**Syllabus**

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| Course prefix and number, section number, and title | **50:160:345 Physical Chem I** |
| Semester term and credit hours | Fall 2024, 3 Credit Hours |
| Class meeting days/times/location | First class: 09/03/2024 (Tuesday)  Last class: 12/10/2024 (Tuesday)  Every Tuesday and Thursday  9:35 am - 10:55 am  Room: CNS-213  *\*Some Meetings Online will be informed in advance* |
| Instructor name, contact information, and office hours | **Dr. Hong Fang**  Email: [hong.fang@rutgers.edu](mailto:hong.fang@rutgers.edu)  Website: https://sites.rutgers.edu/fang-lab/people/hong-fang/  Office: JHSC-120  Office Hours: by appointment |
| Course description | **Introduction to thermodynamics and kinetics, as well as quantum chemistry.** |
| Course prerequisites | Solid state chemistry, basic math. |
| Student learning outcome | Thermodynamics: understanding thermodynamics laws and equilibrium chemical systems.  Quantum chemistry: quantum mechanics used in chemistry, including particles and waves, wave mechanics, semi-classical quantum mechanics, molecular orbital theory, molecular structure, molecular spectroscopy, and photochemistry. |
| Reference book | *Atkins, De Paula & Keeler, Atkins’ Physical Chemistry, 11th Edition.*  *(Available for sale at https://universitydistrict.bncollege.com*  *and for short-term loans at the Robeson Library Reserve).* |
| Course schedule(According to the content order in “Atkins’ Physical Chemistry”) | Ch. 1. Properties of gases.  Ch. 2. Thermodynamics: First law  Ch. 3. Second and Third laws  Ch. 4. Phase transitions  Ch. 5. Mixtures  Ch. 6. Chemical equilibrium  Ch. 7. Quantum theory: wave nature of the electron and atomic structure (Oct.31)  Ch. 8. Quantum theory of motion (Nov.5)  Ch. 9. Hydrogen atom and many-electron atoms (Nov.7 & Nov.12)  Ch. 10. Atomic spectra (Nov.14)  Ch. 11. Molecular orbital theory (Nov.19)  Ch. 12. General aspects of molecular spectroscopy (Nov.21)  Ch. 13. Molecular symmetry, Rotational and vibrational spectroscopy (Nov.26; Nov.28; Dec.3)  Ch. 14. Electronic spectra, Decay of excited states (Dec.5 & Dec.10) |
| Final Exam | Exam period: Monday, December 16 - Saturday, December 21  Exact date(s) within the period to be determined. |
| Grading scale | Letter grades will be assigned on the following scale: A: 90-100%, B: 80-89%, C: 70-79%, D: 60-69%, and F: <60%  Depending upon the class performance, these margins may be modified, benefiting the students. |
| Grade categories and weights | 70% Assignments including Homework and Quizzes posted on Canvas. These contain both thermodynamics and quantum chemistry content. 30% Final Exam (with focus on the quantum chemistry content). |