Ministry of Health
National Institute for Public Health
School of Public Health

Master of Science Program

Prepared by
THE TECHNICAL WORKING GROUP ON THE DEVELOPMENT OF MASTER OF SCIENCE CURRICULUM, MINISTRY OF HEALTH, CAMBODIA
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I. Introduction

The National Institute of Public Health (NIPH) is the only public institution providing training in public health. Under its auspice, the School of Public Health opened its door for the first batch of students in 2007. Since then the school has been offering the Master of Public Health in two tracks; health service and disease control tracks.

**Master of Public Health degree in Health Services (HS)** was designed to produce graduates who can comprehensively analyze the situation and challenges in health care system development and health service organization with public health officers in the management and leadership positions as the potential students. On the other hand, **Master of Public Health degree in Disease Prevention and Control (DC)** is a research oriented program that aims at providing students with broad understanding of disease dynamics; the tools and skills to study factors related with the disease occurrences and strategies in disease preventions and controls. This program targeted both health program managers and public health researchers.

NIPH School of Public Health shares the view that decision related to the development of the country health care system requires scientific evidence that can only come from quality research designed and implemented by competent local health researchers. While the two tracks of Master of Public Health program address the development of basic research competencies, there is still the felt need for the development of health professionals who will act as leaders in the field of health research and facilitate the establishment of a robust health research culture in the country.

II. Rationale for the establishment of the Master of Science Programs

The Master of Science (MSc) programs were designed to help addressing the growing demand for research-oriented professionals in Cambodia and in the region. This program will address this need by developing students who upon the graduation are expected to assume research positions in governmental, non-governmental and international organizations; hospitals, clinical and public health research-based institutions and pharmaceutical companies.

Furthermore, the program offers students the opportunity to conduct medical research and health problems in their clinical and community contexts through the master’s thesis requirement and also in courses related projects. The Master of Science program is also envisioned to help promote evidence-based decision making at all level of government and non-government health institutions and organization.

Financially, since the NIPH school of Public Health is already offering Master program in Public Health, extending to MSc program will be more cost efficient. While the core and major courses for MSc program will have to be established, the MSc programs will share other core and elective courses with existing MPH program. The two (2) MSc programs to be established at NIPH School of Public Health are the MSc in Epidemiology and MSc in Nutrition.
II. 1. MSc Program in Epidemiology

The public health landscape of Cambodia is very much active in all areas, except perhaps in research. The death in health research in the country is caused in part by the limited number of health professionals skilled in all aspects of research, ranging from design, implementation, dissemination and the use of research results.

There is a need to increase the number of health professionals who have appropriate skills for designing and implementing health research through the provision of a research-oriented degree such as Master of Science in Epidemiology.

II. 2. MSc Program in Nutrition

In Cambodia, malnutrition is a major contributor to early childhood mortality and is considered a serious public health threat. There was a significant reduction in malnutrition rates in Cambodia in the early part of the 20th century (CDHS, 2005) but progress slowed in the second half according to recent reports (CAS, 2008; MDG, 2010). Cambodia has had the highest malnutrition rates in the Asia Pacific Region for the last two decades according to anthropometric measures. Immediate as well as long term measures are needed in order to resume progress towards the Millennium Development Goals of ending hunger (MDG1), reducing child mortality (MDG4), and improving maternal health (MDG5).

The poor nutritional status of the Cambodian population is reflected in the high infant mortality rate of 65 per 1,000 live births, the under-five mortality rate of 83 per 1,000 live births, and the maternal mortality rate of 473 out of 100,000 births1.

Similarly, these high rates of malnutrition contribute to high rates of morbidity in the country. Forty-six percent of women and 62% of children have anemia, of which iron deficiency is a contributor; 22% of Cambodian children are vitamin A deficient (WHO standards categorize this as a severe problem); and 44% of Cambodian children are zinc deficient (correlating with stunting rates and having implications for length and severity of diarrhoeal episodes)1.

Currently in Cambodia, there is much work being done in the area of reducing maternal, infant, and child mortality rates through improving nutritional status, improving child feeding practices, decreasing micronutrient deficiencies, and improving policies. This work is being carried out by the Cambodian Ministry of Health's National Nutrition Programme (NNP), international agencies, and several NGOs.

The NNP’s main goal is to reduce the high rates of infant, child, and maternal mortality and morbidity by improving the nutritional status of children and women in the following nutrition areas: 1) supporting, protecting and promoting infant and young child feeding practices, 2) eliminating and controlling malnutrition and micronutrient deficiencies, including vitamin A, iron, and iodine, and 3) developing, implementing, and monitoring and evaluation of policies, legislations, and strategies.

Despite their immense responsibilities, the NNP operates with limited human and financial

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1 Cambodia Demographic Health Survey (2005).
recourses. NNP staffs are mainly medical professionals who have limited training and knowledge in nutrition and program management.

The importance of having professionally locally trained nutritionists overseeing nutrition programs and interventions is manifold. Nutrition professionals offer a level of expertise in nutritional health and disease that allows them to select and prioritize effective nutrition interventions; to design, implement, manage, and evaluate effective and tailored nutrition programs and research endeavours; to disseminate accurate nutrition information; and to train other health professionals in nutrition. Locally trained nutritionists have an inherent knowledge of cultural preferences and constraints, language skills, and are more likely to remain in the country and continue contributing to the health care system throughout their working life. Hence, they will build the capacity of their colleagues through their training and experience.

As the NNP has recently received more interest and support from both the government and development partners to expand and improve its interventions and activities, they will be in a good position to respond to the rapid expansion of the nutrition interventions at all levels. The NNP staff needs to be equipped with appropriate knowledge and skills to implement nutrition activities in the most effective and efficient ways. They need and want more formal training to allow them to gain the required knowledge and skills to address the current needs and to continue their work without long periods of disruption attending programmes outside the country. This programme will be designed to fill the current systemic gaps in nutrition education at the pre and post service level.

In short, there is a lack of qualified nutrition professionals in Cambodia and a well demonstrated need. The benefit of having Cambodian nationals educated and work in nutrition is important to the self-sufficiency and development of the country’s nutrition and health programs and ultimately to the long term effectiveness of nutritional interventions. Therefore, the purpose of the Master of Science in Nutrition program is to build capacity in nutrition at all levels from community to policy through education in a sustainable manner.

**III. Degree Offered**

Two degree will be offered under the Master of Science Program:

**III. 1. The Master of Science (M.S.) in Epidemiology**

The MSc in Epidemiology offers basic training in the methods of design, conduct and analysis for various types of studies including sample survey, longitudinal, case control and clinical studies.

This is a disease focused research-oriented degree that provides in-depth training in research methods and research experience. It includes the preparation of a thesis and is appropriate for persons intending to go into a research career.

**III. 2. Master of Science in Nutrition**
The MSc in Nutrition degree program is designed to train postgraduates in the nutrition field to a highly skilled professionals level. The graduates from this program will be able to undertake advanced research to plan, implement, manage and evaluate nutrition programs at all levels in the country, and to advise nutrition policy for the country.

III. 3. Admission Requirement at NIPH School of Public Health

III. 3.1. Academic Requirement

For the admission into the Master of Science programs, student should posses the following criteria:

- Possession of a bachelor or higher degree in any discipline in science or social science or other science related areas (See in the Annex 1 for detail)
- Possession of a bachelor or higher degree in Public Health or health sciences or health related areas
- Good academic record

III. 3.2. School Requirement

Addition to academic student must meet with the school requirement listed below:

- Having good English proficiency (IELTS score at least 4.5 or TOEFL of 450 (paper based) or 53 (Internet based). If not, students must sign an agreement to provide the English score prior to proposal defense.
- Agree to the internal rule and regulations for the students at NIPH school of Public Health

III. 4. Grading System

The work of the students is evaluated at the end of each course in accordance with the following grading system:
Grading system for NIPH School of Public Health

<table>
<thead>
<tr>
<th>Grade</th>
<th>Meaning</th>
<th>Score</th>
<th>Grade point</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>Excellent</td>
<td>95-100%</td>
<td>4.0</td>
</tr>
<tr>
<td>A</td>
<td>Excellent</td>
<td>90-94%</td>
<td>4.0</td>
</tr>
<tr>
<td>B+</td>
<td>Very good</td>
<td>80-89%</td>
<td>3.0</td>
</tr>
<tr>
<td>B</td>
<td>Good</td>
<td>70-79%</td>
<td>2.0</td>
</tr>
<tr>
<td>C+</td>
<td>Pass</td>
<td>60-69%</td>
<td>1.0</td>
</tr>
<tr>
<td>C</td>
<td>Fail</td>
<td>&lt;60%</td>
<td>0</td>
</tr>
</tbody>
</table>

1. If students got grade “C” and the score is between 50-59%, they can retake the exam. The result of re-exam is ‘pass’ or ‘fail’.
2. Grade Point Average (GPA) will be computed to give the overall evaluation of the courses. The GPA is weighted by the number of credits of each course.
3. Proposal defense and thesis defense is not included in the computation of GPA.
4. GPA of at least 2.0 is the minimum requirement for the Master degree
5. The minimum grade of ‘C+’ is required for each subject for the Master degree
6. Proposal defense and thesis defense will be graded as ‘pass’ or ‘fail’. Thesis defense can be done at most two times.

III. 5. Requirement for the Degree of Master of Science

This MSc degree requires that student to successfully complete at least 54 credits/credits (20 credits/credits for core courses, 12 credits/credits for major courses, at least 10 credits/credits for elective courses and 12 credits/credits from thesis). Note: 1 credit/unit=16 hours of teaching or 32 hours of practice) with:

- Fulfill all admission and school requirement
- Having good English language skills by submitting a valid TOEFL IBT score of at least 53 or paper-based score of at least 450 or IELTS at least 4.5 at the school admission or prior to the proposal defense.
- GPA at least 2.0, with no “C” grade in any course
- Pass the Thesis Defense
- Bind and submit the complete thesis to NIPH School of Public Health

III.6. Tentative Schedule for Classes

The NIPH school of Public Health will follow the semester system. That is; there will be 2 semesters per academic year.

In consideration for students who may be working part-time or full-time in public and private organizations and who may have problems with attending regular weekday programs, classes could be offered either run during the weekend. However, there is also a possibility of offering class on working day if there are enough full-time students who want to have class on working days.
Tentative Schedule for classes offered during the weekend

<table>
<thead>
<tr>
<th>TIME</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
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<tbody>
<tr>
<td>8-10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Class</td>
<td>Class</td>
<td>Class</td>
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<tr>
<td>10-12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Class</td>
<td>Class</td>
<td>Class</td>
</tr>
<tr>
<td>13.30-15.30</td>
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<td></td>
<td></td>
<td></td>
<td>Class</td>
<td>Class</td>
<td>Class</td>
</tr>
<tr>
<td>15.30-17.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Class</td>
<td>Class</td>
<td>Class</td>
</tr>
</tbody>
</table>

**Independent Study**
(Student are expected to work on their assignments and prepare for weekend class activities)

**IV. Course Structure for MSc Programs**

In order to complete the Master of Science Program students are required to complete two components; course work and thesis.

Courses will be spread out mainly in the first 3 semesters. The last semester is reserved for students to work on and to defense their thesis. On the other hand, students can start working on their Master thesis as soon as they got admitted to the program.

