CURRICULUM

Bachelor of Science Program in Occupational Health and Safety

(Revised Curriculum, 2018)

Department of Occupational Health and Safety
Faculty of Public Health, Mahidol University
Bangkok, Thailand

Details of Curriculum

Bachelor of Science Program in Occupational Health and Safety

(Revised Curriculum, 2018)

Name of Institution	Mahidol University
Campus/Faculty/Department	Faculty of Public Health Department of Occupational Health and Safety

Section 1 – General Information

1. Title of Program

Thai: หลักสูตรวิทยาศาสตรบัณฑิต สาขาวิชาอาชีวอนามัยและความปลอดภัย

English: Bachelor of Science Program in Occupational Health and Safety

2. Title of Degree and Major

Full Title in Thai: วิทยาศาสตรบัณฑิต (อาชีวอนามัยและความปลอดภัย)

Abbreviation in Thai: วท.บ. (อาชีวอนามัยและความปลอดภัย)

Full Title in English: Bachelor of Science in Occupational Health and Safety

Abbreviation in English: B.Sc. (Occupational Health and Safety)

3. Major/Concentration - none -

4. Total Required Credits Minimum of 150 credits

5. Curriculum Characteristics

5.1 Type: Bachelor Degree Program (Technical Degree)

5.2 Duration: 4-year Program

5.3 Language: Thai

5.4 Degree Offered to the Graduates: Single Degree

6. Development of Curriculum

Mahidol University has an ultimate goal to become a world-class university and truly serve as the "wisdom of the land" through four main strategies: 1) Setting obvious goals and focusing on achievements for the betterment of Thai society and the benefit of mankind, 2) Creating new knowledge and the culture of innovation, 3) Modifying the learning process by applying the concept of intellectual education to develop students' internal potential; and 4) Building organizational culture, teamwork and creation of integrated body of knowledge.

Mahidol University was the first university in Thailand to administer a degree program in Occupational Health and Safety. Dated back to 1969, the Faculty of Public Health launched the Bachelor of Science Program in Occupational Health. A few years later, the title of the program was expanded to "Occupational Health and Safety". For almost 50 years of experience in teaching and learning, the curriculum has been gradually developed in response to current health situation and health determinants of workers, such as the expansion of the industrial sector, the advancement of the technology, digitalization, automation, the advent of new production process, the invention of new hazardous chemicals. These may affect workers' health and safety as they can bring about the accidents or new occupational diseases which deviate from the current ones.

The Bachelor of Science Program in Occupational Health and Safety, 2018-2022, has been developed from the framework focusing on Outcome-based Education with the primary goal of all graduates to have the balance in knowledge, well-rounded skills, and specialized competencies to fulfill the needs of employers, business in all sectors, and society. The major program objective is consistent with the University's and Faculty of Public Health's vision, mission, shared core values. This B.Sc. (Occupational Health and Safety) program is the Department of Occupational Health and Safety's crucial product and service that has been recognized and acceptable for a long-standing period of time. The program is regularly revised, updated, evaluated for serving changes and needs of stakeholders (i.e., learners, employers, faculty staff and alumni) and graduates' feedback, and ensuring that all graduates have multidisciplinary knowledge including health, public health, engineering, science, technology, and environment as well as problem-solving skill that go along with the current disruptive situation. In addition, they are competent to be an occupational health and safety professional, to protect workers' health and safety and community at large, as well as practicing morality, ethics, and their career's code of conducts. This curriculum structure was established under the credit system with the minimum total credits of 150 throughout the program, including fieldwork, training, and self-learning. Multiple measures are utilized in classes in order to promote learners' competences and occupational health and safety professional literacy. All core and elective classes foster learners' generic and specialized competences for serving as an occupational health and safety professional.

Section 2 – Philosophy, Program Objectives, and Program–Level Learning Outcomes

1. Philosophy

The Bachelor of Science (B.Sc.) in Occupational Health and Safety Program has been designed based mainly on the competencies to strive for excellence in health, sciences, and innovation in helping protect and maintain the health and safety of all professionals and their community. Besides, the B.Sc. graduates continue their fullest competencies, as an Occupational Health and Safety Officer, cherished with professional ethics and moral values for safer and healthier society. The administration of teaching and learning under this program is designed according to Mahidol University's Educational Philosophy through learning-centered approach, outcome-based education, and constructivism with new knowledge and with experiential learning activities.

In addition, this curriculum has a special emphasis on the development of graduates who have multidisciplinary knowledge in science, public health, engineering, technology, and related social aspects. They are also expected to be self-learners, to blend their knowledge with the work experience from the workplaces to have competency, meeting with professional standards of occupational health and safety, satisfying the learners' need, and the employers.

2. Program Objectives

The program aims to produce graduates who are able to:

1) Acquire knowledge in basic sciences and specific sciences on occupational health, safety and environment at work.
2) Demonstrate practice ability and leadership in profession of the occupational health and safety with morality, ethics and public mind.
3) Perform Innovations in occupational health and safety practices for health and quality of life of professionals.
4) Demonstrate ability to contribute to the team and collaborate with others in a manner of good leadership and followership.
5) Perform ability to communicate knowledge, opinions and recommendations in the field of occupational health, safety and environment at work effectively.

