

PROGRAMMES OF STUDY

## **Institute of Chinese Medical Sciences**

### **Doctoral Degree Programme**

#### AREA OF STUDY

- Biomedical Sciences

## Doctoral Degree Programme

### Doctor of Philosophy

#### • Biomedical Sciences

| <u>Disciplinary Courses</u>                                      | <u>Credits</u> |
|--|----------------|
| <b>Compulsory Courses:</b>                                       |                |
| CMED8012 Research Ethics   | --             |
| CMED8013 Research Writing  | 1              |
| CEMD8006 Seminars  | --             |
| CMED8005 Quality Research in Chinese Medicine                    | 3              |
| <b>Total Credits:</b>  | <b>4</b>       |
| <b>Required Elective (Choose <u>one</u> of the following):</b>   | <b>3</b>       |
| CMED8001 Advanced Pharmacokinetics                               |                |
| CMED8002 Advanced Pharmaceuticals                                |                |
| CMED8003 Functional Food Product Development in Chinese Medicine |                |
| CMED8004 Healthcare Decision Analysis                            |                |
| CMED8007 Chemistry of Natural Medicine                           |                |
| CMED8008 Advanced Pharmaceutical Analysis                        |                |
| CMED8009 Drug Discovery  |                |
| CMED8010 Advanced Pharmacology                                   |                |
| CMED8011 Advanced Topics in Medicinal Administration             |                |
| <b>Total Credits:</b>  | <b>3</b>       |
| <b>Doctoral Thesis</b>   | <b>Credits</b> |
| CMED8999 Doctoral Thesis   | 18             |
| <b>Grand Total:</b>  | <b>25</b>      |

For students admitted without a relevant Master's degree, in addition to the above, students are required to take 1 more Required Elective from the 9 courses listed above.

INSTITUTE OF CHINESE MEDICAL SCIENCES

**Master's Degree Programmes****Master of Philosophy**• **Chinese Medicinal Science**

| <b>Year I</b>  |  | <b>Credits</b> |
|--|--|----------------|
| <b>Compulsory Courses:</b>                                       |  |                |
| CMED7001   | Pharmacology and Safety Evaluation                                   | 3              |
| CMED7002   | Introduction to Research in Chinese Medicinal Science                | 3              |
| CMED7008   | Quality Control of Chinese Medicine                                  | 3              |
| CMED7009   | Development of Drugs and Health Products                             | 3              |
| <b>Required Electives (Choose <u>four</u> of the following):</b> |  | 12             |
| CMED7003   | Medical Technology Management  |                |
| CMED7007   | Biomedical Informatics   |                |
| CMED7010   | Pharmaceutical Science   |                |
| CMED7011   | Systems Biology  |                |
| CMED7012   | Targets and Models for Drug Screen                                   |                |
| CMED7013   | Emerging Materials in Clinical Medicine                              |                |
| CMED7014   | Advanced Natural Products Chemistry                                  |                |
| CMED7015   | Progress in Contemporary Study of Chinese Medicine                   |                |
| CMED7016   | Application of Pharmacokinetics and Metabonomics in Drug Development |                |
| CMED7017   | Across the Gap between Science and Industry                          |                |
| CMED7020   | Computational Pharmacy   |                |
| <b>Total Credits:</b>  |  | <b>24</b>      |
| <br>   |  |                |
| <b>Year II</b>   |  | <b>Credits</b> |
| Thesis   |  | 12             |
| <b>Total Credits:</b>  |  | <b>12</b>      |
| <br>   |  |                |
| <b>Grand Total:</b>  |  | <b>36</b>      |

