

2309 CS480-02 Course Outline

Course Code : CS480-02
Course Title : Exploration of STEM
Course Type : Elective
Level : 2
Credit : 3
Teaching Activity : Lecture (3 hours/class x 15 classes = 45 hours)
Prior Knowledge : NA (high-school-level science at most)

Schedule :

Class	Week	Time	Venue	Date
D1	WED	12:30-15:20	C309	23/019/4-23/12/17

Instructor : Dr. Yuji Harada
Phone Number : (853) 8897 2122
E-mail Address : yharada(at)must.edu.mo
Office Room : A303c
Office Hour : TBD (to be informed at the beginning of the class)
Language : English

Course Description

This cross-faculty course aims to provide non-scientific audiences with an opportunity to learn non-math physical science as liberal arts education. The main topics include chemistry, geoscience, and astronomy like those typically taught in pre-college-level to freshman-level science, but with no equation/formula, or only a few, very simple equation(s)/formula(e) at most, in each chapter. In this manner of concept-oriented learning, the course engages students in familiarizing themselves with the ideas and ways of physical science, rather than highly math-based problems.

To achieve the above-mentioned goal, this course mostly utilizes a couple of main textbooks written by Paul G. Hewitt, that is, “Conceptual Physics” and “Conceptual Physical Science”. Both these two books and the author are famous for the successful approach of “concepts before calculation”. From this perspective, the students hopefully have an interest in physical science, develop their own scientific knowledge, and connect many real-world analogies with their resultant conceptual understanding.

(It should be noted that the objective of the course, at least in this semester,

might be similar to that of another course entitled “Conceptual Physical Science” (CS480-04). This parallel course is presented by the same instructor and arranged at the same timeslot but in a different day. Since these two courses will share the common purpose, the potential audiences may consider the other course instead.)

Textbook

As above, the following textbooks are primarily adopted in this course.

1. Conceptual Physics, 13th ed.;
Paul G. Hewitt;
ISBN-13: 9780137394975; Pearson; February 5th 2021.
<https://www.pearson.com/en-us/subject-catalog/p/conceptual-physics/P200000006941>
2. Conceptual Physical Science, 6th ed.;
Paul G. Hewitt, John A. Suchocki, and Leslie A. Hewitt;
ISBN-13: 9780134857107; Pearson; January 3rd 2016.
<https://www.pearson.com/en-us/subject-catalog/p/conceptual-physical-science/P200000006948>

However, no prior preparation of the textbooks is required. Alternatively, any material is distributed on an as-needed basis. Also, the slides are made available, though only inside some learning management system. The students shall strictly comply the copyright of the material.

Intended Learning Outcomes

Upon successful completion of this course, as mentioned in the description, the students will be able to:

1. familiarize themselves with the ideas and ways of physical science in the manner of concept-oriented learning.

In particular, they will:

2. have an interest in physical science from the conceptual perspective;
3. develop their own scientific knowledge; and
4. connect many real-world analogies with their resultant conceptual understanding.

Weekly Schedule

Week	Teaching Topic (tmp)	Hour	Teaching Method
1	Prologue: The Nature of Science Part One: Physics Part Two: Chemistry 12. Atoms and the Periodic Table 13. The Atomic Nucleus and Radioactivity	3	Lecture
2	14. Elements of Chemistry	3	Lecture
3	15. How Atoms Bond and Molecules Attract	3	Lecture
4	16. Mixtures	3	Lecture
5	17. How Chemicals React 18. Two Classes of Chemical Reactions	3	Lecture
6	19. Organic Compounds	3	Lecture
7	Part Three: Earth Science 20. Rocks and Minerals	3	Lecture
8	21. Plate Tectonics and Earth's Interior	3	Lecture
9	22. Shaping Earth's Surface	3	Lecture
10	23. Geologic Time -- Reading the Rock Record	3	Lecture
11	24. The Oceans, Atmosphere, and Climatic Effects	3	Lecture
12	25. Driving Forces of Weather	3	Lecture
13	Part Four: Astronomy 26. The Solar System	3	Lecture
14	27. Stars and Galaxies	3	Lecture
15	28. The structure of Space and Time	3	Lecture
16	Examination Coverage (TBD)	1-2 (tmp)	Final Examination

(The aforementioned topics are subject to minor change without notice.)

Assessment Approach

Assessment Method (tmp)	Weight (tmp)
Class Participation	20-30%

Classwork	20-30%
Homework	0%
Final Examination	50-60%
Total	100%

Guideline for Letter Grade

Marks	Grade	GPA
93-100	A+	4.0
88-92	A	4.0
83-87	A–	3.7
78-82	B+	3.3
72-77	B	3.0
68-71	B–	2.7
63-67	C+	2.3
59-62	C	2.0
56-58	C–	1.7
53-55	D+	1.3
50-52	D	1.0
0-49	F	0.0

Note

1. The course is based on a combination of teacher-centered and learner-centered methods, namely, lecture and classwork, respectively. Besides, the classwork means simple fill-in-the-blank items in the handouts, whose answers are found in the lecture. (It is possible that, depending on the further arrangement, the classwork is excluded from the course.)
2. The final examination is implemented as a major component of the evaluation in the course. The final examination is composed of some multiple-choice and/or true-or-false questions. The questions are answered by applying the knowledge covered in the course.
3. All the contents in the course, including the handouts, slides, and talks themselves, are given in English. At the same time, for convenience, the technical terms used in a class are often written on the whiteboard in Chinese.