3. Program Learning Outcomes (PLOs)

Upon completion of the program, the graduates are able to:

PLO1 Apply knowledge in sciences, public health and liberal arts, in protecting and promoting the health of professionals in accordance with professional ethics.

PLO2 Identify hazards leading to work-related injuries and diseases in accordance with legal regulatory requirements.

PLO3 Manage risks in relation to health and safety at work appropriately in response to the context of business establishment and community.

PLO4 Control risks in relation to health and safety at work in accordance with standards and legal requirements.

PLO5 Extend the uses of communication and information technology skills to develop occupational health and safety practices appropriately.

PLO6 Cooperate with multidisciplinary professionals to protect and promote the health of workers in accordance with the Code of Professional Conduct.

Section 3 – Educational Management System, Curriculum Structure, Course of the Program and Credits

1. Educational Management System

1.1 System Semester System

1.2 Summer Sessions - No -

1.3 Credit Equivalence Ratio (In Reference to Semester System)

Complies with the Commission on Higher Education Standards' criteria for bachelor's degree program B.E. 2009 and followed the requirements in the regulation of Mahidol University on Undergraduate Study.

1) Theorical Course that consists of 1 hour of lecture or discussion and no less than 15 hours per week and self study 2 hours per week throughout the regular semester is equivalent to 1 credit.
2) Practical Course that requires 2 to 3 hours per week, 30 to 45 hours in total over the regular semester, is equivalent 1 credit.
3) Internship/Field work that requires 3 to 6 hours per week, 45 to 90 hours in total and self-study 1 hour per week or 15 hours in total over the regular semester, is equivalent to 1 credit.

1.4 Academic System

☑ In Class
☐ Distance Learning, mainly through Printed Materials
☐ Distance Learning, mainly through Broadcast Media
☐ Distance Learning, mainly through Electronic Media (e-Learning)
☐ Distance Learning through the Internet
☐ Others (please specify)

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1.5 Credit Transfer and Cross-institutional Enrollment (if any)

- No –

2. Curriculum

2.1 Number of Credits

The required number of credits in total shall not be less than 150 credits.

2.2 Curriculum Structure

The structure of this curriculum is designed in accordance with the Announcement of the Ministry of Education re: Criteria of Standards for Bachelor's Degree Program B.E. 2015.

1) General Education	not less than	**30**	**Credits**
1. Social Sciences and Humanities		9	Credits
2. Languages		15	Credits
3. Basic Sciences and Mathematics		6	Credits
2) Specific Courses	not less than	**114**	**Credits**
1. Applied Sciences & Mathematics		36	Credits
2. Public Health & Environmental Science		30	Credits
3. Occupational Health and Safety		48	Credits
3) Free Electives	not less than	**6**	**Credits**

2.3 Courses in the Program

2.3.1 Course Codes

In line with Mahidol University's format, course codes for the Bachelor of Science Program in Occupational Health and Safety consists of 4 alphabets and 3-digit numbers (displayed as "XXYY zzz"). Credit hours are shown as number in front of the bracket, and total hours for learning experience (Theory – Practice – Self-study) are in the bracket (displayed as "a (b-c-d)". Detailed designation of these codes is explained as follow:

A. Course code consists of 7 characters, divided into 2 parts:

1) The four letters (XXYY), with the following meanings:

– The first two letters is the code of the faculty or institute responsible for the management of teaching and learning of that course, for examples:

มม : MU — Courses administered by Mahidol University, for all faculties

สส : PH — Courses administered by the Faculty of Public Health

วท : SC — Courses administered by the Faculty of Sciences

ศศ : LA — Courses administered by the Faculty of Liberal Arts

– The last two letters is the code of the department or program in charge of that course faculty or institute responsible for the management of teaching and learning of that course, for examples:

ชส : BS — Department of Biostatistics
รบ : EP — Department of Epidemiology
สษ : HE — Department of Health Promotion and Behavior
บส : AD — Department of Public Health Administration
อส : EH — Department of Environmental Health Science
ออ : OH — Department of Occupational Health and Safety

2) The 3-digit numbers (zzz), with the following meanings:

– The first number (z_1) refers to the year of study in which the course is offered.

– The last two numbers (z_2z_3) refer to the order in which the course is offered for that class year of study.

B. Credit hours and total hours of learning experience, divided into 2 parts:

1) Credit hours for each course specified in front of the bracket (a)

2) Total hours for learning experience specified in the bracket: Theory (b) – Practice (c) – Self-study (d)

2.3.2 List of Courses

A. General Education not less than 30 Credits

1) Social Sciences and Humanities (9 credits)

MUGE 101 General Education for Human Development	2 (1-2-3)
MUGE 102 Social Studies for Human Development	3 (2-2-5)
MUGE 103 Arts and Sciences for Human Development	2 (1-2-3)
PHHE 235 Health and Wellness Psychology	2 (2-0-4)

2) Languages (15 credits)