## Master's Degree Programmes

### Master of Philosophy

- **Medicinal Administration**

| <b>Year I</b>   | <b>Credits</b>        |
|---|-----------------------|
| <b>Compulsory Courses:</b>  |                       |
| CMED7003 Medical Technology Management                              | 3                     |
| CMED7004 Social Medicine  | 3                     |
| CMED7005 International Business and Law for Medicine                | 3                     |
| CMED7006 Introduction to Research in Medical Administration         | 3                     |
| <b>Required Electives (Choose <u>four</u> of the following):</b>    | <b>12</b>             |
| CMED7007 Biomedical Informatics                                     |                       |
| CMED7009 Development of Drugs and Health Products                   |                       |
| CMED7010 Pharmaceutical Science                                     |                       |
| CMED7011 Systems Biology  |                       |
| CMED7012 Targets and Models for Drug Screen                         |                       |
| CMED7018 Bio-Statistics   |                       |
| CMED7019 Standardization and Quality Management of Chinese Medicine |                       |
| CMED7020 Computational Pharmacy                                     |                       |
| CMED7021 Research Methodology                                       |                       |
| <b>Total Credits:</b>   | <b>24</b>             |
| <br>  |                       |
| <b>Year II</b>  | <b>Credits</b>        |
| Thesis  | 12                    |
| <b>Total Credits:</b>   | <b>12</b>             |
| <br>  |                       |
| <b>Grand Total:</b>   | <b>Credits<br/>36</b> |

INSTITUTE OF CHINESE MEDICAL SCIENCES

**Master's Degree Programmes****Master of Science**• **Medicinal Administration**

| <b>Year I</b>  |  | <b>Credits</b> |
|--|--|----------------|
| <b>Compulsory Courses:</b>                                       |  |                |
| CMED7004   | Social Medicine  | 3              |
| CMED7030   | Introduction to Medicinal Administration                   | 3              |
| CMED7031   | Social and Administrative Pharmacy                         | 3              |
| CMED7032   | Health Industry Innovation                                 | 3              |
| <b>Required Electives (Choose <u>four</u> of the following):</b> |  | 12             |
| CMED7007   | Biomedical Informatics                                     |                |
| CMED7019   | Standardization and Quality Management of Chinese Medicine |                |
| CMED7033   | Application of Medical Statistics                          |                |
| CMED7034   | Application Methodology for Medicinal Management           |                |
| CMED7035   | Application of Computer Technology in Pharmacy             |                |
| CMED7036   | Medical Innovation and Technology Management               |                |
| CMED7037   | Health Policy Assessment                                   |                |
| CMED7038   | Technical English for Healthcare Sector                    |                |
| <b>Total Credits:</b>  |  | <b>24</b>      |
| <br>   |  |                |
| <b>Year II</b>   |  | <b>Credits</b> |
| Project Report   |  | 6              |
| <b>Total Credits:</b>  |  | <b>6</b>       |
| <br>   |  |                |
| <b>Grand Total:</b>  |  | <b>Credits</b> |
|  |  | <b>30</b>      |

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## Course Description

### CMED7001 PHARMACOLOGY AND SAFETY EVALUATION

- Principles of Pharmacology.
- Mechanisms of some classes of drugs.
- Pharmacokinetics.
- In vitro and in vivo models for pharmacology research.
- Experimental models for evaluating drugs used in the areas of cancer, cardiovascular diseases, immunology and endocrinology.
- Principle of safety evaluation.
- Experimental models for drug safety evaluation.
- Acute toxicity in drug safety evaluation, suchronic and chronic toxicity studies, genotoxicity, developmental and reproductive toxicity testing, carcinogenicity studies.
- Pharmacological studies and safety evaluation of Chinese medicine.

Pre-requisite: None

### CMED7002 INTRODUCTION TO RESEARCH IN CHINESE MEDICINAL SCIENCE

- Harmless Chinese medicine and medicinal plants.
- Novel technology on the extraction, separation and purification of Chinese medicine.
- Novel dosage forms of Chinese medicine.
- Regulation and accreditation of the quality standard of Chinese medicine.
- Toxicity and adverse effects of Chinese medicine.
- Research, development and trends of the usage of Chinese medicine in clinical prevention, treatment and rehabilitation.

Pre-requisite: None

### CMED7003 MEDICAL TECHNOLOGY MANAGEMENT

- An introduction to:
  - Management.
  - Human resources management.
  - Financial control.
  - Costing study.
  - Audit system.
  - Organization development.
  - Centralization & Decentralization.
  - Marketing of pharmaceutical products.
  - Sales strategy of medical products.
- Quality control and surveillance of drugs and health products.
- International requirements on quality, safety and clinical trials of registered drugs.
- Good Guideline Practice (GGP).
- Good Agricultural Practice (GAP) of pollution-free Chinese medicine.
- Good Laboratory Practice (GLP) of non-clinical research.
- Good Clinical Practice (GCP).
- Good Manufacturing Practice (GMP).
- Good Supply Practice (GSP).
- Regulations of herbs and Chinese medicine in China, EU, US and East Asia.