Courses offered for MSc is classified into 3 groups:

- **Core courses** (20 credits): required courses for all MSc students regardless of track
- **Major courses** (12 credits): required courses for student on each specific track
- **Elective courses** (at least 10 credits): courses available for student to select based on personal interest. Students can drop any elective course before completing half of its credits. Major course of one track can become elective courses for student from other tracks.
- **Thesis** (12 credits): required for both tracks. It is an individual work where student will have to present their thesis proposal to the assigned thesis committee, carry out the fieldwork (if any) and present the final finding to the thesis committee again.
V. Master of Science in Epidemiology

V.1. Objectives of the Program

• To provide students with research skills to prepare them to become research and teaching

• To provide students in other tracks in the school with an understanding of the basic principles of epidemiology and of their application for investigating health problems in the community

• To improve the quality of epidemiology practices in health sector through in-country training at NIPH SPH.

V.2. Competency of the Graduates

By the end of this program, students should be able to:

• Demonstrate advanced understanding of epidemiological methods and its applications in health-related areas

• Appraise epidemiological studies, including study questions, methods, implementation, statistical analysis and interpretation

• Design and appropriately develop protocols for epidemiological studies

• Manage computerized epidemiological data and carry out appropriate statistical analyses

• Interpret the results of epidemiological studies and making logical conclusions based on the data

V.3. List of Courses

Core courses:
- Introduction to Public Health (4 credits)
- Basic Epidemiology (4 credits)
- Intermediate Epidemiology (4 credits)
- Basic Biostatistics (4 credits)
- Intermediate Biostatistics (4 credits)

Major courses:
- Disease surveillance and outbreak investigation (2 credits)
- Occupational and Environmental Epidemiology (2 credits)
- Epidemiology of infectious disease (2 credits)
- Data Management and Data Analysis (4 credits)
- Epidemiology of Non-communicable diseases (2 credits)

Elective courses

- Rapid survey (2 credits)
- Behavioral science (2 credits)
- Proposal writing (2 credits)
- Critical Appraisal (2 credits)
- Computer application (2 credits)
- Qualitative method in health research (2 credits)
- Reproductive health (2 credits)
- Program Evaluation (2 credits)
- Health Policy (2 credits)
- Vertical Analysis (2 credits)
- Health Promotion (4 credits)
- Health economics (2 credits)
- Public Health management (4 credits)
- Human resource management (2 credits)
- Quality management (2 credits)
- Statistical methods in Epidemiology (4 credits)

V.4. Proposed Course Schedule

Tentative Schedule for Classes in MSc in Epidemiology

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester 1</td>
<td>Semester 2</td>
</tr>
<tr>
<td>Introduction to Public Health (4 credits)</td>
<td>Basic Biostatistics (4 credits)</td>
</tr>
<tr>
<td>Basic Epidemiology (4 credits)</td>
<td>Intermediate Epidemiology (4 credits)</td>
</tr>
<tr>
<td>Epidemiology of Non Communicable disease (2 credits)</td>
<td>Occupational and Environmental Epidemiology (2 credits)</td>
</tr>
<tr>
<td>Elective (2 credits)</td>
<td>Disease Surveillance and Outbreak Investigation (2 credits)</td>
</tr>
<tr>
<td>Elective (2 credits)</td>
<td>Elective (2 credits)</td>
</tr>
<tr>
<td>Total credits: 14</td>
<td>Total credits: 14</td>
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</tbody>
</table>
VI. Master of Science in Nutrition

VI.1. Objectives of the Program

1. To provide detailed knowledge regarding the biological basis of nutrition and the mechanisms by which diet can influence health.

2. To develop the ability to translate research into practice through skills in nutrition surveillance, policy, program planning and evaluation, management, information dissemination, and oral and written communication.

3. To develop an interdisciplinary perspective on Public Health Nutrition in both its domestic and international context.

4. To develop the necessary quantitative skills in biostatistics required for the evaluation of diet and disease relationships in epidemiologic studies.

5. To provide skills in developing research proposals, which requires the integration of knowledge about human nutrition with epidemiologic concepts in order to improve diet and activity and reduce disease risk in populations.

VI.2. Competencies of the Graduates

By the end of the two years program, students will have expertise in the areas of:
- Nutritional assessment of individuals and populations with a focus on women, infant, and children’s health and nutritional needs
- Maternal, infant and young child feeding practices including breast-feeding, complementary feeding, HIV, and infant feeding.
- Malnutrition, its causes, consequences and treatment, including under-nutrition, over-nutrition, micronutrient deficiencies, secondary malnutrition, and nutrition related diseases.
- Nutrition requirement across lifespan.
- Food safety and safe food handling practices and its effects on human health.
- Food security and its effects on human health productivity.
- Design, implementation, management, and evaluation of nutrition programs including food based interventions, management of acute malnutrition, and micronutrient deficiencies.
- Community based nutrient education strategies.
- Adapting dietary recommendations to standard nutrient norms, local agriculture, food availability, food culture and acceptability.
- How to acquire, interpret, apply, and maintain nutrition knowledge through appropriate use of scientific literature and other sources.
VI.3. List of Courses

Core courses

- Introduction to Public Health (4 credits)
- Basic Epidemiology (4 credits)
- Intermediate Epidemiology (4 credits)
- Basic Biostatistics (4 credits)
- Intermediate Biostatistics (4 credits)

Major courses

- Principles of Nutrition (4 credits)
- Applied Nutritional Assessment (2 credits)
- Nutrition throughout lifecycle (2 credits)
- Public Health Nutrition (4 credits)

Elective courses

- Food Safety (2 credits)
- Computer Application (2 credits)
- Program Evaluation (2 credits)
- Health Promotion (4 credits)
- Rapid survey (2 credits)
- Qualitative method in health research (2 credits)

VI.4. Proposed Course Schedule

<table>
<thead>
<tr>
<th>Tentative Schedule for Classes in MSc in Nutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 1</strong></td>
</tr>
<tr>
<td>Semester 1</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Introduction to Public Health (4 credits)</td>
</tr>
<tr>
<td>Basic Epidemiology (4 credits)</td>
</tr>
<tr>
<td>Public Health Nutrition (4 credits)</td>
</tr>
<tr>
<td>Elective (2 credits)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Total credits: 14</strong></td>
</tr>
</tbody>
</table>
VII. Description of the courses for MSc. in Epidemiology

Below is the list of all courses that will be offered in MSc. in Epidemiology. Note that MSc. in Epidemiology shares many courses with the MPH programs. Therefore, only the new courses specific to MSc. will be describe in detail here.

1. Core Courses:

1.1. Introduction to Public Health

1) Credit: 4 Credits, Length: 60 hours

2) Course description

Welcome to the subject Introduction to Public Health. It is really a challenge subject, central to whatever public health directions you are involved in or developing in your career. It is designed for those who are interested in the areas of population health, health management, and policy and research directions. This subject will empower you to do new things and see old things in new ways.

3) Course objective

At the end of the course, the student will be able to:

1. Discuss the principles and practices of PH
2. Provide the application of the principle of PH in their own situation

4) Course contents

The contents of the course will cover:

- History and development of public health in developed countries
- History and development of public health in developing countries
- Determinants of health and disease (1)
- Determinants of health and disease (2)
- Medical care and public health
- Assessing health needs
- Practice of Public Health
- Public Health Policies (1)
- Public Health policies (2)
- Principles of prevention
- Global Strategies for control of communicable diseases
- Disease prevention and control of non communicable diseases
- Public Health function
- Strategies for health services
- Structures and strategies for public health intervention
- Epidemiology: The foundation of public health
- Principle of outbreak investigation
- Application of information system to public health
- Environmental health practices
- Public health surveillance
- Screening
5) **Teaching method**

- Lectures/Presentations
- Group Discussion/Presentation
- In-class exercises (individual/Group)
- Assignments

6) **Student Assessment**

There are no written examinations for this compulsory subject. However, assessment will be based on:

- In-class presentation and/or short abstracts (Individual/group)
- Two written assignments

7) **References and Recommended Readings**

- Bauman A. Handout of Introduction to PH. University of New South Wales, 1997.

1.2. **Basic Epidemiology**

1. **Credit: 4 Credits, Length: 60 hours**

2. **Course description:**

   A basic course on epidemiology, designed specifically for first year MPH student. The course will follow the book, *Epidemiology*, by Leon Gordis and will feature in-person lectures that rely on *MS PowerPoint*.

3. **Course objectives:**

   After completion of the course, the students will be able to:

   - Understand the basic principles and application of epidemiology
   - Understand different of study design used in Epidemiology
   - Calculate different measures of effects and associations
   - Identify different kind of bias and confounders
   - Describe the concept of validity and reliability

4. **Course Contents**

   The contents of the course will cover:
The approach and evolution of epidemiology
Basic principle of disease transmission
Measures of disease frequency and association
Sources of public health data (strength and weakness of different data sources)
Descriptive epidemiology
Study design
Biases
Confounding
Random error
Sampling
Epidemiologic approach to causation (critical appraisal)
Disease outbreak
Surveillance
Diagnostic testing
Screening in public health practices
Presentation of epidemiologic data
Analysis of epidemiologic studies

5. Teaching Methods
1. Lecture/brainstorming
2. Power Point presentation
3. Handout distribution after finished presentation
4. Case study
5. Group discussion /paper critic
6. Homework assignments

7. Student Assessment
The final examination will be comprehensive, covering all readings and lectures, and will be given during the last class (weight is less on exam and more on assignments)

8. References and recommended readings
- Epidemiology, by Leon Gordis
- Medical Epidemiology 3rd Ed. – Raymond S. Greenberg
- Epidemiology for public health practice- Robert H. Friis and Thomas A. Sellers
- Epidemiological research methods- Don McNeil
- Class note Epi 100- Ralph Frerich
- Class note EPI 201A-B- Hal Morgenstern
- Epidemiology in Medicine-Charles H. Hennekens
- A dictionary of epidemiology- John M. Last
- Epidemiology/ an introduction- Kenneth J. Rothman
- Health research methodology- WHO
1.3. Intermediate Epidemiology

1. **Credit**: 4 Credits, **Length**: 60 hours

2. **Course description**

The intermediate epidemiology course is the follow up course of basic epidemiology designed specifically for MSc epidemiology student. The course will follow the book, *Modern Epidemiology*, by Kenneth J. Rothman, Sander Greenland, Timothy L. Lash and *Epidemiology/ an introduction* Kenneth J. Rothman

3. **Course objectives**

After completion of the course, the students will be able:
- To identify different study designs including hybrid design in the literature
- To develop appropriate study design for a specific research question
- To compute and interpret different epidemiological measures
- To appreciate the counterfactual and causal concepts
- To identify different errors occurred in any epidemiological studies
- To develop different strategy to deal with errors
- To appreciate the effect modifier and collinearity concept

4. **Course Contents**

The contents of the course will cover:
- Study design
- Measure of association
- Measure of effect
- Measure of impact
- Counterfactual model
- Causal model
- Selection bias by study design
- Information bias
- Deal with confounding
- Effect modifier
- Collinearity

5. **Teaching Methods**

- Lecture/brainstorming /Power Point presentation
- Handout distribution after finished presentation
- Case study
- Group discussion /paper critic
- Homework assignments

6. **Student Assessment**

Students will be assessed through:
- Three homework exercises (40%) and two quiz (30% each)
- The final examination (2nd quiz) will be comprehensive, covering all readings and lectures, and will be given during the last class.

