國立臺灣大學課程綱要格式範例

Course Syllabus Form, National Taiwan University

課程資訊 Course Information					
課程名稱 Course title	中文名稱：全球衛生資訊處理實務 英文名稱：Introduction to Data Processing in Global Health Practice				
課程編號 Curriculum Number	MGH7023	班次 Class		學分數 Credits	1
全/半年 Full/Half Yr.	半 Half Year			必/選修 Required/Elective	選修 Elective
授課教師 Instructor	半 Half Year			開課系所 Designated for	全球衛生學程 GHP
上課時間 Time	星期四 Thursday 8,9,10 15:30-18:20			上課地點 Venue	公衛大樓 R214 R214, CPH
備註 Remarks	本課程以英語授課。全球衛生碩士學位學程優先選修。外系與公衛系學生亦可選修。總人數上限 20 人。 It is a six-week intensive course offered in English. Priority is given to students from the master's program in global health. However, students from college of public health or other departments are also welcome. The maximum capacity is 20 students.				
課程大綱（中/英文）**Course Syllabus**					
為確保您我的權利,請尊重智慧財產權及不得非法影印 Please respect the intellectual property rights of others and do not copy any of the course information without permission					
課程概述 Course Description	This course will introduce students to a range of practical tools that can be applied to handle data, especially in the field of global health. No prior knowledge or experience is needed to take up this course. We will start from the basics. The course is structured in three sections covering the process of data capture, basic data cleaning and manipulation, and, finally, communication of data through visualizations or infographics. (1) **REDCap data collection:** This part of the course will introduce Research Electronic Data Capture (REDCap), an electronic data capture (EDC) solution which has been widely used by the international research community. These sessions will cover the process of creating a REDCap project, designing the data collection instrument, data management features in REDCap, enabling online surveys, project				

	testing, real-time data collection, and usage of the REDCap mobile app on mobile phones or tablets. Sessions will involve lectures followed by demonstrations, interspersed with exercises to provide students with hands-on experience. (2) **Data cleaning and manipulation in R:** This part of the course aims to give a general introduction to R, an open-source programming language for data analysis and statistics. No prior knowledge of coding is needed. These sessions will provide an overview of basic features and fundamental concepts in R. Students will be taught the basics of reading, cleaning, and manipulating datasets. During the sessions, we will discuss common types of messy data and ways to tidy them. These discussions will include small exercises in writing R code and preparing data for analysis. Messy datasets will be provided for practice purposes. (3) **Data visualization and infographics:** This section will cover the principles of and various approaches to data visualization, as well as key steps in building an effective and eye-catching visual. Students will learn ways to translate data into easily digestible information for various audiences. We will introduce a couple of tools/resources that students can use for data visualization purposes. 本課程旨在向學生介紹一系列可用於全球衛生領域相關的處理數據處理的實用工具。 學習本課程不需要具備任何數據處理經驗，我們將從基礎開始。本課程分為三個部分，涵蓋數據搜集過程、基礎數據清理和操作，最終將數據視覺化。 (1) REDCap 數據採集：這部分課程將介紹 REDCap 的使用。REDCap 是一被國際研究界廣泛使用的電子數據採集（EDC）工具。課程將會講解如何建立一個 REDCap project、設計數據收集工具、REDCap 中的數據管理功能、測試工具、最後實際使用手機或平板進行數據。課程中會穿插練習時間，為學生提供實踐經驗。 (2) R 中的數據清理和操作：這部分課程旨在介紹 R 軟體在數據整理上的應用。修習本課程不需要編碼方面的知識。我們將從 R 中的基本功能和概念開始介紹。學生將學習閱讀、清理和操作數據集的基礎知識。課程中，我們將討論常見的雜亂數據類型以及整理它們的方法。課程中會穿插編寫 R 代碼和準備分析數據的小練習。 (3) 數據視覺化：本節將介紹數據視覺話的原理和各種方法，以及構建有效且引人注目的視覺效果的關鍵步驟。學生將學習如何將數據轉化為各種受眾易於理解的信息。我們將介紹一些學生可以用於數據可視化目的的工具/資源。

