UNIVERSITY OF SCIENCE AND TECHNOLOGY OF HANOI

English Department

Course syllabus

2. GENERAL INFORMATION OF THE SUBJECT

Course title	:	**INTRODUCTION TO SCIENCE IN ENGLISH**
Semester	:	**Autumn**
Number of Credits	:	**2**
Total hours	:	**48 hours + 8 hours self study**
Each session duration		**2**
Total sessions	:	**24**
Prerequisite	:	**Proficiency level equivalent to 4.5 IELTS**
Teachers in charge	:	

3. COURSE DESCRIPTION

This course is designed for USTH students to learn general sciences in English with themes covering 4 main themes of natural sciences, including math, biology, chemistry, and physics. The course is designed to help students to study English for special purposes at very basic level of language, mainly in terminology, concepts and definitions of scientific phenomena.

Students attending this course will have opportunities to improve active reading skills, listening skills, presentation, discussion, and reflection writing skills.

4. COURSE OBJECTIVES

By the end of the program, students are expected to be able to:

1. Build up fundamental vocabulary related to natural sciences;
2. Able to explain natural phenomena of science in English;
3. Cultivate the interest in science and technology and wish to pursuit it as a career;

5. COURSE STRUCTIRE AND MATERIALS

The course is constituted of 6 modules. Each module is divided into units as follows:

No of themes	Themes	Names of Units
1	**Measurement in Science**	1. Measurement systems
2	**Matter in our Surroundings**	2. Atoms and molecules 3. Chemical Reactions and Equations 4. Chemical Bonding
3	**Moving things**	5. Motion and its Description
4	**Energy**	6. Thermal energy 7. Electrical energy 8. Magnetic Effect of Electric Current 9. Sound and Communication
5	**The Living world**	10. Classification of Living Organisms 11. Building Blocks of Life-Cells and Tissues 12. Heredity
6	**Natural resources**	13. Metals and Non-metals 14. Carbon and its Compounds

Course books:

USTH compiled materials

Supplementary materials

1. Website:
   - http://www.softschools.com/language_arts/reading_comprehension/science/
   - http://www.iflscience.com/
   - https://www.youtube.com/user/AsapSCIENCE/videos
   - https://www.youtube.com/user/DNewsChannel/playlists
   - http://notes.sustainablebrands.com/b0000RQUcUL0RUj7010BafA

2. Glossary of math and chemistry (to be provided bu USTH)

3. Youtube (for listening of the same concepts in the themes learnt in class hours)
4. Others (to be prepared by the teachers)

7. COURSE POLICY

- Students who are absent for 4 sessions onwards will merit an automatic failure.
- No late submission or task completion is accepted, unless otherwise approved by the teacher at least ONE week before the deadline. Late submission will occur in 10% reduction of the allotted grade for each day late.
- Completion of all assignments is required as the condition to sit for the final test

8. METHODOLOGICAL PRINCIPLES

This course employs the following different but complimentary teaching and learning approaches and methods:

- Learner-centered: the course places the learner and learning at the center of all teaching and learning activities. The focus is on vocabulary building and comprehension reading skills while interacting with texts.
- Learner autonomy: learners of the course are expected to be active in class and be able to work well on their own.
- Learning by doing: during the course students will be required to apply what they have learned in various ways.
- Case study: Students will be assigned cases for group/pair-work
- Teamwork: As their cooperation is a pivotal source of learning, learners are expected to cooperate well with their classmates not only in class and self-study time but also in doing pair/ group assessment tasks.