7. **References and recommended readings**
   a. Modern Epidemiology- Kenneth J. Rothman, Sander Greenland, Timothy L. Lash
   b. Epidemiology/ an introduction- Kenneth J. Rothman
   c. Epidemiology, by Leon Gordis
   d. Basic Epidemiology, by Bonita, second edition, 2006
   e. Essentials of Epidemiology in Public Health, by Ann Aschengrau and George R. Seage III. 2003
   f. Medical Epidemiology 3rd Ed. – Raymond S. Greenberg
   g. Epidemiology for public health practice- Robert H. Friis and Thomas A. Sellers
   h. Epidemiological research methods- Don McNeil
   i. Class note Epi 100- Ralph Frerich
   j. Class note EPI 201A-B- Hal Morgenstern
   k. Epidemiology in Medicine-Charles H. Hennekens
   l. A dictionary of epidemiology- John M. Last
   m. Health research methodology- WHO
1.4. **Basic Biostatistics**

1. **Credit:** 4 Credits, **Length:** 60 hours

2. **Course description**

   Biostatistics is an essential tool in health research and management. The basic biostatistics course will provide students with necessary understanding in research planning, data collection, data analysis and interpretation. Apart from lectures where students will learn the concepts and methods, class exercises and assignments will be an essential element of the course where students will acquire skills through the application of the knowledge in every step of research process.

3. **Course objectives**

   - **General objective:** To equip the students with the understanding of basic statistical concepts and methods applicable in health research and health management
   - **Specific objectives:** At the end of this course the students will be able to:
     - Define biostatistics
     - Understand the source of data collected
     - Understand the basic step in conducting data analysis
     - Perform data analysis using descriptive and inferential statistics
     - Describe and interpret data using appropriate statistical tools

4. **Course Contents**

   The contents of the course will cover:
   - Orientation to biostatistics
   - Statistical data: types, sources and quality
   - Descriptive statistics
   - Health information system
   - Health statistics, including demography and vital statistics
   - Probability and probability distribution
   - Normal distribution and standard normal distribution
   - Fundamentals of statistical inferences
   - Making inferences about the population proportion: the z-test
   - Making inferences about population mean: the t-test
   - Tests of relationship between two categorical variables

5. **Teaching Methods**

   - Lecture with illustrative exercises
   - Computer lab practices using mock data or existing data which are relevant to student work
   - Assignments which emphasis on the application of statistical rules

6. **Student Assessment**

   - Midterm exam: 25%
   - Final exam: 50%
   - Assignment: 25%

7. **References and recommended readings**
1.5. Intermediate Biostatistics

1. Credit: 4 Credits, Length: 60 hours

2. Course Description:
The course is the continuation of the basic biostatistics. The course is designed to provide students skills to do more complex analyses in determining relationship between variables. The course will offer intermediate-level instruction in the principles of biostatistics focusing on statistical modeling approaches to the analysis of continuous, categorical, and survival data. The course will be conducted with a fair share of lectures and practices using real data.

3. Objectives of the course (competency)
At the end of the course the students should be able to
- Perform ANOVA and ANCOVA tests for comparing two or more sample means
- Determine relationship between variables using correlation coefficients
- Perform linear regression analysis to predict continuous variable
- Perform logistic regression analysis to estimate relationship measures between categorical variables.
- Perform survival analysis
- Draw appropriate conclusions, and present the result appropriate for a manuscript or report.

4. Course contents:

<table>
<thead>
<tr>
<th>No.</th>
<th>Topic</th>
<th>ILO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Analysis of Variance (ANOVA) and Analysis of Covariance (ANCOVA)</td>
<td>1. Indicate the circumstances that call for an ANOVA rather than a t test</td>
</tr>
<tr>
<td></td>
<td>1. Completely Randomized Design</td>
<td>2. Indicate the assumptions that need to be made to perform an ANOVA</td>
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<tr>
<td></td>
<td>2. Randomized Complete Block Design</td>
<td>3. Perform ANOVA to compare two or more sample means</td>
</tr>
<tr>
<td></td>
<td>3. One-way ANOVA</td>
<td>4. Perform post hoc multiple comparison analysis procedures</td>
</tr>
<tr>
<td></td>
<td>4. Post hoc multiple comparison procedures</td>
<td>5. Differentiate between Completely Randomized Design and Randomized Complete Block Design</td>
</tr>
<tr>
<td></td>
<td>5. Two-way ANOVA</td>
<td>6. Perform ANCOVA for Randomized complete Block Design</td>
</tr>
</tbody>
</table>
| 2 | **Correlation** | • Describe the basic purposes of correlation analysis  
• Plot a scatter diagram  
• Compute and explain the meaning of correlation coefficient in terms of: the kind of data it may be used for, the kind of relationship it can measure, and its limitations.  
• Determine the relationship between two variables using Pearson's Moment Product Correlation Coefficient and Spearman's Rank Order Correlation Coefficient  
• Perform reliability test using Kappa statistic |
|---|---|---|
| 3 | **Simple linear regression** | • Describe the basic purposes of regression analysis  
• Predict outcome variable using regression equation |
| • Model description with assumptions  
• Least square criterion and estimates  
• Likelihood based inference  
• Inference for model parameters  
• Inference on mean response  
• Prediction of single response  
• Residual Analysis – Diagnostics  
• Normality and homoscedasticity  
• Outliers and influential observations |
| 4 | **Multiple linear regression** | 1. Indicate reasons for performing multiple linear regression analysis  
2. Perform multiple linear regression analysis using different variable selection procedures  
3. Perform interaction analysis |
| • Interaction  
• Variable selection (Stepwise, forward, backward)  
• Diagnostics in multiple regression  
• Lack-of-fit test  
• Residual analysis  
• Collinearity  
• Outliers and influence statistics |
<p>| 5 | <strong>Logistic regression</strong> | • Indicate reasons for performing logistic regression analysis |
| 1. Logit model, odds ratio |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>2.</td>
<td>Model fitting</td>
<td></td>
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<tr>
<td>3.</td>
<td>Diagnostics</td>
<td>• Perform logistic regression analysis using different variable selection procedures</td>
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<td></td>
<td></td>
<td>• Perform interaction analysis</td>
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<tr>
<td>6</td>
<td><strong>Introduction to survival analysis</strong></td>
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<tr>
<td></td>
<td>1. Life tables</td>
<td>• Indicate basics purposes of survival analysis</td>
</tr>
<tr>
<td></td>
<td>2. Kaplan-Meier (product limit) techniques</td>
<td>• Perform survival analysis using different techniques</td>
</tr>
<tr>
<td></td>
<td>3. Tests for differences between survival curves (log-rank test)</td>
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<td></td>
<td>4. Cox regression</td>
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</tr>
</tbody>
</table>

5. **Prerequisites**
Students must pass the basic biostatistics course.

6. **Evaluation**
- Quiz: Two quizzes (Mid-term and end-term): 30%
- Project: 70%
- Data analysis (in group): 40%
- Report writing (Individual): 30%

7. **References:**
- Collett D., Modelling Survival Data, 1994
2. Major Courses:

2.1. Disease surveillance and outbreak investigation

1) **Credit**: 2 Credits, **Length**: 30 hours

2) **Course Description**

It is a basic course on principles and practices of public health surveillance and outbreak investigation. The course will follow the book, Principles and Practice of Public Health Surveillance by Steven M. Teutsch and R. Elliott Churchill and other practical guidelines, and training materials from US-CDC, WHO and UNAIDS, and will feature in-person lectures that rely on *MS PowerPoint*.

3) **Course Objectives**

After completion of the course, the students will get familiar with:
- The basic approaches to planning, organizing, analyzing, interpreting and communicating surveillance information in the context of contemporary society and public health practice.
- The methods to investigate disease outbreak and control measures

4) **Course contents**

<table>
<thead>
<tr>
<th>No</th>
<th>Topics</th>
<th>ILO (summary key) or Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A surveillance system</td>
<td>Understand the primary function of a SS</td>
</tr>
<tr>
<td>2</td>
<td>National Communicable Disease Surveillance System</td>
<td>Establishment</td>
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<tr>
<td></td>
<td></td>
<td>Key functions</td>
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<tr>
<td></td>
<td></td>
<td>Key concerns of a surveillance system</td>
</tr>
<tr>
<td>3</td>
<td>Sources of health related information</td>
<td>Describe different sources of information</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data collection and reporting</td>
</tr>
<tr>
<td>4</td>
<td>Management of the surveillance information system and data quality control</td>
<td>Data quality check</td>
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<tr>
<td></td>
<td></td>
<td>Surveillance data processing</td>
</tr>
<tr>
<td>5</td>
<td>Food born Disease Surveillance (1)</td>
<td>Essential elements in the Foodborne Disease Surveillance</td>
</tr>
<tr>
<td>6</td>
<td>Food born disease surveillance (2)</td>
<td>Standard foodborne disease outbreak case questionnaire</td>
</tr>
<tr>
<td>7</td>
<td>- Analyzing and interpreting surveillance data</td>
<td>- Communicating information for actions within public health system</td>
</tr>
<tr>
<td></td>
<td>- Analyzing and interpreting surveillance data</td>
<td>- Communicating information for actions within public health system</td>
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<td>T.C.</td>
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<tr>
<td>8</td>
<td>HIV surveillance</td>
<td>WHO</td>
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<tr>
<td>9</td>
<td>Behavioral surveillance</td>
<td>FHI</td>
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<tr>
<td></td>
<td>Activity</td>
<td>Description</td>
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<td>----</td>
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<tr>
<td>10</td>
<td>Evaluating health surveillance system</td>
<td>T.C and CDC.</td>
</tr>
<tr>
<td>11</td>
<td>Outbreak investigation-1</td>
<td>T.C.</td>
</tr>
<tr>
<td></td>
<td>Individual assignment</td>
<td>T.C.</td>
</tr>
<tr>
<td>12</td>
<td>Outbreak investigation-2</td>
<td>T.C.</td>
</tr>
<tr>
<td>13</td>
<td>Case study: outbreak investigation</td>
<td>Practice steps taken in conducting OI.</td>
</tr>
<tr>
<td>14</td>
<td>Case study: outbreak investigation</td>
<td>Practice steps taken in conducting OI.</td>
</tr>
<tr>
<td>15</td>
<td>Case study: outbreak investigation</td>
<td>Practice steps taken in conducting OI.</td>
</tr>
<tr>
<td></td>
<td>Individual assignment due</td>
<td>Practice steps taken in conducting OI.</td>
</tr>
<tr>
<td>16</td>
<td>Feedback Session</td>
<td></td>
</tr>
</tbody>
</table>


5) Learning activities

- Lectures/Presentations
- Group Discussion/ Presentation
- In-class case study (groups of 4-5 people)
- Homework assignments (individual)

6) Student assessment

- In class presentation of case study (50%), participation (10%)
- Individual Assignment assessing what skill student learnt from class (40%)

2.2. Epidemiology of non communicable diseases

1) Credit: 2 Credits, Length: 30 hours
2) Course description

The course on epidemiology of non-communicable diseases (NCD) will walk students through the overall context of NCD epidemiology, burden of NCD, causes and risk factors, prevention and screening strategies for effective control of non-communicable diseases. The epidemiological concept will be applied and discussed over the course.

3) Course objectives

By the end of this module, students will have an appreciation of the growing global importance of non-communicable diseases across low middle and high income countries, the major determinants of non-communicable diseases and the key challenges faced by epidemiology and public health in studying and controlling these conditions. The most common epidemiological methods will be applied and discussed
over the course among the five most common NCD. Also the epidemiological and prevention program of NCD in Cambodia will be addresses.

