# ME 473 Instrumentation
University of Washington  
Autumn 2005 — v2.0

**instructor:** Prof. Garbini—MEB 216—garbini@u.washington.edu — Office Hours: 3:30 M W Th  
**T. A.:** Blake Gaither—MEB 236—bgaiter@u.washington.edu — Office Hours: T 12:30; F 1:30  
**class meets:** 8:30 - 9:20 Mondays, Tuesdays, Wednesdays & Fridays, MEB 242  
**prerequisites:** ME 374 Systems Dynamic Analysis and Design  
**webpage:** http://courses.washington.edu/meng473/  
**grades:** Homework - 20%, Lab - 15% 2 Midterm Exams - 35%, Final Exam - 30%.  
**homework:** Assigned on Friday and due in the ME office by 5:00 PM on the next Friday.  
**last day:** Friday, December 9, 2005  
**final exam:** Tuesday, December 13, 2005, 8:30-10:20  

<table>
<thead>
<tr>
<th>Week</th>
<th>Subject</th>
<th>Suggested Reading</th>
<th>Problems</th>
</tr>
</thead>
</table>
| 1    | **Introduction**  
- Functional Instrumentation Paradigm  
- Performance Criteria,  
- Error Analysis | Chapter 1 & 2  
Sections 3.1 & 3.2 (skim p. 74 - 94) |  
| 2    | **Dynamic Response**  
- Review 1st, 2nd & n'th order response  
- Transient and Frequency Analysis  
- Bode Diagrams  
- Impedance Analysis, Spectral Analysis | Section 3.3 to p. 157 |  
| 3    | **Filters and Compensators**  
- Bridges & Amplifiers  
- Low-pass, High-pass & Band-pass Filters  
- Dynamic Compensation, Modulation | Sections 10.1 & 10.2  
Sections 10.3 - 10.5 |  
| 4    | **Motion Measurement**  
- Relative Displacement | Sections 4.1 - 4.3 |  
| 5    | **Motion Measurement [continued]**  
- Relative Velocity & Acceleration | Sections 4.4 - 4.5 |  
| 6    | **Motion Measurement [continued]**  
- Absolute Disp., Vel. & Accel. | Sections 4.6 - 4.15 |  
| 7    | **Force, Torque, & Shaft Power**  
- Transducers  
- Resolution of Vector Forces and Torques | Chapter 5 |  
| 8    | **Pressure Measurement**  
- Transducers & Dynamic Models | Sections 6.1 - 6.6 |  
| 9    | **Fluid Flow Measurement**  
- Volumetric Flow Rate  
- Mass Flow Rate | Sections 7.1 & 7.2  
Section 7.3 |  
| 10   | **Temperature Measurement**  
- Thermometers & Thermocouples  
- Dynamic Response of Temperature Sensors | Chapter 8 |  