National Taiwan University College of Public Health: Courses taught in English

	Curriculum Number	Course Name	Credit	Semester	Institute/Program
1	EOHS7044	International Environmental and Occupational Health	2	Fall	Inst. of Environmental & Occupational Health Sciences
2	EPM5002	Computing in Epidemiology and Biostatistics	2	Fall	Inst. of Epidemiology & Preventive Medicine
3	HBCS7024	Use of English for Academic Purposes and Professional Development	1	Fall	Design and Analysis of Public Health Research and Practice
4	HPM7099	Globalization and Social Determinants of Health	2	Fall	Inst. of Health Policy & Management
5	MGH5007	Principles of Health Economics	2	Fall	Global Health Program
6	MGH7002	Introduction to Global Health Science	4	Fall	Global Health Program
7	MGH7009	Essentials and Practices of Exposure Assessment	2	Fall	Global Health Program
8	MGH7029	Principles of Biostatistics and Epidemiology	4	Fall	Global Health Program
9	MGH7032	COVID-19 Pandemic: Science, Response and Future Prospects	2	Fall	Global Health Program
10	MGH7041	Global Health Law and Ethics	2	Fall	Global Health Program
11	MGH7043	Global Mental Health and Suicide Prevention and Practices in the Community	1	Fall	Global Health Program
12	EOHS5010	Exposure and Dose Metrics for Environmental and Occupational Epidemiology	2	Spring	Inst. of Environmental & Occupational Health Sciences
13	EOHS7009	Environmental and Occupational Health	3	Spring	Inst. of Environmental & Occupational Health Sciences
14	EPM5025	Introduction to Meta-analysis	1	Spring	Inst. of Epidemiology & Preventive Medicine
15	EPM7001	Structural Equation Modeling	2	Spring	Inst. of Epidemiology & Preventive Medicine
16	MGH5001	Measuring Burden of Disease: Methods and Applications	2	Spring	Global Health Program
17	MGH7011	Cultural Competence in Global Health: Perspectives and Practices	2	Spring	Global Health Program
18	MGH7030	Principle and Application in Health Research Methods	3	Spring	Global Health Program
19	MGH7034	Contemporary Issues in Global Health	3	Spring	Global Health Program
20	MGH7038	Practical Guide for Analysis of Infectious Disease Outbreaks	1	Spring	Global Health Program

NTUCPH Courses in English: Descriptions and Objectives

International Environmental and Occupational Health (EOHS7044)

Course Description: This course includes presenters of Taiwan, Japan, Thailand, and Brunei, to provide understanding of international perspectives of environmental and occupational health.

Course Objective: For the students to understand international perspectives of environmental and occupational health, and to interact with international teachers and students.

Computing in Epidemiology and Biostatistics (EPM5002)

Course Description: In most Biostatistics courses, lecturers usually introduce theoretical models, and then use statistical software (such as SAS and R) to analyze the data. However, there is a black box between these two parts. To fill in this gap, we will teach the numerical computation process involved in statistical models. Students will learn matrix operations, numerical analyses, Monte-Carlo simulations, etc. We will teach how to construct a log-likelihood function according to a statistical distribution, how to obtain maximum likelihood estimates for a logistic regression and a Poisson regression, how to build exact confidence intervals, and how to design Monte-Carlo simulations for a research topic, etc.

Course Objective: This course aims at inspiring students' interests in numerical computation regarding epidemiology and biostatistics and cultivating students' critical thinking and logic in programming. This course is expected to facilitate students' research in biostatistics, epidemiology, or quantitative related fields. It will also build students' deeper understanding of quantitative epidemiology and biostatistics.

Use of English for Academic Purposes and Professional Development (HBCS7024)

Course Description: This course will help to prepare students for presenting or applying for positions in English speaking settings and conference/publication outlets in the fields of social and behavioral sciences and other related professional disciplines.