LATH 100 Art of Using Thai Language in Communication	3 (2-2-5)
LAEN 103 English Level I*	3 (2-2-5)
LAEN 104 English Level II*	3 (2-2-5)
LAEN 105 English Level III*	3 (2-2-5)
LAEN 106 English Level IV*	3 (2-2-5)
LAEN 266 English for Health Science	3 (3-0-6)
LAEN 271 Writing for Work and Study	3 (3-0-6)

3) Basic Sciences and Maths (6 credits)

LAFE 144	Critical Thinking and Analysis	3 (3-0-6)
ITCS 155	Computer Applications	3 (2-2-5)

** Two English courses (LAEN 10x, levels I – IV) are required for each student based on the placement test score.*

B. Specific Courses not less than 114 Credits

1) Basic Sciences & Maths (36 credits)

SCAN 101	Basic Anatomy	3 (2-3-5)
SCBI 114	Basic Biology	2 (2-0-4)
SCBI 115	Basic of Life	2 (1-2-3)
SCCH 102	General Chemistry	3 (3-0-6)
SCCH 118	Chemistry Laboratory	1 (0-2-1)
SCCH 128	Organic Chemistry Laboratories	1 (0-3-1)
SCCH 129	Basic Organic Chemistry	3 (3-0-6)
SCPY 159	Elementary Physics for Health Science	3 (3-0-6)
SCPY 110	General Physics Laboratory	1 (0-3-1)
SCPY 155	Basic Physics for Health Science	2 (2-0-4)
SCPY 156	Physics for Health Science	3 (3-0-6)
SCMA 162	Calculus and Introduction to Ordinary Differential Equations	3 (3-0-6)
SCMA 182	Statistics for Health Science	2 (2-0-4)
SCBC 203	Basic Biochemistry	3 (3-0-6)
SCBC 204	Basic Biochemistry Laboratories	1 (0-2-1)
SCPS 202	Basic Physiology	3 (2-3-5)
SCMI 203	Basic Microbiology	3 (2-3-5)
SCAN 211	General Human Anatomy	3 (2-3-5)

2) Public Health & Environmental Health (30 credits)

PHAD 201	Public Health Administration I	3 (3-0-6)
PHOH 201	Introduction to Occupational Health and Safety	3 (3-0-6)
PHEH 202	Environmental Health Science	3 (3-0-6)
PHHE 204	Health Education and Health Behavior	3 (3-0-6)
PHBS 304	Biostatistics II	3 (3-0-6)
PHEP 306	Principles of Epidemiology and Its Application	3 (3-0-6)
PHOH 202	Principles of Occupational and Environmental Health	2 (2-0-4)

PHOH 320	Fundamental of Occupational Medicine and Medical Care	3 (3-0-6)
PHOH 321	Laws and Ethics in Public Health, Occ. Health and Safety	3 (3-0-6)
PHOH 387	Safety Practice in Establishments	3 (0-18-3)
PHOH 461	Occupational Diseases	3 (3-0-6)

3) Occupational Health and Safety (48 credits)

PHOH 311	Principles of Engineering for Occ. Health, Safety, Environment	2 (1-2-3)
PHOH 312	Environmental and Work Physiology	3 (3-0-6)
PHOH 313	Industrial Process and Hazards	2 (2-0-4)
PHOH 314	Industrial Safety Engineering	2 (2-0-4)
PHOH 315	Fluid Mechanics for Industrial Hygiene	2 (1-2-3)
PHOH 316	Fundamental of Industrial Hygiene	3 (3-0-6)
PHOH 317	Industrial Safety	3 (3-0-6)
PHOH 318	Occupational Toxicology	3 (3-0-6)
PHOH 319	Risk Assessments and Management	2 (2-0-4)
PHOH 322	Prevention and Protection of Fire and Chemical Emergency	3 (2-2-5)
PHOH 403	Occupational Health Administration	3 (3-0-6)
PHOH 434	Ergonomics	2 (2-0-4)
PHOH 436	National and International Standard for Quality, Environment, Occupational Safety and Health Management System	2 (2-0-4)
PHOH 439	Air Pollution Control Engineering	3 (3-0-6)
PHOH 444	Industrial Ventilation	3 (3-0-6)
PHOH 446	Industrial Hygiene Sampling and Analysis	3 (2-2-5)
PHOH 447	Industrial Hygiene and Safety Practice	2 (1-2-3)
PHOH 456	Occupational Health and Safety Seminar	2 (1-2-3)
PHOH 489	Professional Field Practice	3(0-18-9)

C. Free Electives not less than 6 Credits

PHOH 407	Industrial Psychology	2 (2-0-4)
PHOH 437	Toxicology Instrumentations	2 (2-0-4)
PHOH 438	Industrial Waste Managements	2 (2-0-4)
PHOH 452	Storage of Hazardous Chemicals	2 (2-0-4)
PHOH 455	Safety at Work	2 (2-0-4)

Upon their interests or as recommended by the academic advisors, students can enroll in various undergraduate level courses offered by Mahidol University.

