<table>
<thead>
<tr>
<th>Date</th>
<th>Main topics</th>
<th>Class topic</th>
<th>Suggested reading</th>
<th>Modules</th>
<th>Assignments</th>
<th>Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/10/2020</td>
<td>Introduction</td>
<td>Introduction/motivation</td>
<td>Bishop 1.1; Hastie et al. 2.1-2.2</td>
<td>1,2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8/12/2020</td>
<td>Applications, curve fitting</td>
<td>Termination, probability review</td>
<td></td>
<td>3,4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8/19/2020</td>
<td>Models</td>
<td>ML concepts, Minimum description length</td>
<td>Rissanen; Mohri et al. 2</td>
<td>5,6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8/24/2020</td>
<td>Model complexity</td>
<td>Rissanen; Vitanyi</td>
<td></td>
<td>7</td>
<td>HW1 (probability)</td>
<td></td>
</tr>
<tr>
<td>8/26/2020</td>
<td>HW2, Kolmogorov complexity</td>
<td></td>
<td></td>
<td>8</td>
<td>P1 (group testing)</td>
<td></td>
</tr>
<tr>
<td>8/31/2020</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9/2/2020</td>
<td>Scientific programming</td>
<td>P1, motivation for scientific programming</td>
<td>Cormen et al. 1, 2.1, 30</td>
<td>9,10</td>
<td>HW2 (models) due 9/4/2020</td>
<td></td>
</tr>
<tr>
<td>9/7/2020</td>
<td>Computational complexity, algorithm design</td>
<td>Cormen et al. 5.4-5.5, 11.1-11.2</td>
<td>11--13</td>
<td></td>
<td></td>
<td>Test1 - models</td>
</tr>
<tr>
<td>9/9/2020</td>
<td>Computing architectures</td>
<td></td>
<td></td>
<td>14,15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9/14/2020</td>
<td>Data structures, tree structures, profiling</td>
<td>DP in Cormen</td>
<td></td>
<td>16--19</td>
<td>P2 (sorting)</td>
<td></td>
</tr>
<tr>
<td>9/16/2020</td>
<td>Optimization</td>
<td>Motivation for optimization, dynamic programming</td>
<td></td>
<td>20,21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9/21/2020</td>
<td>Linear programming, convex optimization</td>
<td></td>
<td></td>
<td>22,23</td>
<td>HW3 (scientific programming)</td>
<td></td>
</tr>
<tr>
<td>9/23/2020</td>
<td>Integer programming, EM algorithm, discuss project</td>
<td></td>
<td></td>
<td>24,25</td>
<td></td>
<td>Test2 - sci prog</td>
</tr>
<tr>
<td>9/28/2020</td>
<td>Machine learning 101</td>
<td>Classifiers (nearest neighbor, least squares)</td>
<td>Hastie et al. 2.1-2.5</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9/30/2020</td>
<td>Decision theory, linear regression, clustering</td>
<td>Hastie et al 3, 14.3</td>
<td></td>
<td>27-29</td>
<td>P3 (financial optimization)</td>
<td>Drop deadline</td>
</tr>
<tr>
<td>10/5/2020</td>
<td>Subset selection, shrinkage, decision trees</td>
<td>Hastie et al. 3.4, 4</td>
<td></td>
<td>30-32</td>
<td>P4 (ML - image clustering)</td>
<td></td>
</tr>
<tr>
<td>10/7/2020</td>
<td>Linear classification, LDA, &amp; QDA</td>
<td>Hastie et al. 4.3, 4.4</td>
<td></td>
<td>33,34</td>
<td>HW4 (optimization)</td>
<td></td>
</tr>
<tr>
<td>10/12/2020</td>
<td>Logistic regression, basis expansions</td>
<td>Hastie et al. 5.1, 5.2</td>
<td></td>
<td>35-36</td>
<td>Project proposal</td>
<td>Test3 - optimization</td>
</tr>
<tr>
<td>10/14/2020</td>
<td>Kernel methods, support vector machines</td>
<td>Hastie 12.1, 12.2</td>
<td></td>
<td>37-38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/19/2020</td>
<td>Sparse signal processing</td>
<td>Sparsity, bases</td>
<td></td>
<td>39-40</td>
<td>P4 (ML - image clustering)</td>
<td></td>
</tr>
<tr>
<td>10/21/2020</td>
<td>Frames, wavelets</td>
<td>Notes by Mike Wakin</td>
<td></td>
<td>41-42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/26/2020</td>
<td>Multiresolution approximation</td>
<td>Notes by Mike Wakin</td>
<td></td>
<td>43</td>
<td>HW5 (ML)</td>
<td></td>
</tr>
<tr>
<td>10/28/2020</td>
<td>Compressed sensing, sparse recovery</td>
<td></td>
<td></td>
<td>44-46</td>
<td>Test4 - ML</td>
<td></td>
</tr>
<tr>
<td>11/2/2020</td>
<td>Performance limits</td>
<td>detailed supplements</td>
<td></td>
<td>47-48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/4/2020</td>
<td>AMP + example</td>
<td>detailed supplements + Matlab ex.</td>
<td></td>
<td>49-50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/9/2020</td>
<td>Dimensionality reduction</td>
<td>Principle components analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/11/2020</td>
<td>Review / discussion / etc.</td>
<td></td>
<td></td>
<td></td>
<td>HW6 (sparse signal recovery)</td>
<td>Presentation due Nov. 13</td>
</tr>
<tr>
<td>11/16/2020</td>
<td>Project presentations</td>
<td></td>
<td></td>
<td></td>
<td>Final project report</td>
<td>Test5 - Sparsity (begins)</td>
</tr>
<tr>
<td>11/18/2020</td>
<td>No class - finals week</td>
<td></td>
<td></td>
<td></td>
<td>Presentation peer grading</td>
<td>Test5 - Sparsity (ends)</td>
</tr>
</tbody>
</table>