9. ASSESSMENT

Assessment	**Grade allotment**
Attendance	20%

(including mini presentation + Dyadic circle activity)	
Reading portfolio	30%
Final test	50%

A) Portfolio procedure and assessment

- Students will register 3 themes out of 5 science subjects to the teacher at the end of Session 2;
- When the students have registered the themes that they will do extra reading on, they need to be informed that their portfolio is submitted by the end of every theme. For example, after the theme "**Matter in our Surroundings**", those students registering for this theme are required to submit their reading on this theme. Those who do not register for this theme will not have to submit anything, they'll submit their reading by the end of the theme that they have register for.
- The portfolio is collected by the end of every theme.
- Students are encouraged to find extra reading materials of the themes of the lesson learnt in the classroom. The reading length should be at least 2 pages long at minimum, 4 pages long maximum;
- Reading contents: Any theme-related topics are encouraged to be a research for portfolio;
- Teachers will mark the reflection of the portfolio on the band 20;
- Bonus points: Reflection is related to the articles on scientific issues related to contents of the reading. For example, they can reflect the newest study of solution/matters/sustainable development for manufacturing of new materials/chemicals in the world. The maximum bonus points are 10% added up for portfolio for their final marks by the end of the course.

Things to do in portfolio reflections: *Home research activity*

+ Each student can choose 3 out of 5 themes to complete the portfolio;

+ Reading portfolio is done at home;

+ Each reading passage is required to printed out in hard copy; marking the students' interactions with the reading passage by marking the marginal notes. The notes should show their genuine comments. For example, they can make note on the definitions, comparisons of things/concepts/hypothesis/linguistic notes. Students are also encouraged to express opinions and ask questions on specific points made in the text;

+ Paraphrase definitions, hypothesis/concepts in the reading

+ Complete the worksheet (if the reading passage is assigned by the teacher in charge of the subject)

+ If the teacher prepares a required reading passage, he'll deliver the worksheet *(see Appendix 1 for worksheet sample)*

Things to do in the mini presentation: *In class activity*

- Every lesson of the lesson starts with 15 minutes of mini presentation in groups.
- Students sit in groups of 4 to 5 to present briefly on the reading contents of the home reading that they have done a research at home;
- They'll take turn to present on the reading contents
- The presentation can be also be conducted as a round up presentation in front of the whole class if the teacher recommends to.

B) Assessment Criteria for portfolio:

The portfolio should demonstrate:

- ✓ that the materials chosen are relevant to the theme, language level;
- ✓ that the sources are reliable;
- ✓ that the student understands accurately the essential message of the materials they read;
- ✓ that the student can engage and interact with the text, getting themselves familiar with topics they will learn in their specialties latter on in their science study

C) Recommended class activities for progress check

Things to do in the group discussion and mini presentation

- Students who choose the same theme for portfolio reflection will sit in a group to share information and discussion for 15 minutes
- Each group will present the information in 2 minutes about their discussion
- Group topics should be different, no repetition of information

Things to do in Dyadic circle:

(This is a recommended activity only, teachers will decide what will be good for their students)

- Teacher and students prepare a Question Matrix basing on the focus content of the theme *(see appendix 2 for an example of Question matrix)*

- Students will stand/seat in 2 concentric circles, students in the inner circle facing those in the outer. There should be an equal number of students in each circle
- Students will talk about 1 concept, hypothesis, etc. for 1 minute with the one facing them
- After 1 minute, teacher will signal the students of the outer circle move one place so that everyone is now facing a different person
- They now will talk a new dialogue on a similar or different concepts, definition, hypothesis, etc., of the theme.
- This move can be repeated many times
- They can ask and discuss the science matter together
- After about 10 minutes, the teacher and the students will summarize the main things they've discussed from the activity

6. FRAMEWORK FOR INTRODUCTION TO SCIENCE IN ENGLISH

At the beginning of each new session, the students who choose the same themes for portfolio and writing reflection are seated in a group of 3-5 to discuss what they have studied about the theme from (1) the lecture and (2) their home reading.

After that the activities will be ***either*** a presentation of the discussion results in class ***or*** in other groups.