### 4) Course contents

<table>
<thead>
<tr>
<th>Objective</th>
<th>Content</th>
<th>Teaching method</th>
</tr>
</thead>
<tbody>
<tr>
<td>To describe the global trends of global growing of NCD across high, middle and low income countries</td>
<td>Trends Burden of NCD</td>
<td>Lecture and discussion</td>
</tr>
<tr>
<td>To explore and discuss the determinants of NCD</td>
<td>Individual, SES, environmental factors...</td>
<td>Lecture and discussion</td>
</tr>
<tr>
<td>To assess the screening test</td>
<td>Reliability and validity of the test</td>
<td>Lecture and discussion</td>
</tr>
<tr>
<td>To describe and discuss on epidemiology of cardiovascular diseases</td>
<td>Study design Risk and measure of association, and bias, Interpretation of result</td>
<td>Lecture and discussion</td>
</tr>
<tr>
<td>To describe and discuss on epidemiology of diabetes</td>
<td>Study design Risk and measure of association, and bias, Interpretation of result</td>
<td>Lecture and discussion</td>
</tr>
<tr>
<td>To discuss on the epidemiology of injuries and related traffic accidents</td>
<td>Study design Risk and measure of association, and bias, Interpretation of result</td>
<td>Lecture and discussion</td>
</tr>
<tr>
<td>To discuss on the epidemiology of breast and cervical cancers</td>
<td>Study design Risk and measure of association, and bias, Interpretation of result</td>
<td>Lecture and discussion</td>
</tr>
<tr>
<td>To discuss on the epidemiology of lung cancer and tobacco cessation program</td>
<td>Study design Risk and measure of association Bias in epidemiological studies Interpretation of result Overview the tobacco cessation program</td>
<td>Lecture and discussion</td>
</tr>
<tr>
<td>To discuss on the epidemiology and prevention of COPD</td>
<td>Study design Risk and measure of association Bias in epidemiological studies Interpretation of result</td>
<td>Lecture and discussion</td>
</tr>
<tr>
<td>To review the National NCD Strategic Planning</td>
<td>The diabetes program</td>
<td>Lecture and discussion</td>
</tr>
</tbody>
</table>
5) Teaching methods

Classes combine didactic presentations, discussion and critiques of health behavior related to public health issues. Active participation is expected.

6) Student assessment

- Group work presentation (30%)
- 2 individual assignments (30%)
- Final exam (40%)

7) References and recommended reading

- Robert H. Friis and Thomas A. Sellers Epidemiology for Public Health Practice
- Brett W, Preventive Medicine and public health, 2002
- David Schottenfeld and Joseph F. Fraumeni, Cancer epidemiology and prevention. 2006
- WHO website and other webs

2.3. Occupational and Environmental Epidemiology

1) Course credit: 2 credits

2) Course description

By the end of the course, students should gain sufficient understanding of epidemiologic techniques to facilitate their comprehension of published epidemiologic literature and, in some instances, designing and conducting original research.

3) Course Objectives

The student will be able to:

- Determine appropriate research design in occupational and environmental epidemiology
- Discuss biases in occupational and environmental epidemiology
Identify most suitable epidemiologic approaches to characterize exposure-response associations for various occupational and environmental diseases.

4). Course content

Overview of research design in occupational and environmental epidemiology
Overview of research designs and biases in environmental epidemiology
Pollution Health Effects
Exposure assessment approaches: Air
Air pollution health effects
Water Pollution
Adverse Reproductive Outcomes
Children’s Environmental Health
Occupational and Environmental respiratory disease

5). Learning objectives

Students should accomplish the following:

Identify some of the major chemical, physical, and biological agents as risk factors for environmentally-related diseases.

Describe hazardous effects of some major environmental exposures on human physical health, including disease induction, physiological impairment, and genetic susceptibility to risk.

Describe pathways of exposure to hazardous agents in the workplace and general environment.

Describe methods for assessing human exposures to hazardous agents for epidemiological research purposes.

Describe the influences of genetic susceptibility on risks related to environmental agents.

Prepare an in-class group presentation of an epidemiological approach to addressing workplace and community health risks, including: review of relevant literature; epidemiological study protocol, and plans for communication to key stakeholders.

Write a term paper on a selected topic concerning adverse health related to workplace or general environmental hazardous agents; the assignment involves review of relevant literature and development of a research protocol similar to a condensed version of an NIH grant application.

Describe risk assessment methods that are used by governmental agencies.

Describe and explain methods for presenting human health risks to community, workplace, and governmental stakeholders; this is accomplished in the context of the in-class exercises.

6). Teaching Methods
Lecture/brainstorming /Power Point presentation
Handout distribution after finished presentation
Case study
Group discussion /paper critic
Homework assignments

7). Student assessment

Midterm exam (50%)

One term paper that includes a review of the literature on a relevant topic and a proposed research design. Topics must be approved in advance (50%).

8). References

Checkoway H, Pearce N, Kriebel D. Selecting appropriate study designs to address specific research questions in occupational epidemiology. Occup Environ Med;64:633-8.


Kimmel C, Collman G, Fields N, Eskenazi B. Lessons learned for the National Children's Study from the National Institute of Environmental Health Sciences/U.S. Environmental Protection Agency Centers for Children's Environmental Health and Disease Prevention Research. Enviro Health Persp 2005; 113 (10)1414-18.


2.4. Epidemiology for Infectious diseases

1. **Credit**: 2 Units, 30 hours

2. **Course Description**: Principles of infectious disease transmission, including basic mathematical modeling; assessment of burden of disease for infectious disease; infectious disease surveillance and
outbreak investigations; identification of risk factor for infection; assessing the efficacy of public health interventions; epidemiologic features of major infectious diseases; emerging infectious diseases; molecular epidemiology of infectious pathogens.

3. Course Objective:

To equip students with the knowledge and skills required to apply epidemiological concepts to infectious diseases. The focus of this course is on the use of an understanding of disease transmission to guide careful assessment of disease burden, the planning of public health interventions, and the assessment of their impact.

4. Student Learning Outcomes:

Upon successful completion of the course the students should be able to:

a. Describe simple models of infectious disease transmission, how the parameters of those models can be estimated from epidemiological data, and how they affect control measures.

b. Describe different study designs appropriate to measurement of the burden of infectious disease and the factors that make one approach preferable to the others in a given setting.

c. Identify important sources of error in studies measuring prevalence or incidence of infectious disease.

d. Describe the structure and functioning of an effective infectious diseases surveillance program.

e. Plan and execute an outbreak investigation.

f. Describe approaches to assessing the impact of public health interventions designed to reduce infectious disease transmission.

g. Describe special epidemiological characteristics of specific infectious diseases such as malaria and AIDS

h. Describe current approaches to detect, characterize and contain emerging or re-emerging infectious diseases.

i. Describe how molecular epidemiology might be used to assist infection control

5. Course Contents

The course lectures will cover the following general topics

Basic principles of infectious disease transmission
SIS, SIR, and SEIR models of disease transmission
Estimation of $R_0$ from epidemiological data
Measures of infectious disease prevalence, incidence, and case fatality rate
Sources of error in measurements of infectious disease burden
Design of prevalence surveys, analysis of clustered samples, design effects
Design of cohort studies, analysis of longitudinal data
Design of effective disease surveillance systems; detection of outbreaks
Design and conduct of outbreak investigations
Design of studies to identify risk factors for infection; case-control studies
Assessment of the effectiveness of disease control programs
Epidemiology of vector borne diseases
Epidemiology of sexually transmitted diseases
Epidemiology of helminth infections
Detection, characterization and containment of emerging infectious diseases
Molecular epidemiology

6. Teaching Method
Lecture

7. Student Assessment
Mid-term exam
Final exam

8. References and Recommended Readings

   Infectious Diseases of Humans: Dynamics and Control (Oxford Science Publications)
   Roy M. Anderson and Robert M. May 1992
   Epidemiology of Infectious Diseases (Johns Hopkins Open Courseware)

2.5. Data Management and Data Analysis

1. Credit: 4 Units
This is a 4-unit course, which consists of 32 hours of lecture and 56 hours of Computer lab practice.

2. Course description
Data management and data analysis is an applied course. The main objective of the course is to provide students with skills for performing data processing, data analysis and interpret the outputs from statistical software. The pre-requisite courses are Basic and Intermediate Biostatistics.

Students are encouraged to bring their dataset to use in the whole class. The class dataset will be offered for those who do not have their own dataset.

3. Course competency
By the end of the course, students will be able to;
   o Develop database for data entry
Perform data entry and data validation
Perform data management using statistical software
Perform statistical modeling
Interpret the outputs from statistical software

4. Objectives
By the end of this course, students will be able to;
Perform data processing
Perform statistical tests
Interpret the outputs from statistical software

5. Course Contents
Review statistical measurements
Database development
Data entry and validation
Data cleaning
Data handling and storage
Descriptive statistic
Comparing two means
Chi-square test
Analysis of variances
Non parametric testes
Multivariate analysis
Survival analysis

6. Teaching methods
The teaching method is a combination of in class lecture and computer lab. The main software used for this course are; Epi data and STATA. Students will be offered raw data and dataset to work on.

7. Methods of Assessment
Students will be assessed individually. Students are required to write two reports based on the findings from the given dataset. First report, with a weight of 50%, will be focus on logistic regression and the second report, with also weight of 50%, will be on survival analysis.

8. References
3. Elective Courses:

3.1. Rapid surveys

1. Credit: 2 Units, Length: 30 hours

2. Course Description

This applied course will be taught like a workshop with a general outline (shown here), but no daily beginning or ending times. A hard copy of the PowerPoint slides will be available for enrolled students on the course website.

3. Course Objectives

After completion of the course, the students will:

- Appreciate the need for rapid surveys
- Understand the theory of sampling, rapid surveys and assessment for decision-making
- Acquired practical skills to do the field work for rapid surveys and analyze data from rapid surveys
- Able to present analysis of surveys findings in understandable terms (Objectives, Methods, Results, Discussion and recommendations)

4. Course Contents

The contents of the course will cover:

- Introduction to rapid survey
- Planning a survey
- Interview survey
- Hardware and software
- Rapid survey
- Interviewer training
- Statistical methods and issues for rapid surveys
- Sampling
- Variance of cluster sampling
- Sample size determination
- Improving precision
- Improving accuracy
- Example of rapid survey
- Class presentation
- Rapid qualitative and quantitative survey

5. Teaching Methods:

- Lecture/brainstorming
- Power Point presentation
- Handout distribution after finished presentation
- Field work
- Group discussion
- Class presentation by students
- Homework assignments

6. Student Assessment
Student will assessed through
- 2 homework assignments (40%)
- Field work results presentation (40%)
- Field work participation (10%)
- In class participation (10%)

7. References and recommended readings

- Ralph R. Frerichs. Class note. Epi 418 class, University of California, Los Angeles. 2000
- Ronald F. Czaja and Johnny Blair. Designing Surveys: A guide to decisions and procedures. 2004

3.2. Behavioral science

1. Credits: 2 Credits, Length: 30 hours

2. Course description

Health and behavior are related in many ways and those interactions are neither simple nor straightforward. Health compromising behavior is the target for modification or prevention with consequent benefit public health. Therefore, this course introduces MPH students to the socio-behavioral sciences in the context of public health. Critical thinking about public health issues, selected health behavior theories, social determinants of health and health risk behavior and level of intervention will be the focus of the course. Health risk associated with specific behavior such as HIV/AIDS related behavior, poor diet, compliance, alcohol, and drug use will be discussed through out the course in the form of presentation and the various strategies dealing with the issues using behavioral interventions.