2.4 Study Plan

Academic year / Subject code / Course*			Credits
1st Year			
1	MUGE 101	General Education for Human Development	2 (1-2-3)
2	MUGE 102	Social Studies for Human Development	3 (2-2-5)
3	MUGE 103	Arts and Sciences for Human Development	2 (1-2-3)
4	LATH 100	Art of Using Thai Language in Communication	3 (2-2-5)
5	LAEN 103-105	English Level 1-3	3 (2-2-5)
6	LAEN 104-106	English Level 2-4	3 (2-2-5)
7	LAFE 144	Critical Thinking and Analysis	3 (3-0-6)
8	ITCS 155	Computer Applications	3 (2-2-5)
9	SCBI 114	Basic Biology	2 (2-0-4)
10	SCBI 115	Basic of Life	2 (1.5-1-3.5)
11	SCCH 102	General Chemistry	3)3-0-6(
12	SCCH 118	Chemistry Laboratory	1 (0-3-1)
13	SCPY 110	General Physics Laboratory I	1 (0-1-5)
14	SCPY 155	Basic Physics for Health Science	2 (2-0-4)
15	SCPY 156	Physics for Health Science	3)3-0-6(
16	SCMA 162	Calculus and Introduction to Ordinary Differential Equations	3 (3-0-6(
2nd Year			
17	LAEN 266	English for Health Science	3 (3-0-6)
18	LAEN 271	Writing for Work and Study	3 (3-0-6)
19	SCAN 101	Basic Anatomy	3)2-2-5(
20	SCCH 128	Organic Chemistry Laboratories	1 (0-3-1)
21	SCCH 129	Basic Organic Chemistry	3)3-0-6(
22	SCMA 182	Statistics for Health Science	2 (2-0-4)
23	SCBC 203	Basic Biochemistry	3 (3-0-6)
24	SCBC 204	Laboratories Experiments in Basic Biochemistry	1 (0-3-1)
25	SCCH 214	Fundamental Analytical Chemistry	2)2-0-4(
26	SCPS 202	Basic Physiology	3)2-3-5(
27	SCMI 203	Basic Microbiology	3 (2-3-5)
28	PHHE 204	Health Education and Health Behavior	3 (3-0-6)
29	PHHE 235	Health and Wellness Psychology	2 (2-0-4)
30	PHAD 201	Public Health Administration I	3 (3-0-6)
31	PHOH 201	Introduction to Occupational Health and Safety	3 (3-0-6)
32	PHEH 202	Environmental Health Science	3 (3-0-6)

Academic year / Subject code / Course*			Credits
3rd Year			
33	PHBS 304	Biostatistics II	3 (3-0-6)
34	PHEP 306	Principles of Epidemiology and Its Application	3 (3-0-6)
35	PHOH 311	Principles of Engineering for Occupational Health Safety and Environment	2)1-2-3(
36	PHOH 312	Environmental and Work Physiology	3)3-0-6(
37	PHOH 313	Industrial Process and Hazards	2)2-0-4(
38	PHOH 314	Industrial Safety Engineering	2)2-0-4(
39	PHOH 315	Fluid Mechanics for Industrial Hygiene	2)1-2-3(
40	PHOH 316	Fundamental of Industrial Hygiene	3)3-0-6(
41	PHOH 317	Industrial Safety	3)3-0-6(
42	PHOH 318	Occupational Toxicology	3)3-0-6(
43	PHOH 319	Risk Assessments and Management	2)2-0-4(
44	PHOH 320	Fundamental of Occupational Medicine and Medical Care	3 (3-0-6)
45	PHOH 321	Laws and Ethics in Public Health Occupational Health and Safety	3 (3-0-6)
46	PHOH 322	Prevention and Protection of Fire and Chemical Emergency	3 (2-2-5)
47	PHOH 387	Safety Practice in the Establishments	3 (0-18-9)
4th Year			
48	PHOH 403	Occupational Health Administrations	3 (3-0-6)
49	PHOH 434	Ergonomics	2)2-0-4(
50	PHOH 436	National and International Standard for Quality, Environment, Occupational Safety and Health Management System	2)2-0-4(
51	PHOH 439	Air Pollution Control Engineering	3)3-0-9(
52	PHOH 444	Industrial Ventilation	3)3-0-6(
53	PHOH 446	Industrial Hygiene Sampling and Analysis	3)2-2-5(
54	PHOH 447	Industrial Hygiene and Safety Practice	2 (1-2-3)
55	PHOH 456	Occupational Health and Safety Seminar	2 (1-2-3)
56	PHOH 461	Occupational Diseases	3 (3-0-6)
57	PHOH 489	Professional Field Practice	3 (0-18-9)
Elective Courses			
3rd & 4th Years			
1	PHOH 407	Industrial Psychology	2)2-0-4(
2	PHOH 437	Toxicology Instrumentations	2)2-0-4(
3	PHOH 438	Industrial Waste Management	2)2-0-4(
4	PHOH 452	Storage of Hazardous Chemicals	2)2-0-4(
5	PHOH 455	Safety at Work	2)2-0-4(

3. Course Description

Year 1 ***Credits (Lecture–Practice–Self-study)***

MUGE 101 General Education for Human Development 2 (1-2-3)

The meaning, significance, and relation of General Education to other vocational / specific subjects; the relation between behavior and mentality; critical thinking; the qualifications of ideal graduates; analysis of causes and consequences of events / situations / problems; synthesis of solutions to, precautions against, or improvements in those events / situations to benefit individuals and their community; and the application of knowledge to solve the problems of case studies.

