

## RESEARCH PROJECT MODULE

**PREREQUISITES:** PERMISSION OF INSTRUCTOR AND COMPLETION OF AT LEAST 10 PRIOR MODULES.

### OUTLINE OF MODULE X2:

#### What you will learn about in this Module:

You will learn how to employ electronics in a research project.

#### What you will build in the lab:

You will design, build, and test a circuit with the objective of enabling a research project to be carried out, or enhancing an otherwise ongoing research activity.

### INTRODUCTION:

Almost anyone who goes into a career in experimental research, engineering testing, or prototype design finds themselves becoming well acquainted with electronics. Almost anything you can think of doing in these fields either explicitly requires electronic components or sub-systems, or could be improved by their inclusion. Examples include:

- Oceanic and space research.
- Vehicle field testing.
- High-energy physics.
- Biomedical research.

### READINGS FROM HOROWITZ AND HILL (H&H): *ART OF ELECTRONICS*

Depends on the specific content of this independent module.

### ADDITIONAL READINGS & INTERNET RESEARCH:

Identify web-based resources that are relevant for the research project that you plan to work on. Familiarize yourself with this material. In particular, focus on finding instrumentation or circuits that have already been developed that are similar to what you intend to build. Even if a system already exists, you may still wish to build your own for many very good reasons: cost, new features, better performance, smaller size, or just as a learning experience.

## SELF QUIZ

- 1: What electronic instrumentation related to your research project already exists?
  
- 2: Does the existing instrumentation meet your needs?
  
- 3: If the existing instrumentation does not meet your needs, then how will your new design address these deficiencies?
  
- 4: What materials, equipment, and supplies do you think will be necessary?
  
- 5: What would you estimate the cost will be?
  
- 6: What additional resources can you leverage or bring to bear for this Project?
  
- 7: Are there any safety issues you would need to consider?

PLEASE ANSWER THE ABOVE QUESTIONS AND E-MAIL TO THE INSTRUCTOR  
“I have neither given nor received aid on this examination, nor have I concealed any violation of the Honor Code”

X\_\_\_\_\_

## LABORATORY PROJECTS

Specific exercises are to be decided in consultation with the Instructor. Once you have discussed the exercises with the instructor, you are to do the following things:

Propose a Design Specification for your project.

Develop a list of required materials for your project, with an estimated budget.

Get approval from the Instructor.

## FEEDBACK

Was this Module useful and informative?

---

Is there a topic that should get more or better coverage?

---

In what way can this Module be improved:

Content: \_\_\_\_\_

Depth of Coverage: \_\_\_\_\_

Style: \_\_\_\_\_

Any additional comments that will help us to improve this course:

---

---

---

If you prefer, you may e-mail comments directly to Bob Dennis: [yoda@umich.edu](mailto:yoda@umich.edu)