3. Course objectives

By the end of the course, students will be able to:
- Demonstrate an understanding of the social and behavioral determinants of health
- Discuss and understand the behavioral science in the context of health in Cambodia and what have been done in the context of public health in Cambodia
- Apply the theories and model of health behaviors to develop the proper interventions for specific health problem and populations

4. Teaching methods

Classes combine didactic presentations, discussion and critiques of health behavior related to public health issues. Active participation is expected.
5. **Assessment methods**

Students will be assessed on the basis of

- Group work 1 30%
- Group work 2 30%
- Final exam 30 %
- Attendances 10%

6. **Required textbook**

Motivating Health Behavior

Author: John Elder et al; Delmar Publishers

7. **Reading materials**

- Health psychology, Shelly E. Taylor
- Health and Behavior: interplay of biological, behavioral and societal influences, Institute of Medicine, National Academic Press
- Social Psychology, Elliot Aronson, Timothy D. Wilson, and Robin M. Akert
- Published papers relevant to the course

8. **References**

- Charles p. felton national tuberculosis center, 2005, adherence to treatment: A manual for health care providers
- Community Organizing and Community Building for Health, Meredith Minkler, 2007.
- Family Health International, 2002, BCC for HIV.
3.3. Proposal writing

1. **Credit:** 2 Credits, **Length:** 30 hours

2. **Course Description**

Proposal writing is part of a public health professional’s life. Either program project proposal or research proposal will need to be developed with clarity and coherence. Student will learn different templates of proposal writing for different type of grant proposal.

3. **Course Objectives**

The objectives of this course are to enable students to

- Describe types and formats and the essential components of proposals
- Identify the requirements and expectations of the funding agencies
- Define key steps in the proposal writing process
- Effectively communicate with funding agencies
- Write a good proposal

4. **Course Contents**

The content of the course will cover

- Introduction
- Priority areas for target funding agencies
- Theoretical framework for proposal development
  - Key steps in proposal writing

---

- The Tobacco Atlas, Dr. Judith Mackay, Dr. Michael Erksen, Dr. Omar Shafey, Second edition, 2006.
- WHO, 2008, guides to conduct survey
o Proposal design  
o Literature review  
o Methodology  
o Data analysis plan

o Set guidelines and standard to assess the proposals  
o Managing with funding agencies

5. Teaching Methods

o Brainstorming/Lecture: Power Point Presentation  
o Group work and presentation  
o Plenary discussion

6. Student Assessment

o Class participation: 20%  
o Midterm Exam: 40%  
o Final assignment in group: 40%

7. References and recommended readings

o How to write a successful research grant, Ellen Stover, PhD  
o Application for funding of business plan, Australian Government, National Health and Medical Research Council.

o Proposal Development Handbook, American Association of State Colleges and Universities, 1997


3.4. Computer application

1. Credit: 2 Credits, Length: 30 hours

2. Course Description
This course will introduce basic concept of computer and Microsoft office tools will be introduced to students. Hands-on experience with internet search for medical and public health literature to different useful websites such as HINARI and PUBMED will be introduced.

3. Course Objectives
At the end of the course the students will be able to:
- Use Microsoft office tools
- Surf on the internet to do literature search
- Know how to correctly document different references

4. Course Contents
- The course content will include:
  - Introduction to computer and internet
- Microsoft Word
- Microsoft Excel
- Microsoft Power Point
- HINARI search
- PUBMED search
- Introduction to reference manager
- Introduction to Endnote

5. Teaching Methods
Hands-on computer practice using computer laboratory

6. Student Assessment
Home work assignment

7. References and recommended readings
- Thomson Researchsoft, Reference manager
- Thomson Researchsoft, Endnote
3.5. Qualitative method in health research

1. **Credit**: 2 Credits, **Length**: 30 hours

2. **Course Description**
Qualitative research is a type of scientific research, seeking to understand a given research problem from the perspectives of local population involves. The methods are especially effective in understanding cultural specific information about the values, opinions, behaviours, and social contexts of particular population.

This course examines concepts and applications of qualitative research in public health. It develops student skills to identify research problems appropriate for qualitative methods, sampling techniques, various types of data collection methodologies, and approaches to qualitative data analysis. The roles of qualitative methods in mixed methods research and theory building as well as ethical issues inherent in the qualitative approach will also be explored.

3. **Course Objectives**
By the end of the course, the students will be able to:

- Understand the roles of qualitative research in the research spectrum, program development and evaluation.
- Design a qualitative research study for their own purposes.
- Develop interview guides for a key informant, an in-depth interview and a focus group discussion on a specific subject.
- Conduct, transcribe and report on a key informant interview, an in-depth interview and a focus group discussion.
- Prepare qualitative data for analysis, develop a codebook, and perform content and thematic analysis.
- Understand potential contributions and limitations of qualitative research: subjectivity, objectivity and validity of qualitative methods.

4. **Course Contents**
The content of the course will include:

- Introduction to qualitative research
- Nature of qualitative research methodologies
- Designing qualitative research
- Rigor in qualitative research
- Qualitative data analysis
o Ethical considerations
o Writing up qualitative research results

5. Teaching Methods
o Lecture
o Role play
o Group work

6. Student Assessment
o Attendance and class participation: 10%
o First assignment: 30%
o Second assignment: 30%
o Quiz: 30%

Assignment 1 (Group Assignment): Design a qualitative study on a specific subject, describing research question, hypothesis, data collection methods and tools.
Assignment 2 (Individual Assignment): Create a code-book and analyze the collected data and write a paper on some key results.

7. References and recommended readings:
o Qualitative research methods: Pranee Liamputtong and Duglas Ezzy, 2005
o Qualitative research for population and health research: Bencha Yoddumnern-Atting at al., 1993.
o Doing Qualitative Research: David Silverman, 2000.

3.6. Program Evaluation

1. Credit: 2 Credits, Length: 30 hours
2. Course Description
Evaluation is a basic ingredient of the decision-making function of management. It is a judgment process, which concludes whether a program/project is able to achieve the purpose for which it was formulated and what should be done with it. It could also be a judgment process as to which among alternative courses of action should be adopted. Without proper evaluation, the program's stakeholder especially managers will not be able to assess their program's situation and will not able to set an effective strategic directions for their interventions. This course aims at providing techniques and tools
used in program evaluation to students. The course will also emphasize the important link between planning, monitoring and evaluation processes.

3. Course Objectives
After completion of the course, students will be able to:
  o Understand the link between planning, monitoring and evaluation of the program
  o Understand the important of the health information system (HIS) and the use of HIS to evaluate service efficiency and effectiveness
  o Understand the processes of evaluation and select appropriate methodology for evaluation
  o Understand how to conduct an evaluation involving in 3 interrelated stages: plan the study, obtaining information and communicating with interested parties about the progress of the study and its finding
  o Conduct a program evaluation and summarize the findings
  o Effectively disseminate the evaluation findings

4. Course Contents
The contents of the course will cover:
  o Role of Planning, Supervision, Monitoring related to program evaluation
  o Fundamentals in Evaluation
  o Introduction to Forms of Evaluation
  o Players and Principles of Action
  o Conducting an Evaluation
  o Impact Evaluation
  o Program Management and Evaluation
  o Process Evaluation
  o Design Evaluation
  o Evaluation for Development
  o Measurement and data collection in quantitative evaluations
  o Measurement and data collection in qualitative evaluations
  o Analysis and dissemination of the evaluation findings

5. Teaching Methods
  o Lecture
  o Brainstorming
  o Group work case study
3.7. Health Policy

1. Course Credit
This course has two credits with a total length of 32 hours in class with self learning.

2. Course Description
Health Policy is very broad. It is not a separate discipline with its own methodology, but part of the wider domain of public policy and in a wide health system context. This “Introduction to Health Policy” does not have the intention to cover health policy in a comprehensive way, but attempt to widen the participants’ professional horizon to include the field of health policy as something real, relevant and (to some extent) manageable. This course therefore focuses on policies related to health systems and health system reforms.

3. Objectives of the Course:
The general objective of this course is to enable participants to analyze health policy in the context of health systems and health system reforms. More specifically, this course will enable the participants to:

- define what is health policy and describe important determinants of health policy, including policy context, content, process and actors;
- view a country’s health system in a wide sense: its structures, its objectives, and its modes of operating;
- describe actors and their roles in health systems and policies, and analyze what can be their contribution, as an actor, to improving health systems and policies;
- comprehend how a health system is financed with a mix of public and private, domestic and donor resources; understand the basics of health insurance; understand fair financial contribution and the issues related to catastrophic health expenditure;
o identify change processes in health policy that are going on in a country, both transition processes and reform processes, including identification of main challenges in Cambodian health system, and formulate possibilities to tackle them;

o appreciate different approaches used in health system reforms, and the agendas lying behind; in particular: decentralization, financial reform, public sector reform and donor coordination and comprehend how health system reforms can be assessed; and

o read and understand health policy papers and articles of major agencies and journals, and apply the concepts and ideas on Cambodian health system.

4. Course Contents

The content of the course will be divided in three parts: (1) health policy framework, (2) health policy and health systems and (3) health policy and health system reforms.

(1) Health policy framework, which includes:
  o Why is health policy important?
  o What is health policy?
  o Health policy determinants: the health policy triangle

(2) Health policy and health systems, which includes:
  o Institutional (static) and dynamic view of a country health system
  o Actors and their roles in health systems and policies, and stakeholder analysis
  o Overview of recourses for health systems, with a focus on financial resource
  o Economic burden of ill-health on households and catastrophic health expenditure
  o Introduction to health insurance
  o Donor funding in the health sector

(3) Health policy and health system reforms, which includes:
  o History of health system reforms, public sector reforms and health system reforms
  o Decentralization
  o Purchaser-provider split and contracting
  o Health system development and reforms in Cambodia
  o Assessing health system reforms

5. Teaching Methods

The methods used for the ‘Introduction to Health Policy’ are:
  o Lecture with PPT presentations and questions/answers (70%)
  o Cases studies and in-class group exercises (15%)
o Individual home assignment (15%)

6. Participant assessment methods

• Group assignment represents 40% of the total weighted score and will focus on:
  o Participation: active – passive – absent
  o Content of the group output
  o Delivery of the content (presentation)
  o Defense of the content (answer to questions by peers, lecturers or guesses)

• Individual assignment represents 60% of the total weighted score and will focus on the content. However, the process will also be indirectly checked to avoid eventual plagiarism (get the assignment done by others or copied from the work of others) and delay in submission of the assignment.

The passing score is 60% or above for the total weighted score. Participants fail to get at least 60% weighted score will have to re-do the individual assignment (with subject different from the first one).

7. Recommended readings and References


### 3.8. Vertical Analysis

1. **Credit:** 2 Credits, **Length:** 30 hours

2. **Course description:**

A course on Vertical Analysis, designed for the 3rd semester of MPH student who follow Health System track. The course will follow by presenting the TB, Dengue and diabetes examples in Vertical Analysis. These examples are only meant to show how historically
produced research results that can contribute to the building of an epidemiological model that is plausible.

3. Course objectives:
After completion of the course, the students will be able to:

- To know how to analyze a health problem in a rational and systematic manner, in order to identify the most relevant and acceptable activities and strategies to reduce or solve problem, from the point of view of a general public health professional. This includes the identification of relevant fields of research.
- To understand and to know how to explain the necessary complementarity of the horizontal and vertical types of approach. An important question in this context is the decision whether or not to integrate activities in multi-functional basic services.

4. Course Contents
The contents of the course will cover underlying concepts and implications of infectious disease (TB and Dengue) and non-infectious disease (diabetes) as examples which are as follow:

- Evaluation of the importance of the problem
- Description of the disease "system"
- Inventory of possible interventions and selection
- Identification of the type of services that is necessary
- Identification of the type of personnel that is necessary
- Formulation of operational strategies (operationalisation of activities)
- Formulation of how interventions will be evaluated

5. Teaching Methods
- Series of lectures aimed at explaining and demonstrating the vertical analysis (VA) method with lecture/brainstorming/Power Point Presentation.
- 2 lectures treat the Vertical Analysis of tuberculosis and Dengue as examples.
- A group work (applying the VA methodology) on an infectious or non-communicable disease, followed by presentation in plenary sessions, critical discussion and synthesis. The internet accessibility is very critical for students to look for relevant document and reference to strongly support their ideas
- The size of one group is normally 6 or 8 participants.
- Handout distribution after finished presentation

6. Student Assessment
Students will be assessed through:
o Group assignment based on participation in quality of the group work
o The critical discussion and synthesis all readings and lectures, internet accessibility.