MUGE 102 Social Study for Human Development 3 (2-2-5)

Basic principles and theory in relation to events / situations / major problems of the Thai and global communities, for example, evolution of civilization; important events in historical, political and public administration systems; the economic and health systems, etc.; analysis of causes and consequences of events / situations / problems; synthesis of solutions to, precautions against, or improvements in those events / situations to benefit individuals and their community; and the application of knowledge to solve the problems of case studies.

MUGE 103 Arts and Sciences for Human Development 2 (1-2-3)

Humankind in the past, present and future; events / situations / problems in relation to the evolution of the arts and sciences in the Thai and global communities; concepts of the sufficiency economy; analysis of causes and consequences of events / situations / problems; synthesis of solutions to, precautions against, or improvements in those events / situations to benefit individuals and their community; and the application of knowledge to solve the problems of case studies.

LATH 100 Art of Using Thai Language in Communication 3 (2-2-5)

Art of using Thai language and of speaking, listening, reading, writing, and thinking skills for accurate and appropriate communication

LAEN 103 English Level I 3 (2-2-5)

English structure, grammar and vocabulary in the context of daily language use, dealing with integration in listening, speaking, reading, and writing skills; reading strategies, sentence writing, listening for the gist, pronunciation and classroom communication

LAEN 104 English Level II 3 (2-2-5)

Vocabulary, expressions, grammar, and contextualized social language; essential communicative skills in small groups; simulations in various situations; writing practice at a paragraph level; and reading and listening from various sources

LAEN 105 English Level III 3 (2-2-5)

Essential strategies for four language skills: reading and listening from various sources, speaking in everyday use and writing at a paragraph level and shot essay, including sub-skills i.e., grammar, pronunciation, and vocabulary; focusing on English in everyday life and in academic reading and issues that enhance students' world knowledge

LAEN 106 English Level IV 3 (2-2-5)

Integrating four English skills by practicing reading news, research articles, commentary, and academic texts, for comprehension and critical thinking, from various sources focusing on the issues that enhance students' world knowledge; listening to news, lecture, and speech via multimedia and the Internet; making conversations in various situations including speaking in public, giving oral presentations and making simulations; and writing essays in various types using citations and references; also practicing sub-skills such as grammar, pronunciation, and vocabulary used in appropriate context

ITFE 144 Critical Thinking and Analysis 3 (3-0-6)

Principles and rules in good reasoning; application of principles and rules in thinking and analytical processes; various forms of expression of thought to avoid mistakes

ITCS 155 Computer Applications 3 (2-2-5)

Evolution and history of computers. Fundamental concepts of computer systems, Computer main components. Operating systems and the usage, Computer networks and interconnection, Internet and its connecting protocols, Structure of web and its language called HTML, Search engines for Internet, E-mail mechanism and its usage, Internet security, Word processing software, Electronic spreadsheet software, Presentation software

SCBI 114 Basic Biology 2 (2-0-4)

Concepts of biology, scientific methods, chemistry of life, cellular biology, cell communication, genetics and DNA technology and its applications, ecology, population genetics, concepts of evolution, human evolution, ecosystem,environmental problems and conservation ecology

SCBI 115 Basic of Life 2 (1-2-3)

Biodiversity; comparative study of reproduction and development in animals; comparative physiology of organ system, receptor and motor system, digestive system, endocrine system, gas exchange and excretory system, circulatory system and immune system and basic biology laboratories

SCCH 102 General Chemistry 3 (3-0-6)

Atomic structure, chemical bonding, gases, liquids, solids, solutions, colloids, chemical thermodynamics, chemical kinetics, chemical equilibria, ionic equilibria, electrochemistry, the present periodic table

SCCH 118 Chemistry Laboratory 1 (0-3-1)

General techniques in chemistry, simple experiment in qualitative and quantitative analysis, some experiments that are related to lectures

SCPY 110 General Physics Laboratory 1 (0-1-5)

Basic Physics experiments relating to Physics curriculums taught to the first year students in each faculty.

SCPY 155 Basic Physics for Health Science 2 (2-0-4)

Mechanics, temperature and heat, fluid, waves, sound and hearing, optics and visualization, basic electromagnetism, atomic physics, nuclear physics and radioactivity.

SCPY 156 Physics for Health Science 3 (3-0-6)

Mechanics; Oscillation motion; system of many particles; motion of rigid bodies, Thermodynamics; Laws of themodynamics; directons of thermodynamic processes; entrobpy, PhysicalOptics; Diffraction; interference; polarization, Electromagnetism; Gauss's law; Biot-Savart's law; Ampere's law; Faraday-Henry's induction; electrical circuits containing capacitors and inductors, Quantummechanics; Black body radiation; photoelectric effect; Comton effect; De Broglie's hypothesis (wave-particle duality); Davission-Germer's experiment; wave function and probability of finding particles; Schrodinger's equation; application of Schrodinger's equation to simple systems, Atomicphysics; Schrodinger's equation for single-electrons atom; possible wave function and energy level fo electrons; quantum numbers; angular momentum; electron spins; electron configurations in atoms; periodic table, Nuclearphysics; structures and properties of nucleus; binding energy; nuclear model; stability of nucleus and decay; nuclear fission; principles of nuclear reactor control; nuclear fusion, Particlephysics; Elementary particles; standard model of elementary particles.

