What I've learned in this class:

1. Different class of magnetoresistance
   Such as AMR, SMR ……
2. The definition of FM and AFM
3. Difference between longitudinal and lateral spin valves
4. The definition of spin current
5. Typical magnetic materials
6. The definition of spin transfer torque and spin orbit torque
7. The interplay between heat and spin
8. The interplay between topology and spin

Proposal related to spintronics and my own research:

Title: Tunneling spin valves in FM/CdO/FM trilayer structure.

Author: Yang Ma

Abstract: tunneling spin valves have been developed dramatically, since its large resistance ratio for different alignment configurations. Typical intercepted layers, such as MgO, are shown to exhibit a good reliability. Here, we would like to try a new oxide material CdO, which has similarly simple chemical composition as MgO.

Key words: tunneling spin valves, cadmium oxide

Introduction:

Research plan: Constructing a FM/CdO/FM trilayer structure is the first step. Via magnetron sputtering, several nanometers Py could be coated on the MgO substrate. Then in high vacuum chamber, single crystalline CdO can grow onto the Py/MgO with MBE or PLD. Finally, top layer Py is added above and etch into hall bar shape to obtain different coercive field with bottom layer Pt.
When sweeping magnetic field, the upper layer Py is more likely to swtich, and then we can see the voltage deep or peak when we measuring the voltage in top Py.

Final Supplementary

1. Students in the class ought to be more active, thus more discussion.

2. 3 hours is better. More knowledge and details would be included in a 3 hours class.

3. The recent development in spintronics, such as application of certain spin-related effects, would enrich this class.

4. Write paper citations in detail would help students easy to locate the cited paper.

   For example:
   S. A. Wolf et al., Science **294**, 1488 (2001)