7. References and recommended readings
o Internet accessibility to search the literatures
o Tuberculosis 2007, From basic science to patient care

3.9. Health Promotion

1. Course Credit: 4 Credits, Length: 62 hours

2. Course Description
This course deals with health promotion with the strong emphasis on primary health care concepts and strategies in all levels. The course describes and outlines the concept of health promotion, strategies, guidelines for health promotion, concepts of community participation and community empowerment.

3. Learning objective:
At the end of the course, students will be able to:
o Describe the concepts and strategies of Health Promotion and PHC.
o Explain community empowerment, management techniques of comprehensive and integrated community development.
o Develop Health Promotion Plan and evaluation strategy to address particular health problems/issues.
o Discuss about on how to apply health communication theory to different health promotion interventions.

4. Course Contents
The contents of the course will cover:
o Introduction to primary health care and health promotion
o Alma-Ata Declaration and its evolution
o Millennium Health Goals: paths to the future
o Overview of PHC and National PHC Policy and its implementation guideline
o Basic theoretical foundation of Health Promotion
o Community organization and social mobilization
o Behavior Change Communication
o Advocacy for health
o Health promotion plan, program/project development
o Working with Media
5. Teaching Methods
- Lectures/Presentations
- Group Discussion/ Presentation
- In-class exercises (Group)
- Assignments

6. Student assessment
- Individual assignment – presentation (30%)
- Group assignment – presentation (30%)
- Exam (open questions) – (30%)
- Class participation (10%)

7. References and Recommended Readings
- Michael Goodstadt, M, Centre for Health Promotion, University of Toronto, Canada
- www.health.gov/healthypeople
- MOH, 2000, National Policy on Primary Health Care; Kingdom of Cambodia; Inter-ministerial Committee on Primary Health Care, 2000.
3.10. Health economics

1. **Course Credit:** 2 Unit, **Length:** 32 hours

2. **Course Description**
The study of general principles of economics and their applications to health development and to the financing and delivery of health care services. The study of general principles of the microeconomics and their applications to health development and health marketing apply to health care services.

3. **Course Objectives:**
The course aims to provide an introduction to health economics for health professionals and students with no previous economic background, and also to enable them to appreciate and understand the principles and concepts of economics and marketing as they apply to health development and health service financing and provision.

4. **Specific Objectives**
*At the end of the course, the students should be able to:*
- Understand a general principles and concepts of economics and economics system as they apply to health development.
- Analyze the operations of the various sectors of the health industry sector in financing and delivery of health services and identify the various issues regarding economic and health interrelationships especially relating to the public health intervention.
- Evaluation of health programs and projects by applying the economic principles and analyze the impact of the different financing schemes intervention.
- Identify the allocate resources efficiencies to the facilities/organization/ program and select and apply appropriate marketing tools to analyze and /or evaluate health care activities.
- Critically appraise given a core concept of health care market and discuss the general principles and concepts of Procedures, Consumers, Competitive Markets, Market Structure and Competitive Strategy.

5. **Course Contents**
The contents of the course will cover:
- Health economics and its contribution to health planning
- Economic development
- Economic efficiency
- Input resources and cost
- Outputs, and Health Indicators
The technique of economic evaluation and the step of the allocation resources

Source of Finance for Health Sector

Introduction: Market and Price

Procedures, Consumers, and Competitive Markets

Market Structure and Competitive Strategy

Information Market failure, and the role of government

Financing Economic and Health Development

Franchising

6. Teaching Methods

Lecture with providing the example on economics theory applies to health care

Give a gaming reflex to the concept of the lecture

Group report, the student will classify in two group, each group will report on the concept of the previous session and propose the question to their friends, the maximum time is not more than 10 mn

7. Student assessment:

Quiz will be in week 5, which covers class session from week one to week four; the grade will provide 20%.

Assignment covers class session from week one to week 8; hand assignment to instructor in week 10, the grade will provide 30%.

Final examination 50%

8. Teaching Materials

Presentation handout

Book chapter

Strategic Framework on Health Financing, Guideline on Health care Financing related

Others report document on Health Financing related

9. References and recommended readings

Microeconomics, fifth edition, Robert S. Pindyck & Daniel L. Rubinfeld, Massachusetts Institute of technology and University of California, Berkeley


Rudiger Dornbusch,Stainley Fishcher, "Macroeconomis ", 1993
o Hastead,B. "Good health Low Cost " New York : Rockefeller Foundation


Sherman Folland ,allen C.Goodman,Miron Stano,"The Economics of Health and health Care" Oakland University, 2001


Subhush C,Jain "Marketing Principles" South Western Collage, Cincinnati, Ohio .USA (1996)

3.11. Public health management

1. **Credit:** 4 Credits, **Length:** 60 hours

2. **Course Description**
This course is designed to give students knowledge and skills that will enable them to manage effectively and with integrity an organization under difficult and changing conditions. The student will learn management theories and consider applying them in circumstances and features of health system. This course will be implemented in two semesters of 30 hours each.

3. **Course Objectives**
At the end of this course, students will be able to:
- define management
- explain principles underlying the definition of management
- discuss functions of management
- formulate a strategic plan, given a hypothetical case
- develop an operational plan ( a project and evaluating plan preferably from the formulated strategic plan)
- develop skills in organizing and influencing health organizations
- assess an organization using the principles and theories learned
4. Course Contents
The contents of the course will cover:

- Introduction to management
  - Modern management skill for success
  - History and current thinking
- Planning
  - Principle of planning
  - Making decision
  - Strategic planning
  - Plan and planning tools
- Organizing
  - Fundamental of organizing
  - Responsibility, authority and delegation
  - Managing human resource
- Influencing
  - Encouraging creativity and Innovation
  - Understanding people
  - Influencing and communication
  - Leadership
  - Motivation
  - Group, teams and corporate culture
- Controlling
  - Principle of controlling
  - Maintenance work standard

5. Teaching Methods
The following methods will be used for teaching:

- Lecture and Brainstorming
- Question and Answer
- Case study (In-class, group of 5 people)

6. Student evaluation
- In-class case study by small groups and presentation 30 %
- Individual home work assignment 30%
- Written Exam- 40 %
- Students can be evaluated by other means during the course conduct

7. References and Recommended Reading
3.12. Human resource management

1. Course Credit: 2 Credits, Length: 30 hours

2. Course Description
Building on the core course in Public Health Management theories, this course will deal with in-depth and practical issues in health system of human resource management. The course will focus on the current issues facing in the region and in Cambodia and WHO frameworks and recommendations of three main components human resource for health: policy and planning, production and training and utilization and retention.

3. Course Objectives
By the end of this course, students will be able to analyze, calculate and apply in their work places with the knowledge and skills from the course on framework, theories and concepts of the three main components of human resource for health. To meet the objectives, the course will design through lecturing, sharing practical theories and best practices from individual experience and results of group outputs’ efforts.

4. Course Contents
The contents of the course will cover:

- Course orientation on the three main components of human resource for health and its roles and human resource management in health system development;
- Policy framework of human resource for health policy, especially Cambodia human resource for health Policy;
- Projection the needs of human resource for health to respond the health situation, especially for Cambodia context;
- Staff orientation and staff recruitment;
o Staff retention: motivation, work environment, compensation, benefits, and appraisal process;
o Performance management system;
o Career management and development;
o Training need assessment methods;
o Designing training curriculum and training methodology for human resource for health;
o Managing conflicts and dismissal;
o Organizational change;
o Labor retention and employee security.

5. Teaching Methods
o Lecture with precise examples
o Group discussion and assignment
o Case study
o Workshop: present the group outputs and comment from peers and lecturers

6. Student assessment
o Participation to the group work 20%
o Midterm Exam 40%
o Final Exam 40%

7. References and recommended readings
o The World Health Organization, (2008) Strategic Plan for Strengthening Health system in the WHO Western Pacific Region, WHO Regional Office for the Western Pacific
3.13. Quality management

1. **Course Credit:** 2 Credits, **Length:** 30 hours

2. **Course Description**

   Quality management course is designed to provide students with appropriate knowledge and skills in managing quality in their health working place. This course will mainly focus on basic concept of quality management, different dimensions of quality of health care and how they interlinked each other, approaches and models commonly used to improve the quality of health care. Through a participatory learning approach during the course, students will have opportunity to explore and exchange their experiences related to current challenges of applying quality management in the health care services. A practical demonstration session of the course will also give opportunity to students to practice using some commonly used tools for quality management and team building.
3. **Course Objectives**

At the end of the course, students will be able to:

- understand the different dimensions of quality of health care
- discuss the basic concepts of quality management
- explain some approaches and models for quality management and be able to translate quality management models to health services at health centre and hospital levels
- use common tools of quality management in identifying quality problems, analyzing their causes and formulating the best solution for quality improvement
- work with and in a team to design quality improvement project and develop plan for implementing, monitoring and evaluation of the project at their workplace.

4. **Course Contents**

The contents of the course will cover:

- Introduction to quality management and quality terms
- Quality in health care, different dimensions
- Quality management and professional consciences and ethics
- Quality assessment (using different tools)
- Quality improvement tools
- Leadership role in quality improvement
- Performance improvement, self-assessment
- Quality assurance-licensing, certification and accreditation
- Quality circle
- Quality improvement project development
- Quality improvement monitoring

5. **Teaching Methods**

- Lecture
- Brainstorming
- Group Discussion
- Case study

6. **Student evaluation**

- In-class group exercise and presentation: 60%
  - Exercise 1: 30%
Exercise 2: 30%
- Written Exam: 40%

7. References and recommended readings
- Participant Workbook: Introduction to Total Quality Management, Sustainable Management Development Program; Public Health Practice Program Office at the CDC, Atlanta, Georgia, 2003
- Health Care Quality: An International Perspective; WHO; 2001
- Raymond G. Carey, Ph.D., Robert C. Lloyd, Ph.D., Measuring Quality Improvement in Health Care, 2001
- Dr. Carolyn Sunners, HealthNet International: Improving Quality of Care at Kratie Provincial Hospital 2001, June 2002
- Leslie W. Rue, Lloyd L. Byars, Supervision Key Link to Productivity, 1999

8. Recommended articles and websites
- How can we achieve and maintain high-quality performance of health workers in low-resource settings? (www.thelancet.com: Published online August 9, 2005 DOI:10.1016/S0140-6736(05)67028-6)
- See http://www.who.int/imci-mce/index.htm


1. Credit: 4 Credits, Length: 60 hours

2. Course Description
Epidemiologic research is very much prone to various sources of biases. Theses biases could be minimized by carefully designing the study and applying appropriate statistical methods in the data analysis. The course, the continuation of basic epidemiology will guide the students in designing the study with special focus on the issue of validity and analysis methods that help improve the study validity. Basic bio statistic and basic epidemiology courses are the pre-requisite courses of this course.