SCMA 162 Calculus and Introduction to Ordinary Differential Equations 3 (3-0-6)

Complex variables, introduction to ordinary differential equations, linear first order differential equation, nonlinear first order differential equations, applications of first order equations, linear second order equations, applications of second order equations, high order linear equations

Year 2 ***Credits (Lecture–Practice–Self-study)***

LAEN 266 English for Health Science 3 (3-0-6)

Study of English terms, sentence structures and expressions used in health science-related professionals; communicative practice in speaking, listening, reading and writing skills

LAEN 271 Writing for Work & Study 3 (3-0-6)

Writing announcement, advertisement, news, report, letters, summary, and short articles from various types of reading listening materials

SCAN 101 Basic Anatomy 3 (2-3-5)

This course covers the basic concept of living cells, organs and systems of human body. The relationship of human structures and functions is emphasized. The human skeleton and cadavers are utilized in the laboratory study.

SCCH 128 Organic Chemistry Laboratories 1 (0-3-1)

Crystallization, melting point determination, distillation, extraction and chromatography, stereochemistry using molecular model, solubility classification, hydrocarbons, alcohols and phenols, aldehydes and ketones, carboxylic acids and their derivatives, amine, classification of functional groups

SCCH 129 Basic Organic Chemistry 3 (3-0-6)

Molecular structure and classification of organic compounds, reactions of organic compounds, nomenclature and stereochemistry, syntheses and reactions of alkanes, cycloalkanes, alkenes, alkynes, aromatic hydrocarbons, halides, alcohols, phenols, ethers, aldehydes, ketones, carboxylic acids, carboxylic acid derivatives, amines

SCMA 182 Statistics for Health Science 2 (2-0-4)

Concepts and applications of probability and probability distributions in various events; interpretation of statistical values; descriptive statistics; sampling for good representatives of populations and its use in estimation and hypothesis testing.

SCBC 203 Basic Biochemistry 3 (3-0-6)

Structures and functions of 4 biomolecules, carbohydrate, lipid, protein and nucleic acid, metabolic processes and regulation of metabolic pathways of 4 biomolecules, flow of genetic information and gene regulation, DNA technology, role of biomolecules in normal physiological systems with some medical applications

SCBC 204 Laboratories Experiments in Basic Biochemistry 1 (0-3-1)

Basic biochemistry laboratory comprise 8 experiments involved in: preparation of acid-base solution and buffering system, using a basic instrument in analysis of biomolecules, determination a physical and chemical properties of all 4 biomolecules and study a metabolic process, that are related to the course Basic Biochemistry (SCBC 203).

SCCH 214 Fundamental Analytical Chemistry 2 (2-0-4)

Introduction to analytical chemistry, preparation of reagents and samples, data evaluation, volumetric analysis, titration, introduction to spectroanalytical chemistry (molecular and atomic absorption, molecular and atomic emission techniques) potentionmetry: emphasized on pH measurement, separation techniques for sample preparation and high performance liquid chromatography.

SCPS 202 Basic Physiology 3 (2-3-5)

The course covers basic concepts and principles of cell functions and the functions of different organ systems such as nervous, muscular, cardiovascular, respiratory, renal, gastrointestinal tract, endocrine and reproductive systems. It also deals with the mechanisms of regulation of organ system integration and adaptations in order to keep the body in a homeostatic state.

SCMI 203 Basic Microbiology 3 (2-3-5)

Structure, biochemical properties, genetics of microorganism such as bacteria, fungi and viruses roles of microorganism in nature, environment, food and industrial pathogenicity immune response against pathogens immune disorders basic techniques to diagnosis

PHAD 201 Public Health Administration I 3 (3-0-6)

Concepts and principles of public health administration; public health system management; health policy and plan; strategic planning; implementing; monitoring & controlling and health evaluating; health resources management; health economics and health insurance

PHHE 204 Health Education and Health Behavior 3 (3-0-6)

Concepts of health education and behavioral science; health literacy; health behavioral process analysis; strategies and methods of health education; health communication in diverse settings anccording to of each health issues

PHHE 235 Health and Wellness Psychology 2 (2-0-4)

Biopsychosocial factors, biomedical factors related to health, wellness, illness, stress and stress management, disease prevention, health promotion, factors of the 21st century lifestyle and risk behaviors related to chronic disease, communicable diseases, the role of psychology to promote health and wellness

PHOH 201 Introduction to Occupational Health and Safety 3 (3-0-6)

Definition, concept and development of occupational health and safety at national and international level, hazard anticipation; evaluation and control of environmental hazard; work-related diseases; accident; regulations and related standards; problem of role and function of various organization concerning with and occupational health and safety at work and total worker health

PHEH 202 Environmental Health Science 3 (3-0-6)