Course Objective: Students will obtain practical skills regarding how to submit their work in English for publication or presentation consideration. Course participants will also obtain feedback regarding how to write professional correspondences (e.g., cover letter and emails) and CVs and have a chance to practice job interview skills in English. The course will end with feedback on students' professional presentations. The course will have a focus on skills particularly useful for those who are interested in becoming a professional in social and behavioral sciences, but the skills will be relevant for other related fields too.

Globalization and Social Determinants of Health (HPM7099)

Course Description: In this course we examine how globalization affects various types of social determinants of health and health inequalities, which in turn influence individual's health and population health. The course emphasizes the social and policy aspects of health issues. We begin with an introduction to the framework of social determinants of health, typology of policy level interventions to tackle health inequalities and methodological issues. Following that, selected topics will be addressed from a social determinant of health perspective, including health care arrangements, employment and working conditions, gender, minority status, stigma, etc. We will review the state-of-the-art knowledge

and discuss potential policy interventions to promote health equity both on the domestic and international levels.

Course Objective: At the end of the course the students are expected to:

1. Understand the key concepts of social determinants of health;
2. Comprehend the consequences of globalization on social determinants of health and health inequalities;
3. Propose and analyze the different types of health policies to tackle health inequalities.

Principles of Health Economics (MGH5007)

Course Description: This is a master-level, introductory course in Health Economics that is also open to qualified undergraduate students in other fields with basic knowledge in public health and

health services research. The emphasis will be on acquiring a set of different frameworks within which to explain decision-making and service delivery in the healthcare market. In this course, we will cover both demand and supply sides of the healthcare sector. We will also cover basic concepts of program evaluation that use economics or quantitative methods.

Course Objective: The objectives of this course are (1) to develop an understanding of related economic concepts and frameworks related to decision-making in health care sector (demand side),(2) to describe the system of health care financing and delivery arrangements in the healthcare sector (supply side), and (3) to discuss current health care issues within health economics framework).

Introduction to Global Health Science (MGH7002)

Course Description: The aim of this course is to introduce contemporary issues in global health science. This introductory course will cover a broad range of issues in global health, including the measurement of global burden of disease, globalization and health, social determinants of health, planetary health, and health system reform. The course will be conducted through lectures, in class discussion, individual based homework, and group-based projects.

Course Objective:

1. To describe the global burden of disease and risk factors
2. To understand the key drivers of population health across geographies
3. To understand the major interventions in global health and the challenge of resource allocation

Essentials and Practices of Exposure Assessment (MGH7009)

Course Description: This course integrates both concepts and hands-on practices in environmental health studies, and it is designed into three learning stages. In Part I, students will be introduced to the purposes and processes of conducting environmental exposure assessment, including the use of available sampling tools to gather data for exposure monitoring. In Part II, special topics in water and air quality are used as case studies, along with hands-on experiments to analyze collected environmental samples. Students will also learn to conduct data analysis and interpret the results. Building on

the previous two stages, Part III requires that students carry out exposure assessment in a field case study and present their findings.

Course Objective:

1. Familiarize students with basic concepts in environmental exposure assessment.
2. Develop skills in study design, environmental sampling, data analysis and interpretation, through lecture-based case study and hands-on experiments in water and air quality studies.
3. Integrate the aforementioned knowledge and skills to independently conduct exposure assessment on selected topic(s) and pollutant(s) in the field.

Principles of Biostatistics and Epidemiology (MGH7029)

Course Description: The aim of this course is to introduce concepts of health-related study design, data collection, and statistical analysis commonly used with practical sessions involved. This course includes three parts: The first part is "epidemiologic study design", in which an introduction about principle of study design, causal inference, and concepts of fair comparisons in science will be given. The second part is "analytical method", which will provide an introduction of fundamental statistical methods used to extract hidden information in data. The third part is "practical sessions" closely followed by the on-going lectures for better understanding of the contents. Real-life examples from each aspect of global health research topics and latest literature are illustrated in the course. For sessions of data analyses, example datasets are offered to students for performing statistical analyses by R, a well-known freeware for statistical analysis.