3. Course Objectives
At the end of the course the students will be able to:
- Identify different types of biases and their impact on the validity of the epidemiological research
- Design epidemiological research where biases are best dealt with
- Compute the potential impact of a risk factor using the risk estimate
4. Course Contents
The contents of the course will cover:
- Study types
- Measurement
- Sample size
- Sampling techniques
- Bias
- Confounding
- Standardization
- Mantel Haenzel Methods
- Logistic Regression
- Survival analysis
- Data cleaning and data management
- Quality control and quality assurance
- Paper appraisal

5. Teaching Methods
- Lecture with illustrative exercises
- Leave a week between lecture and tutorial for digestion on the course materials
- Computer lab practices

6. Student Assessment
- Quiz 1: 30%
- Quiz 2: 40%
- Homework: 30%

7. References and Recommended Readings
- Don MacNeil, Epidemiological Research Methods
- Rothman K. J and Greenland S., Modern Epidemiology
- Bernard Rosner, Fundamentals of Biostatistics, 2004
3.15. Critical Appraisal

1) Credit: 2 Credits, Length: 30 hours

2) Course Description
This course provides an introduction to the core principles and techniques of critical appraisal of scientific papers. It also provides the opportunity to work through an example. The learning outcomes for the course are to be able to identify the key findings, to be able to assess the validity and reliability of results from a scientific paper, and to be able to determine the relevance of the results.

3) Course Objectives
By the end of this course, students should be able to
   o Understand the meaning of evidence-based in public health and epidemiology and the importance of critical appraisal skills
   o Describe the main components of the critical approach of the articles
   o Identify strengths and weaknesses on methodology

4) Course contents

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<tr>
<th>Numbers</th>
<th>Topics</th>
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<tr>
<td>1</td>
<td>Overall introduction to critical appraisal</td>
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<td>2</td>
<td>Critical Review of paper related to Meta-analysis</td>
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<td>3</td>
<td>Critical Review of paper related to Randomize Control Trial</td>
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<td>4</td>
<td>Critical Review of paper related to Cohort Studies</td>
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<td>Critical Review of paper related to Case Control Studies</td>
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<td>Critical Review of paper related to Case Series</td>
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<td>7</td>
<td>Critical Review of paper related to Case Reports</td>
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5) Teaching methods
   o Semi-lectures
   o In-class group discussions
   o Individual assignments
   o Plenary sessions

6) Assessment methods
   o Direct observation
   o Question/answer
3.16. Reproductive Health

1. Credit: 2 Units, Length: 30 hours

2. Course description
This course is developed with the support from the Department of Reproductive Health, WHO under LiD grant number A65010-2008. Special thanks goes to Dr. Katherine Ba-Thike, Area Manager for Asia and Pacific, Technical cooperation with countries, Department of Reproductive health and research, Family and community health cluster, WHO, Geneva, and Dr. Than Tun Sein, consultant, for their encouragement and support to develop this course. This course is to orient students to become capable health service managers whose functions including managing RH services at district level.

3. Course objectives
After completion of the course, students will be able to:
   1. Discuss causes of maternal mortality
   2. Propose different solutions for maternal mortality
   3. Understand method for maternal death review
   4. Discuss causes of peri-natal mortality
   5. Define unsafe abortion
   6. Conduct causal-impact analysis of unsafe abortion
   7. Describe different medical methods of abortion
   8. Discuss on different family planning methods
   9. Understand the concept of RTI management in ante-natal and post natal care setting
   10. Understand the need of RH among youth

4. Course contents
The course is framed around the following five main topics:
   1. Maternal and newborn health
   2. Prevention of unsafe abortion
   3. Family planning
   4. RTI management in antenatal and post natal care setting
   5. RH services for youth

5. Teaching Methods
   1. Lecture

7) References & recommended leaning sources
   o Making Sense of Critical Appraisal, Ajetunmobi, 2002
   o The Pocket Guide to Critical Appraisal, Crombies, 1996
   o Royal Society of Medicine, UK
   o www.evidence-based-medicine.com
2. Brainstorming
3. Group work case study
4. Assignment

6. Student Assessment
   - Class participation (20%)
   - Final exam (80%)

7. References and recommended readings:

   1. Integrating Poverty and Gender into Health Programmes: A Sourcebook for Health Professionals, Module on Sexual and Reproductive Health, World Health Organization, Western Pacific Region, 2008.


   8. Training Module for Health Professionals on Gender Mainstreaming in Health, World Health Organization, South East Asia regional Office, New Delhi, 2007.


33. The global and Asian context of unsafe abortion and related maternal mortality, power-point presentation made by Iqbal H Shah, Department of Reproductive Health and Research, World Health Organization, Geneva, at the Inter-Country meeting on prevention of unsafe abortion in the Western Pacific Region, 10-12 December 2008, Kuala Lumpur.

34. Unsafe abortion: research findings for development policymakers and practitioners, id21 health focus, August 2007.


37. Abortion in Cambodia, Care seeking for abortion and family planning services, findings from a PEER study, conducted with women in Phnom Penh and Kandal Provinces.

38. National Assessment on Magnitude of Abortion in Cambodia, NIPH/NRHP/IPAS.


42. Guidelines for birth spacing in Cambodia (in Khmer language).


45. WHO Medical Eligibility Criteria for Contraceptive Use.


50. Young people, sexual and reproductive health and HIV, Raoul Fransen-dos Santos.

VIII. Description of the courses for MSc. in Human Nutrition

1. Core Courses:

MSc in Nutrition have the same core course as MSc in Epidemiology. Please refer to the course description for MSc in Epidemiology above.

2. Major Courses

2.1. Principles of Nutrition

1. Course Credit: 4 credits, Length: 60 hours

2. Course Description

It is the fundamental concepts and principles of human nutrition including energy, macronutrient and micronutrient metabolism and how dietary requirements are established and used.

3. Course Objective

The objective of the course is to give students a strong foundation in human nutrition principles and concepts.

4. Student Learning Outcomes

Upon successful completion of the course, students should be able to:

- Describe energy requirements, production, utilization, and balance.
- Describe the basic structure, functions, digestion, and absorption of carbohydrates, proteins, lipids, and fiber and identify food sources of each.
- Describe the major metabolic pathways for the utilization and disposal of macronutrients.
- Explain how the requirements for protein and energy are determined and describe the factors that influence those requirements.
- Understand the general health implications associated with the consumption of excess or inadequate amounts of micronutrient and macronutrients, energy, and fiber.
- Identify the micronutrients and their significance in metabolic processes.
- Understand the functions of micronutrients and identify key food sources of each.
- Understand the principles on which determinations of micronutrient requirements are based.
- Utilize the concept of nutrient requirements and translate these to recommendations for intake of nutrients and foods.
5. Course Contents

The contents of the course will cover:

- Energy and the Nutrients – introduction and review.
- Carbohydrates – simple and complex; structures and functions, digestion and absorption, glucose metabolism, disposal and synthesis, dietary sources, diabetes (intro to impaired regulation of glucose metabolism).
- Fiber – structures, properties, physiological effects and implications for health, glycemic index; dietary sources of soluble and insoluble fiber.
- Lipids – structures and functions, digestion and absorption, metabolism, transport in blood, cholesterol, and lipids’ role in cardiovascular disease (intro).
- Essential Fatty Acids – role in the body, dietary sources.
- Proteins – structures and functions, digestion and absorption, metabolism of amino acids, nutritional value of proteins, protein quality, dietary sources: plant and animal, determination of protein and amino acid requirements.
- Micronutrients – introduction to vitamins; fat soluble and water soluble.
- Micronutrients – introduction to minerals; major and trace minerals.
- How intake recommendations are established for micronutrients.
- Use and limitations of Recommended Dietary Allowance (RDA), national dietary intake standards and guidelines, food ‘groups’ as used in diet pyramids and food guides.
- Nutrition and immunity: introduction to immunology and innate immunity.
- Metabolic links between nutrition and resistance to infection or degenerative diseases. Interaction between infection and nutrition, (diarrheal diseases, gut parasites, acute respiratory infections, measles and malaria)

6. Teaching Method

- Lecture
- Case studies
- Group discussion
7. **Student Assessment**
   - Midterm exam
   - Final exam
   - Home work assignments

8. **References and Recommended Readings**

   **Samples of Potential Course Work:**
   - Sample course work available on request from UBC
   - Principles of Human Nutrition (Johns Hopkins open course ware
     [http://ocw.jhsph.edu/courses/HumanNutrition/](http://ocw.jhsph.edu/courses/HumanNutrition/)
   - International Nutrition (introduction)

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2.2. **Applied Nutritional Assessment**

1. **Credit:** 2 credits, **Length:** 30 hours

2. **Course Description**

   The course will describe the use of dietary, anthropometric, biochemical, clinical, and related information for the assessment of nutritional status of individuals and methods for evaluating the nutritional status of populations.

3. **Course Objective**
   - To be capable of undertaking and interpreting nutritional assessment
   - To understand the strengths and limitations of the different methods used in assessing nutritional status.

4. **Student Learning Outcome**

   Upon successful completion of the course, students should be able to:
   - Use and explain and integrate nutritional assessment methods for individual and population level: anthropometrics, dietary, biochemical and clinical and functional, food balance sheets, drawing inferences from samples, morbidity and mortality data.
   - Identify and evaluate the strengths and limitations of methods of nutritional assessment for populations as well as individuals.
   - Recommend appropriate indicators for the evaluation of nutritional status of populations and individuals with consideration given to lifecycle stage and health status, and support those recommendations with evidence.
   - Use qualitative methods including focus group discussions, key informant interviews, direct observation, in conducting community nutritional assessment.
Search for, review, interpret, concisely describe, and critically evaluate the current scientific literature on topics of controversy regarding the principles and methods of nutritional assessment.

5. Course Contents

The contents of the course will cover:

- Individual assessment:
  - Anthropometry – e.g. weight, height, body mass index (BMI), body composition including mid-upper arm circumference (MUAC), waist circumference, skinfolds, body fat, fat distribution and the determination of stunting, wasting, underweight, overweight and obesity.
  - Dietary – methods including food records, dietary recall, food frequency questionnaires.
  - Biochemical – e.g. hemoglobin, serum ferritin, serum retinol, 25-hydroxy-vitamin D.
  - Clinical and functional – e.g. edema, bitot spots, palmar pallor, goiter, physical activities.

- How to select and use different methods and interpret findings, considering the advantages and disadvantages of each method.

- The purpose of growth monitoring and where it is and is not useful.

- How to convert raw scores into indices such as BMI, wt/age, wt/ht, Z score and the meaning and use of scores.

- How the new WHO growth standards were developed and comparison with the NCHS.

- The different methods used for assessing food intake in individual and population and the strengths and limitations of each including 24-hr food recall, food frequency questionnaires, multiple days food recall/records, weighed/estimated food records and food balance sheet.

- How to convert food intake into energy and nutrients using appropriate database.

- How to evaluate intake in relation to recommendations making use of dietary intake assessment.

- Nutrient bioavailability and bio-efficacy; estimating bioavailability of iron, vitamin A and zinc from dietary intake data.

- Principle of validity and reproducibility in dietary assessment methods.

- Biochemical tests used to evaluate protein and micronutrient status, particularly iron, zinc, vitamin D, vitamin A, folate and other B vitamins.

- Field based tests for assessing iron status – hemocue and WHO colour charts.

- Clinical assessment of protein energy malnutrition (PEM), vitamin and mineral deficiencies e.g. goiter, rickets, kwashiorkor, anemia. Limitations to clinical methods.

- How to access and understand the meaning of population health and nutritional indicators through on-line resources.
6. Teaching Method
   o Lectures
   o Hands on practical laboratory work (anthropometry, dietary, Hb, clinical)
   o Community-based project assignment
   o On-line resources

7. Student Assessment
   o Final exam – 30%
   o Community base project assignments (anthropometry and clinical) - 40%
   o In-class assignment (e.g. 24 hours recall – convert into energy and nutrients) - 30%

8. References and Recommended Readings
   o http://www.who.int/childgrowth/standards/en/WHO Growth Standards/
   o http://www.who.int/childgrowth/software/en/
   o http://wn.com/Assessing_Nutritional_Status_Using_Oedema_and_Mid-Upper_Arm_Circumference_MUAC
   o Food and Nutritional Technical Assistance Project (FANTA) www.fantaproject.org
   o Household Dietary Diversity (FANTA)
     http://www.fantaproject.org/publications/hdds_mahfp.shtml

Samples of Course Materials:
• Sample course work available on request from UBC

2.3. Nutrition throughout the Lifecycle

1. Credit: 2 credits, Length: 30 hours

2. Course Description
Nutritional requirements and dietary patterns of individuals throughout the life span, with a focus on maternal, infant, and child nutrition.