Introduction to environmental health; food sanitation; water supply; wastewater treatment; air pollution control; solid waste and hazardous waste management; excreta treatment; insect and animal vector control; noise and vibration control; building sanitation and recreational areas management; environmental health in emergency and disasters; radiological health and chemical exposure; health and ecological risk assessment

Year 3 ***Credits (Lecture–Practice–Self-study)***

PHBS 304 Biostatistics II 3 (3-0-6)

The meaning of population and sample; parameter and statistics; measurement of central tendency and dispersion; discrete and continuous probability distribution; sampling distribution; parameter estimation; statistical hypothesis testing concerning means variance and proportion; analysis of variance; simple linear regression and correlation

PHEP 306 Principles of Epidemiology and Its Application 3 (3-0-6)

Principles of epidemiology, natural history of disease, principle of disease control, epidemiologic study designs, application of epidemiology in surveillance and outbreak investigation, community diagnosis and prevention and control

PHOH 311 Principles of Engineering for Occ. Health, Safety and Environment 2 (1-2-3)

Basic concepts of various engineering fields, chemical, industrial, mechanic, electric, construction engineering, environmental control of industrial work, control of hazards at the source, path, special technique in control of noise, vibration, dust, light, heat, control of air pollutants in office building, hospitals, practice in inspection of engineering drawing.

PHOH 312 Environmental and Work Physiology 3 (3-0-6)

Mechanisms of human body's work under certain environmental working conditions including physical, mental and social work, capacity and limitation of human's work related to inner and outer body factors, assessment of body healthy, stress, fatigue from working, building concepts of good working conditions, work station design, assessment of efficiency and effectiveness of work station

PHOH 313 Industrial Process and Hazards 2 (2-0-4)

Concepts of building safe factories, selection of factory location, selection of process and manufacturing process of high-risk industrial plants, type of raw materials, chemicals in production process, problem and potential hazards, prevention control concepts

PHOH 314 Industrial Safety Engineering 2 (2-0-4)

Engineering techniques in preventive control of accident, incident, prevention of hazardous working condition, production process, machinery, boiler, pressure vessel, electrical system, building, metal welding, maintenance, material handling, especially type of work defined by safety law

PHOH 315 Fluid Mechanics for Industrial Hygiene 2 (1-2-3)

Fluid mechanics in industrial work, properties of fluids, fluid static, fluid flow, various types of flow in pipe, duct and open channel, dynamic forces of fluid flow, fluid measurement in pipe, duct and open channel, calculation of pump size and duct size, practice in process system drawing

PHOH 316 Fundamental of Industrial Hygiene 3 (3-0-6)

Fundamental concepts of industrial hygiene, components of various working environments especially working environments hazardous to workforce in industries. General principles in recognition, evaluation of problems, principles in preventive control of hazards from working

PHOH 317 Industrial Safety 3 (3-0-6)

Fundamentals of safety at work, causes and nature of accident, incident, evaluation of safety practices, injury records, assessment of frequency and severity of injury, principle of prevention and control of accidents, safety inspection, job safety analysis, safety promotion, personal protective equipment, safety committee, safety program in workplace

PHOH 318 Occupational Toxicology 3 (3-0-6)

Principles of occupational and environmental toxicology, relationship between dose of toxicants and mechanism of body response to toxicants, properties of widely used hazardous toxicants in agricultural and industrial occupations, such as pesticides, heavy metals, gases, solvents, carcinogens, and other air pollutants, prevention method of those toxicants, management of toxicants, storage of toxicants

PHOH 319 Risk Assessments and Management 2 (2-0-4)

Safety protective measure compliance with regulations, production process, activity, location or operational system in industry, hazard identification, risk assessment, severity, review of control measure of existing risks, application principles, safety system in risk management, control and minimization of hazard or risk reduction to international acceptable standards

PHOH 320 Fundamental of Occupational Medicine and Medical Care 3 (3-0-6)

Occupational medicine concepts in occupational health and safety, causes of occupational diseases and work related diseases, body work mechanism under certain hazardous working environment, physical, mental and social health impact, diagnosis of occupational diseases and work related diseases, prevention of diseases, basic medical care, rehabilitation for working, first aids and basic CPR and included aside from there, patient transfer system

PHOH 321 Laws and Ethics in Public Health, Occupational Health and Safety 3 (3-0-6)

Importance, development, application and enforcement of public health law, occupational health safety and environment law, labor protection legislation, factory legislation, public health legislation, other legislations, Ministerial regulation, related ministry announcement, occupational health and safety, law in foreign countries including U.S.A ,Japan and European countries, included professional ethics

PHOH 322 Prevention and Protection of Fire and Chemical Emergency 3 (2-2-5)

Causes and types of fire in industry, fire prevention and control engineering, fire alarm and fire control system in industry, emergency plan, basic fire fighting training, Techniques, procedure of chemical emergency response, serious accident, organization responsible for emergency response, identification of hazards related to emergency, assessment of situation, response strategy and factors, operational access, safe emergency response, chemical protective clothing and level of protection, personnel and equipment decontamination

PHOH 387 Safety Practice in the Establishments 3 (0-18-9)