No	Themes	Session	Topics	Objectives	Homework check
1	**Measurement in science**	**1**	**Measurement systems**	• *Introduction about the course: Themes, units and Portfolio* • explain the need of a common system of units; • define and differentiate base and derived SI units; • derive the SI unit of a physical quantity; • Math glossary	
		2	**Measurement systems**	• explain the need of SI prefixes; • correctly write the SI units using the rules for writing the same. • Math glossary	Mini presentation
2	**Matter in our Surroundings**	**3**	**Atoms and molecules**	• distinguish between atoms and molecules; • define isotopic mass, atomic mass, and molecular mass • define the mole concept and molar mass	Mini presentation

				•	
		4	**Atoms and molecules**	• apply the mole concept to chemical reaction and show a quantitative • Math glossary	Mini presentation
		5	**Chemical Reactions and Equations**	• explore the relationship between mole, mass and volume of various • reactants and products; • Math glossary	Mini presentation
		6	**Chemical Reactions and Equations**	• classify chemical reactions as combination, decomposition, displacement • define oxidation and reduction processes (redox reactions) and correlate	Mini presentation
		7	**Chemical Bonding**	• recognize the stability of noble gas configuration and tendency of other • elements to attain this configuration through formation of chemical bonds;	Mini presentation
		8	**Chemical Bonding**	• explain the attainment of stable noble gas electronic configuration through sharing of electrons resulting in the formation of covalent bonds; • describe the formation of single, double and triple bonds and depict these with the help of Lewis-dot method;	Dyadic circle Portfolio 1 submission

3	**Moving things**	**9**	**Motion and its Description**	• explain the concept of motion and distinguish between rest and motion; • describe various types of motion – rectilinear, circular, rotational and oscillatory; • define distance, displacement, speed, average speed, velocity and • acceleration; • describe uniform and uniformly accelerated motion in one dimension;	Mini presentation
		10	**Motion and its Description**	• draw and interpret the distance time graphs and velocity time graphs; • establish relationship among displacement, speed, average speed, velocity and acceleration; • explain the circular motion.	Dyadic circle Portfolio 2 submission
4	**Energy**	**11**	**Thermal energy**	• distinguish between heat and temperature; • describe experiments to show the expansion in solids, liquids, and gases; • describe the construction and working of a laboratory thermometer and a clinical thermometer;	Mini presentation
		12	**Thermal energy**	• state different scales of temperature, viz .fahrenheit, celsius and kelvin;	Mini presentation

	Energy			• relate readings on fahrenheit, celsius, and kelvin scales of temperature and solve numerical problems based on these relationships; • define specific heat and give its SI unit.	
		13	**Electrical energy**	• cite examples of static electricity from everyday life; • identify two kinds of electric charges and describe the Coulomb's law; • define the terms electrostatic potential, and potential difference; • define electric current; • define the unit of electric power and electric energy in commercial use	Mini presentation
		14	**Magnetic Effect Electric Current**	• identify magnets and explain their properties; • explain the concept of magnetic field and state the properties of lines of magnetic force; • infer that when electricity flows through a conductor, magnetic field is produced around it;	Mini presentation
		15	**Magnetic Effect Electric Current**	• explain the force experienced by a current carrying conductor placed in a magnetic field; • describe electromagnetic induction and its importance in different aspects of daily life;	Mini presentation

		16	**Sound and Communication**	• describe the characteristics and nature of the wave; • distinguish different types of waves- the mechanical (sound) and the electromagnetic waves;	Mini presentation
		17	**Sound and Communication**	• describe the need and importance of communication; • identify and appreciate different type of communication systems and • highlight the use of computers and satellites in communication	Dyadic circle Portfolio 3 submission
5	**The Living world**	**18**	**Classification of Living Organisms**	• recognize the vast diversity of living organisms in terms of variety of size and complexity; • explain the meaning of biodiversity; • describe the levels of biodiversity;	Mini presentation
		19	**Classification of Living Organisms**	• appreciate the need for classification of living organisms; • become aware of and take steps towards conserving biodiversity.	Mini presentation
		20	**Building Blocks of Life-Cells and Tissues**	• recognize cell as the structural and fundamental unit of all living organisms and state the cell theory.	Mini presentation
		21	**Heredity**	• define the term heredity and variation; • state pattern of Mendelian inheritance; • describe the location, structure and function of chromosomes	Dyadic circle Portfolio 4 submission