3. Course Objective
The objective of the course is to give students knowledge of energy and nutrient needs throughout the life span with special emphasis on phases of life where people are most vulnerable to malnutrition: women of reproductive age, infants, and children.
4. **Student Learning Outcomes**
Upon successful completion of the course, students should be able to:

- Describe physiological changes over the life span and their implications for nutrition.
- Describe how and why energy and nutrient requirements change over the life span.
- Identify common nutritional deficiencies/disorders throughout the life cycle.
- Describe and understand the rationale and recommendation of the WHO guidelines for infant and young child feeding practices.
- Understand and account for factors which influence eating behavior and nutritional status at different stages of the life span.
- Understand the intergenerational cycle of malnutrition with emphasis on early life nutrition and its health implications.

5. **Course Contents**
The contents of the course will cover:

- **Prenatal Nutrition** – fetal development and the placenta, maternal physiological changes during pregnancy, nutrient requirements before and during pregnancy, and nutritional issues during the prenatal period (developmental origin of adult diseases).
- **Lactation** – breast milk (composition, properties, etc.), physiology of lactation, maternal nutrient requirements during lactation, and nutritional issues during lactation.
- **Infant Feeding** – physiological development and maturation of the infant, breast vs formula feeding (WHO code of marketing breast milk substitute) dietary reference intakes and patterns of intake, and nutritional issues during infancy; complementary feeding – timing, adequacy, frequency, quantity and quality; Understanding the rationale behind the international IYCF recommendations.
- **Childhood Nutrition** – physiological changes, dietary reference intakes and patterns of intake, and nutritional issues; impact of diet on growth and development.
- **Using and interpreting the WHO growth charts.**
- **Adolescent Nutrition** – physiological changes, dietary reference intakes and patterns of intake, and nutrition issues; nutrition needs of early reproductive year.
- **Adult Nutrition** – physiological changes, dietary reference intakes and patterns of intake, and nutrition issues; gender differences in under and overnutrition.
- **Nutrition and Aging** – physiological changes, dietary reference intakes and patterns of intake, nutrition issues (e.g. bone health, type 2 diabetes, GI issues), physiological aspects of ageing.

6. **Teaching Method:**
- Lectures
- Case scenarios (e.g. WHO growth standard training package)
7. **Student Assessment:**
   - Final exam: 50%
   - 3 In-class assignments (early life, <5, pre and pregnancy): 50%

8. **References and Recommended Readings:**
   - http://www.who.int/entity/nutrition/topics/Lancetseries_Undernutrition3.pdf
   - WHO Growth Standards are available at: http://www.who.int/childgrowth/standards/en/
   - Infant and Young Child Feeding Indicators

**Samples of Potential Course Work:**
- Health Across the Lifespan (Johns Hopkins open course ware) http://ocw.jhsph.edu/courses/PreventingInfantMortality/
- Sample course work available on request from UBC

2.4. **Public Health Nutrition**

1. **Credit:** 4 credits, **Length:** 60 hours

2. **Course Description**

   The course will highlight the multi-factorial, multi-sectorial aspects of nutrition focusing specifically on the Cambodian setting, enable the student to plan, monitor and evaluate nutrition programs and policy.
3. **Course Objectives**
   To equip graduate students with knowledge and skills to enable them formulate, implement and manage food and nutrition interventions

4. **Learning Outcomes**
   - Understand the basic principles, identify and analyze the problems of food and nutrition security
   - Understand the relationship between agricultural/fishery, economics, health/infectious disease and nutrition (macro / micro-economics)
   - Understand the concepts and methods of planning, management, monitoring and evaluation of nutrition policies/programs/interventions
   - Identify food and nutrition problems amenable to policy intervention and define criteria of effective food or nutrition policies/programs.
   - Develop, monitor and evaluate a community nutrition interventions/programs.
   - Understand and use basic skills of nutrition education (CIE) (e.g. in small groups working on making CIE information and present to class)
   - Understand the principles of (evidence-based) advocacy and leadership in nutrition
## 5. Course Contents

<table>
<thead>
<tr>
<th>Program planning</th>
<th>Content</th>
<th>methods</th>
<th>Unit-hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Basic Concepts of projects and programs: planning, implementing monitoring and evaluation (M&amp;E).</td>
<td>Lecture</td>
<td>25</td>
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<tr>
<td>* Types and rationale of food and nutrition interventions.</td>
<td>Small scale community based project / design program or proposal</td>
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<tr>
<td>* Need Assessment (Situation Analysis / SWOT / Rapid Assessment tools / RRA / etc)</td>
<td>Interact with ‘professional community’ e.g. interview policy makers</td>
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<tr>
<td>* Selection and design of nutrition programs: evidence based decision making.</td>
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<tr>
<td>* Objectives, activities, verifiable indicators, means of verification</td>
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<tr>
<td>* Program management: human resources, information flow, and day-to-day monitoring.</td>
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<tr>
<td>* Monitoring and Evaluation</td>
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<tr>
<td>* Overall program evaluation: cost-benefits</td>
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<tr>
<td>* Ethical considerations in program planning</td>
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<tr>
<td>* Define concepts in leadership, qualities and types of leadership.</td>
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<table>
<thead>
<tr>
<th>Behavior change interventions (BCI)</th>
<th>Content</th>
<th>methods</th>
<th>Unit-hours</th>
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</thead>
<tbody>
<tr>
<td>* Principles of BCI (different levels: individual / groups / population)</td>
<td>Lecture</td>
<td>15</td>
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<tr>
<td>* Theoretical approaches to understanding health and nutrition behavior including: The Health Belief Model, The Theory of Planned Behavior, Social Cognitive Theory, The Transtheoretical Model (Stages of Change).</td>
<td>Small group exercise (e.g. leaflet development)</td>
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<tr>
<td>* Basics concepts in behavior change communication (BCC), Behavior change interventions (BCI) (with tools such as CIE).</td>
<td>Interact with community (grass roots)</td>
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<thead>
<tr>
<th>Food /Nutrition policy / program</th>
<th>Content</th>
<th>methods</th>
<th>Unit-hours</th>
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</thead>
<tbody>
<tr>
<td>* Basic concepts of policy definition, policy framework, policy constructs</td>
<td>Lecture (5 hrs)</td>
<td>10</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Food / nutrition security</th>
<th>Content</th>
<th>methods</th>
<th>Unit-hours</th>
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</thead>
<tbody>
<tr>
<td>* Determinants of food and nutrition security (Global and local factors such as emergencies, climate change, bio-fuel, food prices, affecting food/ nutrition security / food diversity).</td>
<td>Lecture</td>
<td>10</td>
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<tr>
<td>* Methods and indicators for</td>
<td>Case studies (emergencies, climate change, bio-fuel, food prices, etc)</td>
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<tr>
<td></td>
<td>Household food security - assessment exercise</td>
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</table>
6. **Assessment**
   - Mock Program proposal  40%
   - Household Food Security  20%
   - CIE group exercise  20%
   - Policy seminar  20%

7. **Suggested literature**
   - Textbooks: Semba, R. Nutrition and health in Developing countries( Humana Press, 2001 )
   - Websites:
     - IFPRI website
     - SCN (Standing committee on Nutrition)
     - FAO
     - WHO
     - UNICEF
     - WFP
     - World Association of Public Health Nutrition
     - INTECH (free reviews on nutrition topics)
     - World Health Chart (WHC)
3. Elective courses

3.1. Food Safety

1. **Credit:** 2 credits, **Length:** 30 hours

2. **Course Description**
Chemical and physical properties of foods; issues pertaining to safety, nutritive value and consumer acceptability; government regulations pertaining to food safety, quality and additives; preservation techniques and transformation of agricultural commodities to food products; foods of the future. Microorganisms of importance in safety, spoilage and preservation of foods; factors affecting growth, survival and inactivation of microorganisms in fermented food systems; food processing and sanitation.

3. **Course Objective**
To provide students with knowledge and skills in different methods used to process foods, the effects of various processing methods on nutrients as well as safe food handling techniques.

4. **Student Learning Outcomes**
Upon successful completion of the course, students should be able to:
- Understand basic food safety concepts and food handling practices
- Recognize unsafe foods and preparation practices
- Develop an intervention to prevent food borne disease.

5. **Course Contents:**
The contents of the course will cover:
- Basic food microbiology
- Safe potable water
- Food-borne pathogens and parasites
- Significance of food-borne disease
- Chemical contaminants and allergens
- Factors affecting survival and growth of microorganisms
- Epidemiology of food-borne disease
- Potential local problems of significance for food-borne disease
- Good Hygienic Practices- Basic concepts of food processing in the community and safe food handling techniques. Principles of temperature, holding time after food preparation, food composition, cross contamination will be covered.
- Food processing methods: Traditional (smoking, fermentation, drying, brining, salting, cooking) and modern (heat treatment of food, Dehydration, Low temperatures, and size reduction).
Effects of different methods of processing of foods in relation to macronutrients and micronutrient retention, destruction and production of toxic substances during processing of foods.

- Cost effectiveness of various methods in food processing.
- Microbial contamination of raw food ingredients, Spoilage of foods.
- Food poisoning; food intoxication and food infections, cleaning and disinfecting.
- Hazard Analysis of Critical Control Points (HACCP) concepts and quality assurance.
- Applications of hygiene principles in the community and family home settings.
- Understand the effect of food processing on micronutrients.

6. **Teaching Method:**
   - Lecture
   - Hands on laboratory work

7. **Student Assessment:**
   - Midterm exam
   - Final exam
   - Assignments

3.2. **Computer Application (2 credits)**
   See detailed course syllabus in MSc in Epidemiology above.

3.3. **Program Evaluation (2 credits)**
   See detailed course syllabus in MSc in Epidemiology above.

3.4. **Health Promotion (4 credits)**
   See detailed course syllabus in MSc in Epidemiology above.

3.5. **Rapid survey (2 credits)**
   See detailed course syllabus in MSc in Epidemiology above.

3.6. **Qualitative method in health research (2 credits)**
   See detailed course syllabus in MSc in Epidemiology above.
Annex 1: List of Disciplines related to Science

Having a bachelor in any discipline related to science or social science or science related fields is the main requirement for being admitted to NIPH School of Public Health.

In order to clarify this academic requirement, a complete list of the disciplines below are considered as science or social science or science related and students with bachelor degree or higher in these areas of study will be eligible to enroll into the Master of Science Program at NIPH school of Public Health.

Based the Sub Decree No. 54, dated on 13 June 2002, of the Royal government of Cambodia, the following disciplines or study areas are considered to be science for social science

+ Science
  a. Mathematics
  b. Chemistry
  c. Biology
  d. Physics
  e. Geography
  f. Environmental Science
  g. Applied Science
  h. Information technology or computer science

+ Social Science
  i. Political science
  j. Public administration
  k. Social science or anthropology
  l. Psychology
  m. Demography
  n. Economy

+ Science related disciplines
  o. Management
  p. Animal health (veterinary)
  q. Agriculture
  r. Education
  s. Business administration
  t. Tourisms
  u. Law
  v. Engineering or architect
  w. Land management/urban planning
  x. Transportation and Communications
  y. Health sciences
  z. Biostatistics/Statistics