Pre-requisite: None

### CMED7004 SOCIAL MEDICINE

- Theory and methods of social medicine research.
- Interactions between social economy, politics, culture and education.
- Principles and applications of economics on health delivery system.
- Social survey and its assessment.

- Medicine ethics.
- Human interactions and communication in medical practice.
- Analysis of psychological, behavioural and social factors of drug usage and abuse.
- Supply and demand of health services.
- Social responsibility of pharmacist.
- Marketing and regulation of drugs.
- Social welfare systems of China (Macao, Hong Kong, Taiwan) and other major western countries.
- Macro policy analysis and methodology.

Pre-requisite: None

### **CMED7005 INTERNATIONAL BUSINESS AND LAW FOR MEDICINE**

- An introduction to international business and trade.
- Introduction of health economics and pharmaceutical economics.
- Health Act & Regulation.
- Types of main international legal systems for medicine.
- Regulations and international treaties for the control of medicine.
- Establishment and operation of multi-national, joint-venture pharmaceutical enterprises/companies.
- Legal settlement for business disputes.
- Medical patenting, trademarks and intellectual property.
- Legal rights and obligations of medical wholesalers.
- Censorships and responsibility of advertisements of medical products.
- Registration of Chinese medicine in European and US markets and its related laws.

Pre-requisite: None

### **CMED7006 INTRODUCTION TO RESEARCH IN MEDICAL ADMINISTRATION**

- Medical care and social security systems in Europe, US and China.
- Developmental strategies for medical health economy and medical technology industry.
- Development strategies for medical technology.
- Development and trends of research in surveillance and management of medicine, functional food, cosmetics and other health products in China and worldwide.

Pre-requisite: None

### **CMED7007 BIOMEDICAL INFORMATICS**

Informatics broadly covers the studies of natural and artificial domains for communication, interaction, data, and information, and relating them to the processes of defining, developing, managing, criticising, and refining knowledge. Biomedical informatics focuses on the theories, methodologies, and technologies of informatics that are related to processing biological and medical knowledge. This course mainly introduces important concepts (not trivial details), including those in basic informatics, medical informatics, bioinformatics, and Chinese medicine informatics. Later parts of this course will cover the recent advances in some integrative approaches such as systems biology, translational medicine, and evidence-based/led Chinese medicine.

Syllabus:

- Knowledge representations and computational reasoning
- Knowledge management
- Web, semantic Web, and multi-agents
- Practical software development
- Medical knowledge-based technologies
- Medical evidence reasoning
- Medical knowledge discovery
- Algorithms for biological sequences and structures
- Prediction of protein structure and protein interactions

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- Analysing data from high-throughput experimentation
  - Systems biology and pathway modelling
  - Translational research in biomedicine
  - Medical research protocols
  - Evidence-based/led Chinese medicine

Pre-requisite: None

#### **CMED7008 QUALITY CONTROL OF CHINESE MEDICINE**

- Strategies of quality control for Chinese medicine.
- Optimization of marker for quality control of Chinese medicine.
- Samples preparation for quality control.
- New development for extraction, separation, and purification of major groups of active components.
- Application of modern biology on quality control of Chinese medicine.
- Chemical identification of major groups.
- Significant factors affecting the quality of Chinese medicine.
- Origin and species identification.
- Analysis of residual pesticides, heavy metals and arsenic salts.
- Contemporary analytical techniques in the quality control of Chinese medicine.
- Spectrophotometry, chromatography, mass spectrophotometry and their combined applications.

Pre-requisite: None

#### **CMED7009 DEVELOPMENT OF DRUGS AND HEALTH PRODUCTS**

- Introduction of international herbs, Chinese medicine and its health products.
- Precursor compounds.
- Principle and methods of drug design.
- Drug forms and process control.
- Screening of bioactive ingredients.
- Investigation of cellular and molecular mechanisms.
- Pharmacokinetics.
- Toxicology and drug dependence.
- Integrated clinical evaluation.
- Development of Chinese medicine, health products and cosmetics.
- Functions and safety assessment of health products and cosmetics.
- Development of simulation design on new drugs and health products.

