**SCCH 161 General Chemistry**

First Semester Academic Year2021

Faculty of Science, Mahidol University

**Student Groups** Biomedical Science (BM)

Bioresources and Environmental BiologySCBE

Materials Science and Nano Engineering SCME

Bio-Innovation SCIN

**Class Schedule** Thursdays 13:30-16:30,

Google classroom section 1 passcode **ucejqdg**

Google classroom section 2 passcode **kf6t2zs**

**Instructors** Assoc. Prof. Siwaporn M. Smith (siwaporn.smi@mahidol.ac.th)

Assoc. Prof. Pasit Pakawatpanurut (pasit.pak@mahidol.ac.th)

Assoc. Prof. Taweechai Amorsakchai (taweechai.amo@mahidol.edu)

Assoc. Prof Panida Surawatanawong (panida.sur@mahidol.edu)

**Course Description**

This course emphasises the general principles in chemistry, which include such topics as atomic structure, chemical bonding, gases and kinetic molecular theory of gases, phase equilibria, solutions and colloids, chemical thermodynamics, chemical kinetics, ionic equilibria, electrochemistry, and the basics of organic molecules and their importance to life. Relevant applications of the principles covered in the course are also discussed whenever appropriate. Students are highly encouraged to engage with class discussions.

**Grading Policy**

Student evaluation is in accordance with the rules and regulations of the Faculty of Science, Mahidol University. Letter grades of A, B+, B, C+, C, D+, D, and F will be given according to the student’s score.

Score consists of:

Quiz/ 60%

Assignments 40%

**Textbooks**

**Recommended**

1. Chang, R, Goldsby, K.A. Chemistry. 12th Edition. New York: McGraw-Hill, 2016.
2. Middlecamp, C.H. et al. Chemistry in Context: Applying Chemistry to Society. 8th Edition. USA:McGraw-Hill. 2015.
3. Other book or publications

**Course Timetable**

Thursdays 13:30-16:30

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| **Date (2021)** | **Topics** | **Instructor** |
| 19 Aug | Atoms, molecules, and ions: the atomic theory, the periodic table, chemical formulas, naming compounds, intro. organic compounds | Panida |
| 26 Aug | Mass relationship in chemical reactions: atomic mass, molecular mass, chemical reactions and equations, stoichiometry, limiting reagents, reaction yields | Panida |
| 2 Sep | Chemical bonding I: atomic orbitals, electron configuration, octet rule, Lewis structure, resonance structure, molecular geometry | Panida |
| 9 Sep | Chemical bonding II: valence bond theory, hybridisation of atomic orbitals, molecular orbital theory, intermolecular interactions | Panida |
| 16 Sep | Phase, The three states of matter | Siwaporn |
| 23 Sep | Gas law, Crystal structure | Siwaporn |
| 30 Sep | Phase equilibria, Phase diagram | Siwaporn |
| 7 Oct | Thermal properties of matter | Siwaporn |
| 14 Oct | Solutions and colloids: the solution process, solubility, and colligative properties | Pasit |
| 21 Oct | Thermochemistry: introduction to thermochemistry, enthalpy and chemical reactions, the three laws of thermodynamics, and Gibbs free energy and the chemical equilibrium | Pasit |
| 28 Oct | Chemical kinetics: the rate of reaction and the rate law, reaction mechanisms, the relationship between reactant concentration and time, activation energy, and reaction mechanisms | Pasit |
| 4 Nov | Ionic equilibria: equilibrium constant, and factors that affect chemical equilibrium, definitions of acids and bases, ionization constant, molecular structure and the strength of acids | Pasit |
| 11 Nov | Ionic equilibria: molecular structure and the strength of acids | Taweechai |
| 18 Nov | Electrochemistry: redox reactions, galvanic cells, and standard reduction potentials, | Taweechai |
| 25 Nov | Electrochemistry: Spontaneity of redox reactions | Taweechai |
| 2 Dec | Redox reactions and the effect of concentration on cell EMF | Taweechai |