsibility? How do you address it? Write what you will do (A good failure plan!) if things don’t go well for an experiment, for an exam, or assignment….** | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | **/3** |
| **4. I can make a draft of my Plan of Study according to my own personal interests at the moment. Write/fill in a draft of your 4-Year** [**Plan of Study**](https://express.adobe.com/page/LnisNV1QUmpSe/) **excel spreadsheet. Where do you find 2027 Curriculum templates (**[**EE**](https://rpi.app.box.com/s/h62fo2p5zdz3e524dktqqzoalv60iqkx/file/1232401013050) **and** [**CSE**](https://rpi.app.box.com/s/h62fo2p5zdz3e524dktqqzoalv60iqkx/file/1257359188644)**) for all majors? Where will you find** [**Program templates**](https://ecse.rpi.edu/academics/undergraduate-programs/program-templates) **and more detail about Navigating ECSE?** | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | **/3** |
|  |  |  |  |  |  |
| **5. I can begin to prepare for my future internship or job search on RPI’s Handshake portal. Handshake connects college students looking for jobs with companies looking to hire college students. Navigate to** [**RPI Handshake**](https://ccpd.rpi.edu/handshake) **and create an account. Name three career-oriented things that students can do via Handshake. Also choose a company that you would be interested in doing an internship with or working for – why does this company interest you?** | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | **/3** |
| **6. --MAX LEVEL PROOF OF SKILLS THAT WILL BE USED IN LAB PROOF OF CONCEPTS!!!—**  I **can clearly document and compare a calculated, simulated, and experimental result** to answer the question “Is this right?” for myself | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | **/5** |

**Circuit Simulation (21 Points)**

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| **Skill to be Proven** | **First Submission** | **Optimization #1** | **Optimization #2** | **Optimization #3** | **Best Score from All Submissions** | |
|  |  |  |  |  |  | |
| **1.** I can use operation point **dc analysis** to find voltages across a resistive circuit *(****Must be two or more resistors****, hint: to do something useful to you, try to simulate a homework or class problem!)* | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | **/3** | |
| **2.** I can label and identify Nodal Voltages in a circuit. (creating a well labeled schematic!!) | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | **/3** | |
| **3.** I can use **transient analysis** with a sinusoidal source to measure voltage across ONE resistor in a resistive circuit (**Total resistor count in the circuit must be two or more**) | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | **/5** | |
| **4.** I can step through parameters with **parametric analysis** to repeatedly measure voltages as I vary my resistance over a range of values | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | **/5** | |
| **5.** I can use **AC analysis** to find the frequency response of an RC or RL filter (*hint: find a filter with or without an op amp, we’ll understand how this works later!*) | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | **/5** | |
| *Each of the Circuit Simulation* *Objectives above should reflect the following goals (each are worth 1 pt where applicable):* | | | | | |
| 1. I can **change my schematic and plot background to white** and cut and paste on an external document 2. I can **change the line thickness and color** of my schematic and simulation output 3. I **can label the simulation output clearly with the circuit schematic component names** 4. I can intentionally show the most relevant part of a simulation by **changing the simulation output window** | | | | | |

**Experimental Measurements and Personal Instrumentation (26 Points)**

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| **Skill to be Proven** | **First Submission** | **Optimization #1** | **Optimization #2** | **Optimization #3** | **Best Score from All Submissions** | |
|  |  |  |  |  |  | |
| **1.** I can use my instrumentation board’s function generator to **create a DC, sinusoid, and pulsed signal** and measure with its oscilloscope directly (*hint: no circuit necessary but need external wires!*) | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | **/5** | |
| **2.** I can **build a resistive circuit** and **measure dc voltage across ONE resistor using a dc input source** and vary dc voltage at least 3 times (-5,+5 and any voltage in between) *(****Must be two or more resistors****, hint: to do something useful to you, try to simulate a homework or class problem!)* | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | **/5** | |
| **3.** I can **build a resistive circuit** and **measure the dc current through ONE resistor using a dc source** (OR find another way if needed depending on board!) *(****Must be two or more resistors****, hint: to do something useful to you, try to simulate a homework or class problem!)* | Attempted?  Graded Score  /6 | Attempted?  Graded Score  /6 | Attempted?  Graded Score  /6 | Attempted?  Graded Score  /6 | **/6** | |
| **4.** I can **build a resistive circuit** and **measure voltage across ONE resistor using a sinusoidal input source** *(****Must be two or more resistors****, hint: try to make a sinusoidal source with amplitude 0 to 5V centered at 2.5 V and another from -5 to +5V centered at 0 then document whether your board can accomplish both or only one of these)* | Attempted?  Graded Score  /7 | Attempted?  Graded Score  /7 | Attempted?  Graded Score  /7 | Attempted?  Graded Score  /7 | **/7** | |
| **5.** I **can use my cursor function** to show specific voltage and time points on an oscilloscope measurement. | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | **/3** | |
| ***Each of the Experimental Measurements and Personal Instrumentation* *Objectives above should reflect the following goals:*** | | | | | |
| 1. I can use consistent **color coding of wires when I build circuits on my breadboard** to aid in troubleshooting (you must include a photo of your circuit when relevant). 2. I can “zoom in” to an oscilloscope output by **changing the time** **scale (x-axis)** to show important parameters (for example, a sinusoid with 25 cycles would be easier to see if only 3-5 cycles were shown instead!) when needed 3. I can “zoom in” to an oscilloscope output by **changing the voltage** **scale (y-axis)** to show important parameters (for example, a sinusoid with 500mV amplitude would be difficult to see with 5V/div…) when needed 4. I can ***change the THICKNESS*** of my trace lines for easy viewing. 5. I **can change the background color of my oscilloscope output to white** and paste in an external document for easy viewing. 6. I **can label the measurement output clearly** with the circuit schematic component names | | | | | |