Pre-requisite: None

#### **CMED7010 PHARMACEUTICAL SCIENCE**

- Optimal design of drug preparation.
- Novel medical subsidiary materials.
- Stability of drug preparation.
- Different types of preparations: slow-release and controlled-release preparations, targeted preparations, important and new types of Chinese medicine preparations, biotechnological preparations, etc.
- Manufacturing techniques and instruments used in drug preparation.
- Techniques and their applications in Chinese medicine preparations: inclusion technique, solid dispersion, micro-cyst, liposome, etc.

Pre-requisite: None

#### **CMED7011 SYSTEMS BIOLOGY**

- Principles of system biology.
- Gene expression, regulation and molecular cloning.
- Genomics (that is, organismal DNA sequence) and its application.



- Epigenetics (that is, DNA methylation, histone acetylation and deacetylation, etc.) and its application.
- Proteomics (that is, whole proteins and peptides from organismal, tissue, or cell level) and its application.
- Metabolomics (that is, organismal, tissue, or cell level measurements of all small-molecules) and its application.
- Application of system biology for studying Chinese medicine.

Pre-requisite: None

#### **CMED7012 TARGETS AND MODELS FOR DRUG SCREEN**

- Principles of targets, models and drug screen.
- Drug screen for the samples from different sources.
- High-throughput drug screen.
- High-content drug screen.
- Targets and models for anti-cancer compounds screen.
- Targets and models for anti-microorganism compounds screen.
- Targets and models for neuro-protective compounds screen.
- Targets and models for immune-regulation compounds screen.
- Targets and models for screening compounds for treatment of cardiovascular diseases.
- Screen biological active compounds from Chinese medicine.

Pre-requisite: None

#### **CMED7013 EMERGING MATERIALS IN CLINICAL MEDICINE**

This course aims to provide students a broad understanding of cutting-edge development in biomedical materials, devices and implants, and their emerging applications in clinical medicine. This course will introduce successful stories from bench to bedside (and beyond), discuss exciting breakthroughs in nanomedicine, tissue engineering, cancer therapy and regenerative medicine, as well as outline important regulatory and marketing challenges for these inventions.

Pre-requisite: None

#### **CMED7014 ADVANCED NATURAL PRODUCTS CHEMISTRY**

This course introduces and reviews the basic concepts of natural products chemistry, focusing on modern extraction and purification methods, and advanced spectroscopic methods. Biogenesis pathways of common natural products, as well as the biological activities and pharmaceutical importance of natural products will also be discussed. The course includes lectures and group discussion.

Pre-requisite: None

#### **CMED7015 PROGRESS IN CONTEMPORARY STUDY OF CHINESE MEDICINE**

The objective of this course is to provide an overview of progress in contemporary study of Chinese medicine. The course will consist of a series lectures based on the specific disciplines of Chinese medicine research, focusing on immunopharmacology, tumor pharmacology, cardiovascular pharmacology, toxicology, chemistry and medicinal pharmacy, etc. The academic staff in ICMS or guest speakers will be recruited to provide lectures in their areas of expertise, and each is responsible for respective course objectives. This course will also have a journal club component, which will enable students to read and present a scientific journal article related to the course.

Pre-requisite: None

#### **CMED7016 APPLICATION OF PHARMACOKINETICS AND METABONOMICS IN DRUG DEVELOPMENT**

This course aims to equip students with practical working knowledge of pharmacokinetics and metabonomics and its application to lead identification and target validation in drug discovery and development. Properties that affect pharmacokinetics, pharmacodynamics, and toxicity are discussed (i.e., physicochemical, interactions with human body). Cutting-edge models and

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technique platforms as well as comprehensive strategies are introduced. Cases examples from the literature illustrate successful lead selection and optimization using pharmacokinetics and metabonomics approaches in drug development.

Pre-requisite: None

#### **CMED7017 ACROSS THE GAP BETWEEN SCIENCE AND INDUSTRY**

There is a big gap between science and industry. This course tries to help student get across this gap by introducing necessary knowledge and skills in the industry. The course covers a wide range of information including: over all view of business of Chinese medical science, a glance of big Pharms, the organization of global company, product development strategies, project management, business communication skills, leadership and team work, knowledge transfer issues, introduction of generic drugs and the GXP in drug development. The course will be useful for those who want to move to industry after graduation and also for those who want to develop health related products in the university.

