

## Comparing a Typical Engineering Teaching Style to a Problem-Based Learning Approach

<b>Characteristic</b>	<b>Typical Engineering Teaching Style</b>	<b>Problem-Based Learning Approach</b>
1. Course format	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Homework (problem sets)</li> <li>• Exam(s)</li> </ul>	<ul style="list-style-type: none"> <li>• Targeted lectures</li> <li>• Facilitated class discussions</li> <li>• Guest lectures</li> <li>• Student group work</li> <li>• Student presentations</li> </ul>
2. Learning objectives	<ul style="list-style-type: none"> <li>• Demonstrate knowledge of engineering principles</li> </ul>	<ul style="list-style-type: none"> <li>• Apply engineering principles</li> <li>• Synthesize results</li> <li>• Present and communicate findings</li> <li>• Develop engineering judgment</li> <li>• Exercise critical decision making</li> </ul>
3. Required work	<ul style="list-style-type: none"> <li>• Homework (problem sets)</li> <li>• Exams</li> </ul>	<ul style="list-style-type: none"> <li>• Engineering reports</li> <li>• Term paper(s)</li> <li>• Oral presentations</li> <li>• Wikis</li> </ul>
4. Source of problems students solve	<ul style="list-style-type: none"> <li>• Textbook</li> </ul>	<ul style="list-style-type: none"> <li>• Existing real-world problems</li> <li>• Requests by professionals</li> </ul>
5. Data and assumptions used	<ul style="list-style-type: none"> <li>• All provided and given in the problem statement</li> </ul>	<ul style="list-style-type: none"> <li>• Some given</li> <li>• Promising data sources provided</li> <li>• Data students collect</li> <li>• Additional sources students find</li> </ul>
6. Solutions	<ul style="list-style-type: none"> <li>• Typically one correct solution</li> <li>• Given in the textbook solution key or posted afterwards by instructor</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple correct approaches</li> <li>• Multiple correct solutions</li> </ul>
7. Intended audience of student work	<ul style="list-style-type: none"> <li>• Instructor</li> </ul>	<ul style="list-style-type: none"> <li>• Instructor</li> <li>• Other students</li> <li>• Practicing engineers</li> <li>• Future employers</li> </ul>
8. Grading of student work	<ul style="list-style-type: none"> <li>• For technical correctness</li> <li>• Other instructor-determined criteria</li> <li>• Often one-shot</li> </ul>	<ul style="list-style-type: none"> <li>• By a grading rubric</li> <li>• Criteria and weights developed jointly with students</li> <li>• Opportunities to revise and resubmit</li> </ul>