Why would we want to do this in Solid State Physics?

Information Literacy: Several hot topics in condensed matter (such as graphene, shown to the left) have multiple papers published every day! In order to keep up with the literature and make contributions to the field, we must be able to critically read and evaluate the papers. Students are expected to be able to use novel and effective information retrieval tools and to expand to include others as needed. This is part of the information literacy process.

Introducing Information Literacy in Graduate Solid State Methods

Partnership between Micky Holcomb (Physics) and Linda Blake (Librarian)

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Goal: To Add and Assess Information Literacy Outcomes to Graduate Solid State Physics

Method: To Require Students to Write Three Thorough Paper Reviews as if a Reviewer

771 Expected Learning Outcomes (Listed on Syllabus):

1. Understand why solids form and the symmetries of different crystal structures.
2. Understand the properties of phonons and their role in the thermal and electrical properties of solids.
3. Calculate fundamental properties of metals using the free electron approximation.
4. Explain the nature and role of the electronic band structure in solids.
5. Understand the principles behind selected experimental techniques relevant to solid-state physics.
6. Communicate and apply their knowledge of the above topics in written and oral form.

Grading Rubric for Paper Reviews

Information Literacy:

Several hot topics in condensed matter (such as graphene, shown to the left) have multiple papers published every day! In this rapidly changing environment, it is vital to be able to locate the most up-to-date information and critically analyze its value to the scientific community. In order to efficiently and effectively find sources, an information literate student can identify keywords to utilize on various relevant search systems, follow citations and cited sources to identify additional pertinent articles, refine their search strategy as necessary, and create a system for organizing the gathered information.

Mock Review Papers: Experts in a field can recognize good work from problematic investigations, and must report such problems frequently for paper or grant reviews. We will practice this skill by doing several mock journal paper reviews on varying topics related to the course throughout the semester and apply this knowledge to a final project paper at the end of the semester. A good review should be able to identify the key ideas of the paper, indicate the weak points in the experiments, suggest improvements, locate papers that have found similar or contradictory results, and comment on the importance of this work to the field. See a detailed rubric below.

Syllabus Description of Information Literacy Assignments

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Final Class Project: At the end of the semester, students will present and write a short paper on a topic relevant to the field. We are encouraged to discuss how your own research relates to class material. To grade your papers, I will use a very similar rubric to what is used for the mock paper reviews. My hope is that the skills you learn through critically reviewing the work of others can be transferred to critically review your own work. The more you illustrate this transfer of information literacy skills, the more likely you are to get a good grade.

Grading Rubric for Paper Reviews

Average Scores

Conclusions

1. Doctoral students would be expected to self assess as high on information literacy skills
2. The assessment showed the perception of improvement across all areas
3. Students felt they improved particularly in identifying potential sources (Q1) and organizing information for practical application (Q6)

Pre and Post Self Assessment of Information Literacy Skills

This survey asked students about their attitudes toward information literacy skills. There were four graduate students in the course. They will be identified by the letters A, B, C, and D.

Student A: Physics, third year
Student B: Mechanical Engineering, second year
Student C: Electrical Engineering, third year
Student D: Electrical Engineering, fourth year

Please indicate your comfort level with your ability to do the following skills.

1. Determine the nature and extent of the information needed
2. Acquire needed information effectively and efficiently
3. Critically evaluate the procured information and modify queries as needed
4. Understand the economic, ethical, legal, and social issues around the use of information
5. Understand acquiring information is an ongoing process

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