課程目標 Course Objective	Upon completion of the course, students should be able to: • have a baseline competency in REDCap (D17-3, GH-2, DGH-3) • create and design a data collection form or case reporting form in REDCap (D17-3, GH-2, DGH-3) • perform data entry online using the web-based tool and offline using the REDCap mobile app (D17-3, GH-2, DGH-3) • set up surveys and perform data quality checks in REDCap (D17-3, GH-2, DGH-3) • understand how to use REDCap for different study designs (e.g. cross-sectional, longitudinal etc.) (D17-3, GH-2, DGH-3) • design, use, and maintain a custom-made redcap database for research studies (D17-3, GH-2, DGH-3) • manage basic data types in R calculations (D17-3, DGH-3) • conduct basic computation with matrices and data frames in R (D17-3, DGH-3) • identify and tidy messy data to prepare for analysis using R (D17-3, DGH-3) • understand the importance of data visualization as a communication strategy (D17-3, DGH-3) • understand the principles and key elements that make up an effective visual (D17-3, DGH-3) • understand the tools and resources available to visualize data (D17-3, DGH-3)
課程要求 Course Requirement	The slides of each lecture will be available on the course for students to download. Students should attend classes and submit assignments on time.
關鍵字 Keywords	Data collection, Data analysis, REDCap, Global Health, Data visualization
Office Hours	By appointment
指定閱讀 Designated reading	無
參考書目 References	1. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. (2009) Research electronic data capture (REDCap) – A metadata-driven methodology and workflow process for providing translational research informatics support, J Biomed Inform. (http://www.sciencedirect.com/science/article/pii/S1532046408001226) 2. Tippmann, S. (2014). Programming tools: Adventures with R. Nature, 517(7532), pp.109-110. (http://www.nature.com/polopoly_fs/1.16609!/menu/main/topColumns/topLeftColumn/pdf/517109a.pdf) 3. Venables, W.N. (2018). An Introduction to R: Notes on R: A Programming Environment for Data Analysis and Graphics (https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf) Wickham, H. (2017). R for Data Science: Import, Tidy, Transform,

	Visualize, and Model Data (http://r4ds.had.co.nz/index.html)
評量方式 Grading	<table><tr><th>No.</th><th>項目</th><th>百分比</th><th>說明</th></tr><tr><td>1.</td><td>Participation</td><td>40%</td><td>Attending classes on time is needed. Active participation of in-class discussion is encouraged. Following the taught lectures, students will be given tasks to complete.</td></tr><tr><td>2.</td><td>Assignment 1</td><td>30%</td><td>Creating a data collection instrument using REDCap.</td></tr><tr><td>3.</td><td>Assignment 2</td><td>30%</td><td>Tidying up messy data with R.</td></tr></table> D17-3 Explain the role of quantitative and qualitative methods and sciences in describing and assessing a population's health • During the lecture, we will discuss the design of quantitative questionnaires using an electronic data capture solution. Students are required to complete small tasks assigned during the class. They will receive immediate feedback from the instructors. • In assignment 2, students will be asked to process quantitative data using R. They will be evaluated by their understanding of different data types in quantitative methods. GH-2 Apply ethical approaches in global health research and practice • During the lecture, we will discuss important ethical issues that need to be considered when carrying out research and planning data collection in fields. Students will learn the 18 HIPAA PHI Identifiers and the de-identification options in REDCap. • In assignment 1, students will be evaluated whether they take ethical issues into consideration when designing their data collection instrument. DGH-3 Design, implement, and evaluate theory-informed and evidence-based research programs in an academia or practice setting • The lecture puts emphasis on the principles and essential steps to design a data collection instrument. Students will learn ways to design a data

	collection tool that collects quality data. They will also learn key steps to implement data collection in fields. The lecture will equip students with skills to carry out research programs in an academia or practice setting. • In assignment 1, students will be asked to design an electronic data collection instrument based on a true research questionnaire. They will be evaluated by whether the tool can be practically used in research settings to collect quality data. • In assignment 2, students will be asked to process research data. They will be evaluated by how well they prepared the datasets for analysis purposes.

