The Hong Kong Polytechnic University

Subject Description Form

Subject Code	ABCT1D20
Subject Title	Science of Happiness
Credit Value	3.0
Level	1
Pre-requisite/ Co-requisite/ Exclusion	NIL
Objectives	This subject aims to introduce the fundamental principles and mechanism about happiness from scientific prospective.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: 1. understand the fundamentals and mechanism of chemicals and biological materials that cause happiness; 2. identify the chemical and biological factors inside our brain and body that accounts for happiness; 3. demonstrate analytical and critical thinking about happiness using scientific approaches; 4. appreciate and enjoy healthy life style – such as positive attitude, relaxation, healthy life habit and regular exercise; 5. appreciate the scientific aspects of happiness in laboratory study; 6. appreciate the importance of lifelong learning, teamwork, and communication skills.
Subject Synopsis/ Indicative Syllabus	Basic principles and fundamentals of chemical and biological factors inside our brain and body leading to happiness will be covered. The function of hormones and chemicals will be introduced in this course. The positive values of healthy life habits and life style, positive attitude, regular exercise will be introduced in this subject. Details of Indicative Syllabus: Part I. Sciences of happiness (a) Understanding the function of hormones that increase positive emotion - "What are happy hormones?" - "How does the body sense happiness?" Explain from scientific aspects - Serotonin: neurotransmitter that carries messages between nerve cells that affect sleep

	- Dopamine: neurotransmitter that can affect mood, memory, motivation, sleep and plays a role as a 'reward centre' and important in sensations of pleasure - Endorphins: hormones related to body pain or stress - Oxytocin: hormone related to reproductive functions and human behaviour including romantic attachment, parent-infant bonding, etc. - Ways to boost "Happy Hormones" - spending time outdoors, in sunlight - regular exercise - laughing - certain food e.g., green tea, chocolate, red wine, etc. - music (b) Chemicals and Mood - Caffeine in coffee and tea - Chocolate chemicals related to happiness - Pyrazine and antioxidants in food - Alcohol e.g., polyphenols in red wine - Psychoactive drugs: many prescription drugs used to treat psychological disorders alter the effects of neurotransmitters e.g., Tranquilizers activate receptors and reduce neurotransmitter's effect - The mechanism of action will be introduced e.g., absorption of chemicals in gut and cross into brain which affect the effect of neurotransmitters (c) Exercise and Mood - exercise can keep us healthy, decrease anxiety and enhance learning, thinking and judgement. - exercise can reduce risk of depression and improve sleeping pattern, reduce neurodegeneration diseases (d) Scientific aspects of drug addiction and abuse -biological perspective: changes in brain's reward system, which is responsible for regulating feelings of pleasure and motivation. -chemically, drugs interact with specific receptors in the brain, altering the transmission of signals between neurons Part II. Laboratory/workshop classes The laboratory/workshop include classes of team building activities, simple physical group/individual exercises as well as students' competition and sharing. After the laboratory/workshop, students are required to investigate the level of happiness by the collection of peers' responses through the use of questionnaire survey and group interview.
Teaching/Learning Methodology	**Lectures:** Scientific basis of chemical and biological factors, which affect happiness, will be introduced and discussed. The scientific principles and mechanism for happiness will be examined.

Guest lecture(s): Subject leaders will invite colleague(s) from SAO to introduce healthy lifestyle and positive attitude to our students.

Tutorials: Students need to perform literature search and participate in in-class discussion on selected topics and their project. In-class tutorial questions will be used to draw students' interest, improve their understanding and to participate in classroom discussion. Group poster/oral presentation or project preparation may be arranged. Finally, logical thinking will be developed using the tutorial questions.

Laboratories: Experiments will be conducted to study happiness and the possible measurement using scientific approaches. Students can acquire basic scientific understanding about happiness for the development of positive lifestyle, analytical thinking as well as critical and creative ideas via experiments and scientific report writing. Students will develop their team cooperation through group practical classes.

Group activities: (1) students are required to work in groups for in-class or out-of-class learning activities; (2) students will be required to prepare a mini project and deliver an oral/poster presentation on selected topics. Through presentation, their higher order thinking, such as problem analysis and solving skills, critical and creative thinking, can be evaluated. Their group effort such as preparation of group presentation and discussion, their critical and creative thinking mind can be solicited and consolidated. During the project preparation, students can apply their lifelong learning skills, analytical skills as well as critical thinking for problem identification, data collection, analysis and interpretation as well as drawing conclusion and recommendation for further action. In this subject, students are required to do extensive reading (on literatures, reference books and scientific reports/websites) and analyse information for possible action formulation via self-study and group discussion. Students will also be required to write individual/group report on their findings for learning consolidation, idea elaboration as well as developing scientific thinking for their future study.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		1	2	3	4	5	6
1. Test	30%	✓	✓	✓			✓
2. Laboratory work	20%	✓	✓	✓	✓	✓	✓
3. Group activities	50%	✓	✓	✓	✓	✓	✓
Total	100 %						

	Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: **Test:** Assess the students' understanding of the basic scientific aspects related to the subject context. The students' higher order thinking, such as analytical and problem-solving skills, critical thinking and creative thinking, will be evaluated. [Outcomes 1, 2, 3 and 6] **Laboratory work:** Student performance during the laboratory classes will be assessed, and their report will be graded. The students' higher order thinking, such as the analytical mind, data collection as well as report writing skill will be assessed and evaluated. Students will develop their teamwork skill during practical classes. [Outcomes 1-6] **Group learning activities, project work and presentation:** Students will be assessed based on their individual performance in group learning activities, presentation skills and prepared content, as well as response to questions raised by subject lecturer(s), peers. The team spirit and individual contribution to the presentation will also be evaluated. [Outcomes 1-6]	
Student Study Effort Expected	Class contact:	
	▪ Lecture	16Hrs.
	▪ Tutorial	12Hrs.
	▪ Laboratory	8 Hrs.
	Other student study effort:	
	▪ Preparation of presentation; laboratory; preparation of reports	40 Hrs.
	▪ Self study (reading on literatures, reference books, textbooks and reports)	50 Hrs.
	Total student study effort	126 Hrs.
Reading List and References	1. Lecture notes and supplementary materials will be given. 2. The How of Happiness: A New Approach to Getting the Life You Want by Sonja Lyubomirsky (2015) Penguin Group USA. 3. Lynn A. Schaefer (2019) The women's brain book: the neuroscience of health, hormones, and happiness, Journal of Women & Aging, 31(4), 361-362. 4. Ladislav Kováč (2012) The biology of happiness Chasing pleasure and human destiny, European Molecular Biology Organization EMBO report, 13(4), 297-302. 5. Turker Bas (2017) Joy.ology: The Chemistry of Happiness, Independently published.	