				and genes and briefly explain DNA fingerprinting and its significance; • outline the process of DNA replication;	
6	**Natural resources**	**22**	**Metals and Non-metals**	• differentiate between metals and non-metals on the basis of their physical properties; • describe the reactions of metals with oxygen, water and some common acids and bases;	Mini presentation
		23	**Carbon and its Compounds**	• recognize carbon as a constituent of all living matter and physical world; • appreciate the existence of large number of carbon compounds; • identify various sources of carbon compounds; • explain various allotropes of carbon and compare their properties;	Mini presentation
		24	**Carbon and its Compounds**	• describe the preparation of oxides of carbon and mention their properties; • recognize different functional groups (alcohol, aldehyde, keto, carboxylic acid, halogen, double bond (alkene) and triple bound (alkyne) present in common organic compounds: • appreciate that organic compounds have unique names as per IUPAC nomenclature;	Dyadic circle Portfolio 5 submission

APPENDIX 1

WORKSHEET FOR THE READING COURSE

Student: .....

Class: .....

Reflection: #.....

Reading theme: .....

In this part of the reflection, teacher team will design questions weekly and send the students after the lesson. The questions are based on the contents of the lesson; the question is not limited to what is taught in the classroom.

Each worksheet includes 7-10 questions. Specific questions will be designed by teacher every week, by the end of each session.

Appendix

Sample Worksheet for the English Engineering Course

***Teaching English for Science and Technology: An Approach for Reading with Engineering English* • James W. Porcaro**

Name _____

Einstein and car batteries
[from *The Economist* (Science & technology), January 13, 2011]

Rhetorical elements:
hypothesizing, definition, description, comparison, cause and effect

1. State the **hypothesis** of Dr. Pekka Pyykko and his colleagues.

2. State the **scientific problem** addressed by Dr. Pyykko, generally mentioned in paragraph 3 and expressed in detail in paragraph 5.

3. State the given **physical description** of a lead-acid battery.

4. State the given **definitions** of “electropositive” and “electronegative.”

5. State the given **process description** of the operation of a lead-acid battery.

6. State the given six points of **comparison** of tin and lead.

7. At the start of paragraph 9, “That” **causes** “the **effect** of making metallic lead less electropositive than classical theory indicates it should be.” What does “that” refer to?

State the **cause and effect** process

APPENDIX 2: QUESTION MATRIX EXAMPLE

Question matrix

	Event	Situation	Choice	Person	Reason	Means
Present	What is?	Where/ When is?	Which is?	Who is?	Why is?	How is?
Past	What did?	Where/When did?	Which did?	Who did?	Why did?	How did?
Possibility	What can?	Where/When can?	Which can?	Who can?	Why can?	How can?
Probability	What would?	Where/When would?	Which would?	Who would?	Why would?	How would?
Prediction	What will?	Where/When will?	Which will?	Who will?	Why will?	How will?
Imagination	What might?	Where/When might?	Which might?	Who might?	Why might?	How might?

Some ways in which a question matrix could be used

1. Make dice or spinners to indicate different question beginnings, eg ‘What?’, ‘Which?’, ‘Where/When?’, ‘Who?’, ‘Why?’, ‘How?’.
2. Make dice or spinners based on questions with a particular emphases, eg finding the reason – ‘Why is?’, ‘Why did?’, ‘Why can?’, ‘Why would?’, ‘Why will?’, ‘Why might?’.
3. Give each group their own question matrix chart and instruct members to ask a question using one of the question beginnings, and to then place a counter on that square. The question beginning cannot be used again in the same round, encouraging the formulation of different kinds of questions by the group.