週次 Week	單元主題（中/英文）Topic	CEPH 核心能力
第 1 週	Introduction to course materials and software, followed by introduction to REDCap: basic features, instrument building, data entry, data dictionary, data exports and reporting, and user rights management	D17-3 GH-2 DGH-3
第 2 週	Advanced features in REDCap: REDCap mobile apps, branching logic and calculated fields, longitudinal projects, and randomization	D17-3 GH-2 DGH-3
第 3 週	Advanced features in REDCap: REDCap surveys Introduction to R: basic features and data types	D17-3 GH-2 DGH-3
第 4 週	Working with data in R (I): data cleaning and manipulation	D17-3 DGH-3
第 5 週	Working with data in R (II): data cleaning and manipulation	D17-3 DGH-3
第 6 週	Working with Data in R (III): data cleaning and manipulation Introduction to Data Visualizations: principles, key steps, and examples. Data Visualizations and infographics: related tools and use of design elements (e.g., typography, color, and structure)	D17-3 DGH-3
第 7 週		
第 8 週		
第 9 週		
第 10 週		
第 11 週		
第 12 週		
第 13 週		

第 14 週		
第 15 週		
第 16 週		

* 授課內容引用本所教師發表之著作_____篇，引用本院教師發表之著作_____篇。
（請列出著作出版資料：作者姓名，題目，期刊名稱，卷數，起訖頁數及出版年）

全球衛生學位學程 核心能力

CEPH 2016 Accreditation Criteria for Foundational Knowledge

Profession & Science of Public Health

D17-1	Explain public health history, philosophy and values
D17-2	Identify the core functions of public health and the 10 Essential Services*
D17-3	Explain the role of quantitative and qualitative methods and sciences in describing and assessing a population's health
D17-4	List major causes and trends of morbidity and mortality in the US or other community relevant to the school or program
D17-5	Discuss the science of primary, secondary and tertiary prevention in population health, including health promotion, screening, etc.
D17-6	Explain the critical importance of evidence in advancing public health knowledge
D17-7	Explain effects of environmental factors on a population's health
D17-8	Explain biological and genetic factors that affect a population's health
D17-9	Explain behavioural and psychological factors that affect a population's health
D17-10	Explain the social, political and economic determinants of health and how they contribute to population health and health inequities
D17-11	Explain how globalization affects global burdens of disease
D17-12	Explain an ecological perspective on the connections among human health, animal health and ecosystem health (e.g. One Health)

ASPPH Master of Public Health's Global Health Concentration Competencies

GH-1	Analyze the roles, relationships, and resources of the entities influencing global health
GH-2	Apply ethical approaches in global health research and practice
GH-3	Apply monitoring and evaluation techniques to global health programs, policies, and outcomes
GH-4	Propose sustainable and evidence-based multi-sectoral interventions, considering the social determinants of health specific to the local area
GH-5	Design sustainable workforce development strategies for resource-limited settings

GH-6	Display critical self-reflection, cultural humility, and ongoing learning in global health

NTU CPH Doctoral Core Competencies in Global Health

DGH-1	Exemplify proficient skills to contribute to public health scholarship and engage community partners and stakeholders to conduct own research and form collaborations based on high ethical standards
DGH-2	Scrutinize and apply qualitative and quantitative methods to provide evidence-based solutions to global health problems considering cultural safety and diversity
DGH-3	Design, implement, and evaluate theory-informed and evidence-based research programs in an academia or practice setting
DGH-4	Recognize and analytically evaluate socioeconomic, environmental, behavioral, and biological determinants of population health