Application of occupational health and safety administration principles, relevant regulations and standards in order to identify occupational safety hazards, prioritize and develop action plan; project planning, project implementation and monitoring, and project evaluation. This safety practice would be held in the factories where machines, equipment and technologies are utilized to enable production/manufacturing processes as well as maintenance and transportation of goods and raw material by applying hazard identification, risk analysis, risk control technique in real situation

Year 4 ***Credits (Lecture–Practice–Self-study)***

PHOH 403 Occupational Health Administrations 3 (3-0-6)

Application of public health administration principles towards occupational health, safety and environment, law and related regulations, principles in occupational health planning, occupational health services in factories, role and functions of governmental organizations, private sectors, international organization related to occupational health, in occupational health, safety management of occupationists in large, medium and small industries

PHOH 434 Ergonomics 2 (2-0-4)

Fundamental concepts of ergonomics, human working system and working environment, antopometry and working capacity, control equipment in man-machine system, biomechanics, work and work station design, stress, fatigue and mental health at work and psychology at work for safety

PHOH 436 National and International Standard for Quality, Environment, Occupational Safety and Health Management System 2 (2-0-4)

Principle of quality management and international management standard in Thailand and other countries, international standard of quality management (ISO 9000), international standard in environmental management (ISO 14000), British standard in Occupational health and safety (BS 8800) and Thai Industrial Standard (TIS 18001) and health impact assessment

PHOH 439 Air Pollution Control Engineering 3 (3-0-6)

Air pollution, chemical transformation, dispertion in the atmosphere, prevention and control air pollution at source, management and engineering control, air pollution control devices, setting chamber, cyclone, wet scrubber, filter, after burn, electrostatic precipitator and clean technology

PHOH 444 Industrial Ventilation 3 (3-0-6)

Ventilation principles in control and prevention of air pollutants, natural ventilation, general ventilation and local exhaust ventilation, ventilation in building, office, design and calculation of general ventilation system, local exhaust ventilation, ventilation system components, hood, duct, fan, cleaning system of air pollutants, ventilation system testing

PHOH 446 Industrial Hygiene Sampling and Analysis 3 (2-2-5)

Principle and method of working environment evaluation, e.g. heat, cold, light, noise, radiation, pressure, vibration, workplace air pollutants monitoring both personal and area sampling of vapor/gas and particulates, stack sampling, principles of sample analysis, data analysis and interpretation, health risk assessment

PHOH 447 Industrial Hygiene and Safety Practice 2 (1-2-3)

Apply concepts and theory of industrial hygiene, Law, Practice industrial hygiene work in industry, Sampling strategic plan, work plan, walkthrough survey, environmental measurement, evaluation of hazards, data analysis and interpretation, writing report including results and control measure and presentation

PHOH 456 Occupational Health and Safety Seminar 2 (2-0-4)

Discussion of problems in occupational health and safety, searching, problems solving, integrated approach in prevention, considered decision, constructed opinion, listening to other opinions, practice in reading article related to occupational health and safety and oral presentation

PHOH 461 Occupational Diseases 3 (3-0-6)

Occupational disease, occupational related disease; infectious disease, non-communicable diseases, hypertension, diabetes mellitus, accidents and injuries, adverse effect to physical and psychological health, prevention and control of occupational disease and occupational related disease by integrating knowledge of occupational health, health risk assessment, epidemiology in industrial work, Immunization

PHOH 489 Professional Field Practice 3 (0-18-9)

Practice in industries, to acquire knowledge and increase experience, coordination, working with community and individual problem solving, presentation of result, project handling and project assessment

Elective Courses for Year 3/4 ***Credits (Lecture–Practice–Self-study)***

PHOH 407 Industrial Psychology 2 (2-0-4)

Principles of general psychology, psychological application in industrial sectors, social and environment factor affecting physical, psychological health of workers, prevention and control unsafe work behavior and practice, teaching and training technique, worker's encouragement and good relationships among safety officer, employer and employees

PHOH 437 Toxicology Instrumentations 2 (2-0-4)

Theories of instruments used for analysis of toxic substances in air, water, soil, toxic substances in biological samples such as blood and urine, extraction of toxic substances from various sources and study of analysis method according to the principles of NIOSH and EPA. The major instrument used in this course, spectrophotometer, gas chromatograph, atomic absorption spectrophotometer and gas chromatograph-mass spectrometer

PHOH 438 Industrial Waste Managements 2 (2-0-4)

The categories and characteristics of industrial wastes, health effects and environmental impact, industrial waste management, waste reduction at source of generation, storage, collection, transportation, treatment and safe disposal, related regulation

PHOH 452 Storage of Hazardous Chemicals 2 (2-0-4)

Comprehensive knowledge of material safety data sheet, regulation related to hazardous chemicals, types and storage classification of hazardous chemicals, hazardous chemicals storage building characteristics and control measures, storage method of hazardous chemicals in buildings and outside, additional requirement and report of safety storage of hazardous chemicals

PHOH 456 Safety at Work 2 (2-0-4)

Safety at work, safety in high risk industry, manufacturing, transportation, mining high dangerous activities, working in confined space, working at height, diving, radiation, dust explosion