1. **Course number and name:** 055:018 - Principles of Electronic Instrumentation (55:018)

2. **Credits and contact hours:** 3

3. **Instructor:** James Maxted


5. **Specific course information**
   a. Brief description. Principles of analog signal amplification, signal conditioning, filtering; operational amplifier circuit analysis and design; principles of operation of diodes, bipolar transistors, field effect transistors; discrete transistor amplifier analysis and design; laboratory included.
   b. Prerequisites: Electrical Circuits (059:008), and Introduction to Physics (29:082)
   c. Required for all majors

6. **Specific goals for the course, mapped to outcomes**

<table>
<thead>
<tr>
<th>Course Goal</th>
<th>Basis For Goal Assessment</th>
<th>Supports ABET Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ability to think critically and to apply problem solving and reasoning strategies to analysis of electronic circuits</td>
<td>Relevant exam questions</td>
<td>a(•), c(•)</td>
</tr>
<tr>
<td>2. Ability to analyze operational amplifier circuits</td>
<td>Relevant exam questions</td>
<td>a(•), c(•), k(•)</td>
</tr>
<tr>
<td>3. Ability to analyze diode circuits</td>
<td>Relevant exam questions</td>
<td>a(•), c(•), k(•)</td>
</tr>
<tr>
<td>4. Ability to analyze BJT and FET circuits and gain some experience with design of transistor circuits</td>
<td>Relevant exam questions</td>
<td>a(•), c(•), c(•), k(•)</td>
</tr>
<tr>
<td>5. Ability to use electronic instruments to make basic electrical measurements and perform experiments</td>
<td>Laboratory reports</td>
<td>a(•), b(•), k(•)</td>
</tr>
</tbody>
</table>

7. **Brief list of topics to be covered**
   a. Introduction
   b. Op Amps and Circuits
   c. Diodes and Diode Circuits
   d. Field Effect Transistor (FET) and FET Circuits
   e. Bipolar Transistors (BJT) and BJT Circuits
   f. Frequency Response
   g. Power Amplifiers
   h. In Class Exams
7. Brief list of topics to be covered, continued

1. Laboratory projects:
   i. Equipment Orientation
   ii. Basic Op Amp Circuits
   iii. Op Amp Differentiator & Integrator
   iv. Non-Linear Op Amp Circuits
   v. Diode Shaping Circuits
   vi. Precision Diode Circuit
   vii. MOSFET Switch
   viii. MOSFET Amplifier
   ix. BJT Exploration
   x. BJT Discrete Amplifier
   xi. Frequency Response Measurements
   xii. Power
   xiii. Amplifier Circuits