Course Objective: In the end of this semester, students should have the following core knowledge and competencies:

1. To understand the principle of statistical and causal inference.
2. To explain how random variation and bias affect public health research findings.
3. To understand the principles of epidemiologic study design in experimental and observational studies.
4. To critically appraise public health literature in terms of validity and applicability.
5. To analyze health datasets with appropriate statistical methods, to implement statistical software, and to explain the analysis results correctly.

COVID-19 Pandemic: Science, Response and Future Prospects (MGH7032)

Course Description: This class aims to provide interdisciplinary knowledge around COVID-19, the most impactful new emerging infectious disease in the past century. Knowledge on clinical, epidemiological, and social elements of the novel coronavirus will be shared. Key concepts, trends, and analytical tools designed to facilitate public health communication and crisis management will be provided. The course will be conducted through lectures, discussions, and group work.

Course Objective: By the end of the class, attendees should be able to:

1. Describe and understand the current developments related to COVID-19, including its virology, epidemiology, impact on mental health and vaccine efforts.
2. Discuss societal challenges raised by COVID-19 and opportunities to address them; as well as developing a communication and crisis management plan in response to infectious diseases.

Global Health Law and Ethics (MGH7041)

Course Description: Health issues are highly politicized (domestically and diplomatically), and health governance has been complicated by involving diverse actors who have different agendas and approaches. In this course, we will thus consider the questions: How 'global' is global health? What are its normative implications? Therefore, this course explores the role of law and ethics in the governance over global public health, which includes but is not limited to the work of related multilateral institutions, policy implementations, research activities, and political processes.

The course is divided into two parts. In the first nine weeks (Part I), we will look at the normative dimension of global health, particularly reflecting on the contestation and application of core concepts, theories, and analytical frameworks. As follows (Part II), we will turn to its empirical dimension, in order to identify the legal and ethical accounts of different global health issues.

Course Objective: This course aims to equip students to be able to:

1. Describe the definitions of and relationships between the essential concepts of global health, global health ethics, global health law, health equity, and global justice;
2. Identify the major ethical and legal issues that are implicitly embedded in the practices in the field of global health;
3. Identify the ethical principles and legal frameworks that underpin a specific global health policy;
4. Evaluate the quality of the argumentation of ethical and legal debates; and
5. Provide ethical justifications for global health laws and policies.

Global Mental Health and Suicide Prevention and Practices in the Community (MGH7043)

Course Description: The course is aimed to introduce important concepts and frameworks of mental health and suicide prevention in global settings. It will provide the students an opportunity to understand critical issues in mental health, mental illness, suicidal behavior, and suicide prevention, with a focus on major differences in settings with low and high levels of resources and their implications for prevention and intervention. Emphasis will be put on public health, population-based, life course, and social ecological perspectives to address the substantial global health burden from mental disorders and suicidal behavior.

The content of this course will be separated into five parts. First, the students will learn from selective readings such as peer-reviewed journal articles, book chapters, or other references on various issues of global mental health, wellbeing, and suicide prevention before the course. Second, the course will introduce the aspects of global mental health such as historical perspectives, current situations, determinants, and existing promotion / prevention / intervention strategies on population mental health, mental disorders, and suicidal behavior thru classroom-based lectures and activities. Third, the students will attend the two talks on global mental health and suicide prevention given by the two overseas instructors in the global mental health section of the 2019 Taiwan Global Health Forum in Taipei on Oct 20. Fourth, the course will describe context-specific issues around mental health and suicidal prevention through classroom-based lectures and activities. Fifth, students will have an opportunity to immerse themselves in different hospital and community-based settings where mental disorders are treated and suicide prevention efforts are made thru field trips to department of

psychiatry in general hospital, psychiatric hospital, psychiatric clinic, community family support group, and helpline organization.