Pre-requisite: None

#### **CMED7018 BIO-STATISTICS**

This course is designed for master students to understand the basic bio-statics theory and skills. Also the course will teach students how to use the most advanced bio-statics softwares.

Pre-requisite: None

#### **CMED7019 STANDARDIZATION AND QUALITY MANAGEMENT OF CHINESE MEDICINE**

In 'Standardization and Quality Management of Chinese Medicine' course, some basic concepts and theories of standardization will be introduced. The topics include standard substance, uniformity stability, precision, ISO, Total Quality Management (TQM), Six Sigma (  $6\sigma$  ), Lean Manufacturing and Lab certification. Moreover, some cases will also be introduced to show how to design the quality of traditional Chinese medicine or new drugs.

Pre-requisite: None

#### **CMED7020 COMPUTATIONAL PHARMACY**

The course introduces computer application to pharmacy, including expert and knowledge-based systems, artificial intelligence, online pharmacy and medical databases, molecular modeling and computer-aided drug design, computational pharmaceuticals and bioinformatics. In computer laboratory, students will acquire initial skills of molecular modeling. They will also practice in searching online databases. The course will build a bridge between computer science and pharmacy for students.

Pre-requisite: None

#### **CMED7021 RESEARCH METHODOLOGY**

This course aims to help students to master the main research methods for their thesis projects, including qualitative methodology, case study, web content analysis, qualitative data analysis, network visualization and analysis, correlation analysis, multiple regression, etc. Moreover, students will learn how to write and publish academic papers in major journals.

Pre-requisite: None

#### **CMED7030 INTRODUCTION TO MEDICINAL ADMINISTRATION**

This is an introductory course that aims to provide an overview of the discipline of medicinal administration to the students. With an integrative vision of pharmacy and social science, the principles of and knowledge about modern pharmacy management, the approaches to medicinal management analysis, and the applications of evidence-based policy development and strategic planning in medicinal administration will be explained and discussed in details. Real-world case study in areas such as global drug research and development and drug-related laws and regulations (local, national and international) will be used to support the transformation of basic knowledge to practical skills. The students will also be supported to develop practical writing and presentation skills as important tools to communicate effectively about medicinal administration

at international level.

Pre-requisite: None

### **CMED7031 SOCIAL AND ADMINISTRATIVE PHARMACY**

The core functionality of an effective pharmaceutical system are driven by the widespread use and the speedy innovation of pharmaceutical products, as well as the evolving development and application of pharmaceutical services. This prompts an increasing need for individuals who are able to evaluate and leverage the social, psychosocial, political, legal, historic and economic factors impinging upon the availability, accessibility, affordability and acceptability of such products and services. To address such need, this course is designed to equip students with the abilities to apply interdisciplinary theories, knowledge and skills to pharmacy problem solving and pharmaceutical system development for positions of responsibilities and leadership in such sectors as industry, clinical setting, government agencies and educational institutions.

Pre-requisite: None

### **CMED7032 HEALTH INDUSTRY INNOVATION**

Health industry, composed of several components such as health care, pharmaceutical, medical device, community pharmacy, health insurance, etc, is facing multiple challenges and opportunities. This course will introduce the main frameworks of health industry innovation at both meso and micro level. Key management innovation practices will be presented and discussed in this course. Frontier documents in health industry innovation will also be introduced in this course to the students.

Pre-requisite: None

### **CMED7033 APPLICATION OF MEDICAL STATISTICS**

Bio- and medical statistics incorporate a variety of data types. The most common statistics reported are vital (birth, death, marriage, divorce rates), morbidity (incidence of disease in a population) and mortality (the number of people who die of a certain disease compared with the total number of people). Other common statistical data commonly used in the health sector include health care costs, the demographic distribution of disease based on geographic, ethnic, and gender variables, and data on the socioeconomic status and education of health care professionals. This course is designed to enable students to develop essential skills to determine the root causes of health-related problems, identify and collect the relevant data, and interpret the results of data analysis appropriately. Real-world examples will be used to demonstrate the translation of statistical concepts and techniques in problem-solving application in the health sector.

Pre-requisite: None

### **CMED7034 APPLICATION METHODOLOGY FOR MEDICINAL MANAGEMENT**

This course aims to introduce the key application methodologies that are needed for medicinal administration. Both qualitative and quantitative methods will be discussed in details in this course. Application project design will also be experimented to enhance students' ability to apply different kinds of application methodologies for medicinal administration.