MATLAB and Simulink Basics (27 Points)

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| **Skill to be Proven** | **First Submission** | **Optimization #1** | **Optimization #2** | **Optimization #3** | **Best Score from All Submissions** |
|  |  |  |  |  |  |
| **1.** I have completed the [MATLAB Onramp Tutorial](https://www.mathworks.com/support/learn-with-matlab-tutorials.html?gclid=CjwKCAjwgaeYBhBAEiwAvMgp2valuIavBSmkwK3auWFHQhq2vYtRLzun1o_kAPebnTT_rs1uJNpf2RoCmHwQAvD_BwE&ef_id=CjwKCAjwgaeYBhBAEiwAvMgp2valuIavBSmkwK3auWFHQhq2vYtRLzun1o_kAPebnTT_rs1uJNpf2RoCmHwQAvD_BwE:G:s&s_kwcid=AL!8664!3!547061324766!p!!g!!matlab%20onramp&s_eid=ppc_108293288628&q=matlab%20onramp) (submit certificate to Gradescope) | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | **/5** |
| **2.** I have completed the [Simulink Onramp Tutorial](https://www.mathworks.com/support/learn-with-matlab-tutorials.html?gclid=CjwKCAjwgaeYBhBAEiwAvMgp2valuIavBSmkwK3auWFHQhq2vYtRLzun1o_kAPebnTT_rs1uJNpf2RoCmHwQAvD_BwE&ef_id=CjwKCAjwgaeYBhBAEiwAvMgp2valuIavBSmkwK3auWFHQhq2vYtRLzun1o_kAPebnTT_rs1uJNpf2RoCmHwQAvD_BwE:G:s&s_kwcid=AL!8664!3!547061324766!p!!g!!matlab%20onramp&s_eid=ppc_108293288628&q=matlab%20onramp)  (submit certificate to Gradescope) | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | **/5** |
| **3.** I can add two sinusoid waves and show the display using MATLAB Simulink | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | **/2** |
| **4.** I **can analytically determine the amplitude, frequency, period and phase shift of a sinusoid** (hint: for phase shift you will need a reference point which could be two different sinusoids plotted together!) | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | **/3** |
| **5.** I **can find the solutions for linearly independent equations using the matrix function** on my personal calculator (TI-XX) and compare it to the calculation in MATLAB | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | Attempted?  Graded Score  /5 | **/5** |
| **6.** I **can import simulation data** (from LTSpice or equivalent) **to MATLAB** and plot the function | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | **/2** |
| **7.** I **can import experimental data (from Scopy or Waveforms) to MATLAB** and plot the function | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | **/2** |
| **8.** I **can use a regression** in MATLAB to help define my function | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | Attempted?  Graded Score  /3 | **/3** |

**Community, Communication, Asking for Help, Helping Others – Be an active part of the learning community! (8 Points)**

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| --- | --- | --- | --- | --- | --- |
| **Skill to be Proven** | **First Submission** | **Optimization #1** | **Optimization #2** | **Optimization #3** | **Best Score from All Submissions** |
|  |  |  |  |  |  |
| **1.** I **can ask for help** from a TA or SA when needed for technical issues, parts, or general question as I complete this Proof of Skills work | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | **/2** |
| **2.** I **can HELP someone else OR ask another student for help** after I have mastered a skill | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | **/2** |
| **3. Make your** [**portfolio**](https://sites.ecse.rpi.edu/courses/F22/ECSE-1010/PortfolioInstructions.pdf) in Box or start formatting your website | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | **/2** |
| **4.** I **add new information, add a comment or make a correction to the Intro to ECSE Skills documentation** in a meaningful way for future semesters | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | Attempted?  Graded Score  /2 | **/2** |