Course Objective: Students in this class are expected to:

1. To correctly describe the current global situation and major determinants of mental disorders and suicidal behaviors.
2. To apply the population-based, life course, and social ecological perspectives to appraise contemporary issues of mental health and suicide prevention at the individual and community levels.
3. Learn the historical foundations of contemporary Taiwanese and Chinese psycho-social-political cultures, with a focus on the perspectives, presentations, and need for mental health.
4. Learn the current state of knowledge in Taiwanese and Chinese psychological practice.
5. Examine personal attitudes, experiences, and beliefs as they relate to the component and ethical delivery of mental health services to Taiwanese and Chinese populations.
6. Learn the potentials and principles of applying knowledge and skills in the area of mental health in a culturally, socially, and politically sensitive way to promote mental health in global health settings, including but not restricted to Taiwanese and Chinese communities.

Exposure and Dose Metrics for Environmental and Occupational Epidemiology (EOHS5010)

Course Description: Hazardous exposures are usually complex extended temporal processes leading to the development of biological responses, “damage/adverse responses/health effects”. A study intended to determine the quantitative relationship between exposure and risk of the effect requires a careful matching of the temporal variation in exposure with the kinetics of uptake, distribution and metabolism and matching those to the dynamics of response. However, bias and attenuation of the health risk estimate can be introduced when there is exposure error in air pollution measurement. Adequate exposure metrics may provide a means of reducing error (leading to less bias and uncertainty in health risk estimates) if they capture variability in exposure, which depends on the study design, health outcome, and pollutant of interest.

To enable this, the course will start from a review of the basic components of exposure assessment for air pollution and subsequently introduce exposure metrics for four types of health outcomes: different combination of reversible/irreversible and discrete/proportional outcomes. Students will develop knowledge of exposure determinants and its temporal behavior (variability), in conjunction with skills for modeling temporal behavior of exposures and outcomes through simulations using excel spreadsheets. Guided critical analysis of publications will be performed, and information from simulations will be used to design an exposure assessment matched to the biology of the adverse effect(s). In the finals, the class will culminate with a design project where small groups of students design a new study of a specific exposure and hypothesized effect(s) reported in a previously critiqued scientific paper.

Course Objective: Not available

Environmental and Occupational Health (EOHS7009)

Course Description: Introducing the core knowledge of environmental and occupational health. Enlightening the students to understand real-world application through group projects.

Course Objective: To understand environmental factors affecting human health. Students should be able to summarize and interpret variables and indicators commonly used in the field of environmental and occupational health.

Introduction to Meta-analysis (EPM5025)

Course Description: This course will introduce students to the principles and key statistical concepts in conducting a meta-analysis quantitative review of randomized controlled trials and observational studies. The course will be structured by the critical steps in conducting a meta-analysis, with particular emphasis on common pitfalls when doing such an analysis. The course consists of lectures and computer labs using R language for meta-analysis.

Course Objective: The goal of the course is to provide the students with a general framework for conducting a meta-analysis. At the end of the course, the students are expected to be able to read and critically appraise the literature of meta-analysis and to conduct basic meta-analysis.

After this course, students should learn how to:

1. Conduct a meta-analysis of continuous and binary data
2. Conduct network meta-analysis for multiple treatment comparisons
3. Conduct meta-analysis of diagnostic test accuracy
4. Assess the publication bias and explore other potential biases

Structural Equation Modeling (EPM7001)

Course Description: The aim of this course is to provide a general introduction to path analysis, factor analysis, structural equation modeling and multilevel analysis. The examples and data are extensively drawn from literature in health and medical sciences. Students will learn how to use Mplus and Lisrel software to undertake these analyses. After attending the course, students should be able to describe the relationship between commonly used statistical methods and structural equation modeling (SEM); define the statistical concepts behind factor analysis, path analysis, and structural equation modeling; understand the relation between SEM and multilevel modeling (MLM); explain the above statistical methods and properly interpret their results; and use a computer software package to undertake the statistical analyses and correctly specify the statistical models. SEM has been very popular among quantitative social scientists in the last two decades and has started to draw attention from epidemiologists.