Pre-requisite: None

### **CMED7035 APPLICATION OF COMPUTER TECHNOLOGY IN PHARMACY**

This course introduces computationally algorithmic methods in collection, transformation, storage, organization, distribution, retrieval, visualization, and analysis of pharmaceutical and healthcare information. It provides a unique opportunity for students to learn essential computational chemistry, bioinformatics, artificial intelligence, physiologically-based pharmacokinetic modelling and simulation, computer science and their applications in pharmacy and medicine.

Pre-requisite: None

### **CMED7036 MEDICAL INNOVATION AND TECHNOLOGY MANAGEMENT**

Medical Innovation and Technology Management is a discipline that combines medical sciences, technological innovation and practical management. It will introduce the current laws and policies

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of medical innovation management, provide basic knowledge and research methods, and train students' management ability in the development of new drug discovery by discussing the frontier issues of medical innovation management.

Pre-requisite: None

### **CMED7037 HEALTH POLICY ASSESSMENT**

Health policy assessment is the systematic evaluation of the properties and effects of a health policy, addressing the direct and intended effects of this policy approach, indicated its indirect and unintended consequences, and aimed mainly at policy decision making regarding health services. It includes method of evidence synthesis that considers evidence regarding clinical effectiveness, safety, cost-effectiveness and, health applications, includes social, ethical, and legal aspects of the use of health policy.

Pre-requisite: None

### **CMED7038 TECHNICAL ENGLISH FOR HEALTHCARE SECTOR**

Effective gathering, analysing, responding to and communicating about global medical information are pivotal for professionals in the health science and the health industry, especially in the current age of globalisation. This course aims to enable graduate students to understand the essentials of career technical requirements of English communication skills as professionals of 21st century in the health sector. The course content will focus on reading with precise and accurate interpretation of texts, establishing a formal style and objective tone in analysis about a given text, writing business plans and biomedical essays, and conveying a clear and distinct perspective through written and oral presentations. Interesting topics also include the structure of logical paragraphs, the tips to write concisely and avoid ambiguity, and tenses used in various forms of presentation.

Pre-requisite: None

### **CMED8001 ADVANCED PHARMACOKINETICS**

The principal objective of the course is to provide the students an in-depth insight into the basic processes that governs the disposition of drugs and other xenobiotics by the human body and the correlation with efficacy and toxicity. The course focuses on the application of the principles of pharmacokinetics solving problems in new drug discovery and development and the development of the herbal medicine products. Real-world cases will be reviewed and formal readings and discussions will occur throughout the course to foster critical thinking and independent learning.

Pre-requisite: Participants need to have knowledge in biological sciences, pharmaceutical sciences, mathematics

### **CMED8002 ADVANCED PHARMACEUTICS**

This course introduces the recent progress in the interdisciplinary field of pharmaceutical sciences, with particular emphases on drug delivery systems, nanoscale formulations as well as gene/cell therapy. It enables students to understand how these new theories and technologies can improve drug safety, enhance therapeutic efficacy and translate into new therapeutic modalities.

Pre-requisite: None

### **CMED8003 FUNCTIONAL FOOD PRODUCT DEVELOPMENT IN CHINESE MEDICINE**

This course will introduce students to the essential concept and development procedure of functional food in Chinese Medicine (CM). It includes basic knowledge of medicine - food dual purpose CM, functional ingredients in CM, pharmacological activity evaluation and safety evaluation. These lectures will also cover in moderate detail the new technologies and methodologies for the development of functional food from CM. Moreover, this course will introduce selected topics of functional food from other natural products, including functional fatty acids, mushroom, soy extracts, grape, etc. In addition, functional food regulations in China, USA and Europe will be briefly introduced.

Pre-requisite: None

**CMED8004 HEALTHCARE DECISION ANALYSIS**

This course aims to equip research students with the knowledge and skills to conduct evaluation research into the healthcare issues that require evidence-based reasoning and data analytics. Major healthcare cases related to complex diseases will be studied through interactive study and project-based research.

Pre-requisite: Before taking this course, the students should prepare themselves with a working knowledge of basic multivariate statistics and pathophysiology. Some knowledge of statistical software or data mining packages based on R or Python would be an advantage.

