ECE 8580 Theoretical Neuroscience II

**Brief description:** Sensory stimuli and neural responses. Neural encoding and decoding including firing rate and spike statistics, reverse correlation and visual receptive fields. Modeling of neurons and neural circuits on the basis of cellular and synaptic biophysics. Adaptation and learning including plasticity, classical conditioning, reinforcement learning and representational learning.

**Prerequisites:** ECE 8380 Theoretical Neuroscience I

**Instructor:** Satish S. Nair, 229 EBW (882-2964; nairs@missouri.edu)

**Credits/ Class hours:** 3 credits; Mon 2-3:15 pm, Thurs 4-5:15 pm, EBW 145


+ Notes hosted at Blackboard site, incl. documents related to the software modeling package NEURON (available free online).

**References:** *Principles of Computational Modelling in Neuroscience* by Sterratt, Graham, Gillies and Willshaw, Cambridge University Press

**Grading:**

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<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homeworks</td>
<td>20%</td>
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<td>One Mid-Term Exam</td>
<td>35%</td>
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<td>Final Exam</td>
<td>45%</td>
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**Letter grades:** A-F, Curve grading

**Academic dishonesty:** Academic honesty is fundamental to the activities and principles of a University. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards academic dishonesty as an extremely serious matter, with consequences that range from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, or collaboration, consult the course instructor. If you are caught cheating on an exam or assignment, you will either receive a grade of zero for the exam/assignment, or an F for the course. Weekly assignments are individual assignments, so do not copy someone else's assignment.

If you are caught committing academic dishonesty, your actions will be reported to the Provost's office, according to university policy.

**Special needs:** If you need accommodations because of a disability, if you have emergency medical information to share with me, or if you need special arrangements in case the building must be evacuated, please inform an instructor immediately. Please see an instructor privately after class, or during office hours. To request academic accommodations (e.g. a note-taker) students must register with Disability Services, AO38 Brady Commons, 882-4696. It is the campus office responsibility to review documentation provided by students requesting academic accommodations, and for accommodations planning in cooperation with students and instructors, as needed and consistent with course requirements. For other MU resources for students with disabilities, click on "Disability Resources" on the MU homepage.