SEM is a very useful tool for testing causal models, and learning SEM theory is very helpful for students to understand the causal assumptions behind different models. SEM is also useful for explaining the concepts of confounding, mediation, and moderation in epidemiological research. The course will start with basic concepts of SEM, such as model specification, fitness testing, interpretation of causality and model modification. Then, more advanced topics will be introduced, such as equivalence models, identification issues, and multiple groups testing. MLM will then be introduced for the analysis of clustered data, where random effects may be viewed as latent variables. Students will be assessed by their participation in the classroom discussion, one interim and one final report on the critical appraisal of literature and real data analysis.

Course Objective: By the end of this course, students should be able to:

1. Describe the relations between general linear models and structural equation models
2. Explain the statistical theory of principal component analysis, exploratory and confirmatory factor analysis, path analysis and structural equation models
3. Understand the concepts and rationales of causal models within the framework of structural equation models
4. Understand the concept of mediation and the decomposition of total effects into direct and indirect effects
5. Undertake structural equation modeling using statistical software packages and interpret the results properly
6. Report the results from structural equation modeling properly

Measuring Burden of Disease: Methods and Applications (MGH5001)

Course Description: Not available

Course Objective: Not available

Cultural Competence in Global Health: Perspectives and Practices (MGH7011)

Course Description: The course will use indigenous health as an example to illustrate the importance of cultural competence on global health issues. Cultural competence is a critical element of cultural safety, which also encompasses notions such as cultural awareness and cultural sensitivity. Cultural safety – defined as including a strategic and intensely practical plan to change the way healthcare is delivered to indigenous peoples – has been adopted for new approaches to healthcare and community healing by the healthcare providers who are working in indigenous community, through recognizing the contemporary conditions of indigenous peoples which result from their post-contact history.

A specific attention is given to how colonialism affects indigenous health and well-beings. Basing upon the concept of cultural safety, this course will explore several indigenous health issues, including indigenous health inequalities, indigenous cultural safety, social determinants of indigenous health, indigenous ethnomedicine, indigenous mental health, indigenous eco-health, indigenous health promotion, and indigenous long-term care. In addition to lectures, fieldtrips will be arranged to visit government institutions, indigenous hospital, and indigenous communities for enhancing students' understandings to the relationship between cultural safety and indigenous health from the global health perspective.

Course Objective: Objectives of this course are to help students:

1. Promote the praxis of considering perspectives of other professionals and persons from other cultures or contexts;
2. Employ self-reflection to evaluate beliefs, values, emotions, and implicit assumptions that are embedded in one's approach to identifying and solving problems;
3. Understand population health in the context of multiculturalism, impacts of health inequality to different social groups; and
4. Develop better cultural awareness and sensitivity with respect to global health policymaking and interventions.

Principle and Application in Health Research Methods (MGH7030)

Course Description: The module will be delivered over one semester, as a blend of small group work and lectures, practical exercises, group project and presentation, and in-class discussion of reading tasks.

Course Objective: The aim of this course is to introduce concepts of study design, literature review, data collection and analysis, and evidence synthesis commonly used in public health and related social research, with a strong focus on their application to global health study.

Contemporary Issues in Global Health (MGH7034)

Course Description: This course is designed for undergrad and grad students majoring in or have an interest in global health. This course will provide students with information regarding the latest global health issues, and ways of working together to improve global health. In addition to lectures, we will also invite speakers from international NGOs located in southeast Asia and Africa, providing first-hand experience of working in global health.

Course Objective: To ensure educated university graduates understand contemporary issues global health and their impact on our lives and world.

Practical Guide for Analysis of Infectious Disease Outbreaks (MGH7038)

Course Description: We begin with understanding of the disease occurrence and continue on finding such important epidemiologic characteristics as a time-varied reproduction number. The course will mainly be based on explaining two methods for finding the reproduction number: Wallinga-Teunis method and Cori et al. method. Additionally, the use of some freely accessible R packages will be demonstrated.

Course Objective: The aim of the course is to give practical guide for students to perform first steps analyzing the epidemiological data, especially to estimate the strength of spread of infectious diseases with particular focus on the spread of COVID-19.