**CMED8005 QUALITY RESEARCH IN CHINESE MEDICINE**

This subject introduces the novel strategies, new methodologies and state-of-the-art techniques for quality research of Chinese medicines. Strategy of systematic evaluation, advanced instruments and analytical techniques including sample preparation and detection will be emphasized in the course.

Pre-requisite: None

**CMED8006 SEMINARS**

The Seminar is a graduate level course designed to give students an opportunity to hear from and interact with experts in their fields of study. ICMS will invite the leading local, national, and international scientists to speak about the latest advances in Biomedical Sciences. Graduate students also present talks about their own research. This experience gives the students practice speaking to the others and allows for the exchange of ideas as they conduct their thesis research.

Pre-requisite: None

**CMED8007 CHEMISTRY OF NATURAL MEDICINE**

This course is intended to provide an extensive understanding of chemistry of natural medicine and the cutting-edge techniques in discovering and developing natural medicines. Especially, the isolation, structural elucidation, classification, bioactivities and toxicities of natural medicines and related topics will be discussed in this course.

Pre-requisite: None

**CMED8008 ADVANCED PHARMACEUTICAL ANALYSIS**

The principal objective of the course is to provide the students an in-depth insight into the advanced development in strategies and practices in pharmaceutical analysis. The course focuses on the new methodologies and state of the art techniques for including sample preparation, instrumental analysis and data processing for pharmaceutical analysis. Real-world cases will be reviewed and formal readings and discussions will occur throughout the course to foster critical thinking and independent learning.

Pre-requisite: Participants need to have knowledge in analytical chemistry, pharmaceutical sciences, pharmaceutical analysis

**CMED8009 DRUG DISCOVERY**

This course will introduce students to the essential concepts and principles of drug discovery. It covers the latest and most outstanding developments on the medicinal chemistry and pharmacology of molecular drug targets, e.g. disease specific proteins, receptors, enzymes, and genes. This course also includes descriptions of current techniques in isolation and structural elucidation, screening techniques and high-capacity instrumentation for increased productivity in the development and discovery of new drugs.

Pre-requisite: None

**CMED8010 ADVANCED PHARMACOLOGY**

This course will introduce students to the essential concepts and principles of pharmacology. It includes descriptions of type of receptor, agonist and antagonist activities, analysis of agonist-effect relationships and the intracellular signaling pathways and transcriptional regulation at molecular level by which endogenous and exogenously applied compounds elicit effects. Also,

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this course will introduce some new research strategies recently developed in pharmacology such as systems pharmacology, network pharmacology. Lastly, this course will emphasize the hot topics of biology such as autophagy, hormesis, epithelial-mesenchymal transition, etc., which could be integrated into pharmacological study of Chinese medicine research.

Pre-requisite: None

### **CMED8011 ADVANCED TOPICS IN MEDICINAL ADMINISTRATION**

This course will introduce various advanced topics in medicinal administration to PhD students, including pharmaceutical care at community pharmacy, pharmaceutical innovation system, basic theories of standardization and quality management (ISO 9001), total quality management (TQM) and relevant case study, data and visualization of data, e-learning in pharmacy education, ICT in pharmaceutical industry, and drug registration and patent linkage. Once completing this course successfully, students can have a wide understanding of cutting-edge theories and methods in medicinal administration, which is crucial to integrate multidisciplinary resources to develop PhD study.

Pre-requisite: None

### **CMED8012 RESEARCH ETHICS**

The on-line course provides students with an understanding of the following issues:

- the need for research ethics and the responsibility of the researcher (the student)
- the most common types of academic dishonesty (such as fabrication and plagiarism)
- how to avoid committing acts of academic dishonesty (such as through using citations and references)
- how the University deals with students who have been proven to have committed acts of academic dishonesty (The University's 'Rules on Handling Student Academic Dishonesty' will be outlined)

Pre-requisite: None

### **CMED8013 RESEARCH WRITING**

The course focuses on helping students to make academic presentations whether verbally (as in a conference) or in writing (as in a paper). Topics include:

- how to write a research proposal
- how to structure a presentation (on paper and in powerpoint)
- tenses used in various parts of a paper presentation
- how to structure clear and logical paragraphs
- how to be concise
- how to avoid ambiguity and different writing styles (for example, conventions for use of numbers, abbreviations, etc.)

Pre-requisite: None