I. Course Title
   • Electronics and Electrical Measurement

II. Course Prefix/Number
   • PHYS 300

III. Credit Hours
   • 3.0

IV. Prerequisites
   • Phys 226 or Phys 232

V. Catalog Description
   • A combined lecture and laboratory course in electronics consisting of 4 laboratory contact hours and 1 lecture contact hour per week. The course is a study in operational amplifiers, TTL integrated circuits, microprocessors and computer interfacing. The focus is on applications and circuit design. Offered in the fall of even years.

VI. Curricular Relationships
   • This course is a required course in the Chemical Physics and Mathematics-Physics Emphasis degree tracks.
   • Students pursuing a B.S. in Chemistry, or a B.S. in Mathematics-Computer Science often select to take this course.
   • This course will count toward a minor in physics.

VII. Student Learning Outcomes
   • Students will be able to define and describe terminology, abbreviations, and symbols used in electronics.
   • Students will be able to design and build circuits using standard solid state chip technology.
   • Students will be able to use standard electronic test instruments.
   • Students will be able to use standard reference works to design circuits.
   • Students will be capable of programming microprocessors that interface with circuits they designed.

VIII. Content Outline
• High and low pass RC filters
• Oscilloscope use
• Fourier Analysis of complex signals
• Generalized Ohm’s Law for AC circuits
• Diodes
• Operational Amplifiers
• 555cn timers
• Logic Gates
• JK Flip-Flops
• Sequencers and Decoders
• Parallax Basic Stamp II
• I2C Memory
• A to D and D to A converters
• Sensors

IX. **Course Procedures/Policies/Grading Scale**

• Grades are based on a combination of homework and projects. Typically, three major projects are assigned. Students will need to complete various minor projects to understand the operation of the various components before they can attempt the major projects. The major projects consist of the design/ construction of circuits in each of the three emphasis areas: analog circuits, digital circuits, and microprocessors.

X. **Required/Recommended Readings**

• None required. Students will have access to reference materials available on the internet (technical manuals & data sheets).

XI. **Issues Unique to this Course**

• The course uses a lecture/lab format

XII. **Additional Departmental Issues**

• None.