Special Topics in Functional English

副題/Subtitle
Topics in university chemistry and its language

授業概要/Course Outline
In this course, students will study a variety of topics in university chemistry and develop awareness about how language is used to convey scientific (specifically, chemistry-related) knowledge. Basic topics of university chemistry will be conveyed through a variety of ways: classroom spoken discourse by a native English speaker, classroom spoken discourse by a non-native English speaker, and a textbook written by a native English speaker. As students access content through different channels, they are expected to develop first awareness of the differences among the language used in everyday life and that used in academic settings, in both written and spoken forms, and second the academic skills related to the language of chemistry.

授業の到達目標/Objectives
1. Learning new content related to university chemistry
2. Develop awareness of different types of language
3. Develop academic language skills
4. Develop awareness of the role of language in science

事前・事後学習の内容/Assigned work before/after class
In addition to the instruction given in the classroom, students will practice listening to native English speakers through MIT Opencourseware. A mid-term test will serve for testing the content taught in the first half of the course. In the second half, students will have, in addition to classroom instruction, the help of a textbook, in which plenty of technical language, figures and tables illustrate the content. Comprehension of the textbook will be necessary for learning the content, so that students will be encouraged to learn with the help coming from the information given in the textbook.

授業計画/Course Schedule
Session 1
Outline of the course: purposes, methods, syllabus

Session 2
Structure of the atom
(with examples of classroom discourse by a native English speaker)

Session 3
Discovery of the nucleus
(with examples of classroom discourse by a native English speaker)

Session 4
Particle-like nature of matter
(with examples of classroom discourse by a native English speaker)

Session 5
Wave-like nature of matter
(with examples of classroom discourse by a native English speaker)

Session 6
Review session

Session 7
Mid-term test

Session 8
Kinetic Theory of Gases
(1) Molecules modeled as hard spheres
(with textbook and non-native English speaker classroom discourse)

Session 9
Kinetic Theory of Gases
(2) Pressure, temperature and volume relationship
(with textbook and non-native English speaker classroom discourse)

Session 10
Kinetic Theory of Gases
(3) Maxwell-Boltzmann velocity distribution
(with textbook and non-native English speaker classroom discourse)

Session 11
Review session

Session 12
Kinetic Theory of Gases
(4) Collisions between molecules: principles of gas-phase chemical reactions
(with textbook and non-native English speaker classroom discourse)

Session 13
Kinetic Theory of Gases
(5) Collisions of molecules with walls: principles of surface reactions
(with textbook and non-native English speaker classroom discourse)

Session 14
Review session

Session 15
Final test

教科書/Textbooks
Course materials will be distributed during the course.

参考文献/Reference
MIT Opencourseware, Principles of Chemical Science (2005) by Sylvia Ceyer
D.A. McQuarrie and J.D. Simon (1997). Physical Chemistry: a molecular approach, Chapter 27, University Science Books.

成績評価方法/Evaluation
Students are expected to attend each class, and take the mid-term and final tests. Students will be evaluated based on:
1. Mid-term test (40%).
2. Final test (50%)
3. Attendance and homework (10%)

関連資料/Note / URL
1. The lectures will be conducted in English and all materials distributed will be written in English.