PH8007: MEDICAL IMAGING INSTRUMENTATION FOR RESEARCH AND CLINICAL PRACTICE

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Medical Imaging Instrumentation for Research and Clinical Practice

Subject Code
PH - Infectious Diseases and Public Health
Course Number
8007

Academic Unit
Infectious Diseases and Public Health (PH)

College/School
Jockey Club College of Veterinary Medicine and Life Sciences (VM)

Course Duration
One Semester

Credit Units
3

Level
R8 - Research Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract

The field of medical imaging instrumentation is centred on developing and evaluating new imaging methods and approaches, encompassing device and system development, novel methods of signal acquisition and reconstruction, synthesis of imaging contrast and therapeutic agents, algorithm design, and image processing and computational analysis. The subject aims to provide the student with knowledge of the fundamental working principles, practical operation, and quality management procedures of common diagnostic imaging equipment for research and clinical practice.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Demonstrate an understanding of the current status of medical imaging for research and clinical practice		x		
2	Critically review the imaging parameters and post imaging methods for image enhancement in research and clinical practice		x	x	
3	Interpret and evaluate medical images of normal anatomy and commonly encountered pathologies		x	x	x
4	Evaluate the clinical role and usefulness of medical image in the diagnosis of disease and research projects		x	x	x

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Students will be introduced to the fundamental working principles, practical operation, and quality management procedures of common diagnostic imaging equipment for research and clinical practice through lectures.	1, 2, 3, 4	

2	Tutorial and/or case studies	Student will participate in tutorial and/or case study sessions, which involve in-class interactive discussions, analyses and problem-solving activities to facilitate their better understanding on concepts studied during the classes and self-directed learning after classes.	2, 3, 4	
3	Hands-on practical tasks and literature review	Students will engage in hands-on problem-based group activities that will be conducted to facilitate conceptual mastery of working principles, practical operation, and quality management procedures of common diagnostic imaging equipment for research and clinical practice. Take-home literature review will also be assigned to critically assess the current status of medical imaging technological advance, development and contribution in research and clinical practice.	2, 3, 4	
4	Examination	Examination will be arranged to assess students' understanding and ability to apply subject-related knowledge learned in class, textbooks and required reading materials.	2, 3, 4	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	In-class Activities Students will be engaged in critical analyses and discussion of real-world research or clinical topics with the applications of common diagnostic imaging equipment. Hands-on problem-based group activities will also be conducted to facilitate conceptual mastery.	1, 2, 3, 4	10	-	Yes
2	Literature Review The literature review requires a critical appraisal of the current status of medical imaging technological advance, development and contribution in research and clinical practice. Students are allowed to focus a specialized area to develop the review.	1, 2, 3, 4	30	-	Yes
3	Group Presentation Project Students will work collaboratively in groups, prepare and deliver presentations on selected research or clinical topics with the applications of common diagnostic imaging equipment.	1, 2, 3, 4	30	-	Yes

Continuous Assessment (%)

70

Examination (%)

30

Examination Duration (Hours)
2

Minimum Continuous Assessment Passing Requirement (%)
40

Minimum Examination Passing Requirement (%)
40

Assessment Rubrics (AR)

Assessment Task
1. In-class Activities

Criterion
1.1 Ability to examine the technical knowledge on medical imaging for research and clinical practice.

1.2 Ability to critically evaluate the applications of medical imaging for research and clinical practice.

1.3 Ability to work effectively in a team while influencing others to achieve results.

Excellent
Excellent knowledge in medical imaging and very enthusiastic participation in class discussion.

Good
Significant knowledge in medical imaging and active participation in class discussion.

Fair
Moderate knowledge in medical imaging and some participation in class discussion.

Marginal
Basic knowledge in medical imaging and inadequate participation in class discussion.

Failure
Poor knowledge in medical imaging and very limited participation in class discussion.

Assessment Task
2. Literature review

Criterion
2.1 Ability to develop plans to apply medical imaging techniques in research and clinical practice.

2.2 Ability to work effectively in a team while influencing others to achieve results.

Excellent
Excellent analytic skills to examine the knowledge to demonstrate in-depth understanding of the applications of medical imaging.

Good

Significant analytic skills to examine the knowledge to demonstrate good understanding of the applications of medical imaging.

Fair

Moderate analytic skills to examine the knowledge to demonstrate adequate understanding of the applications of medical imaging.

Marginal

Basic analytic skills to examine the knowledge to demonstrate some understanding of the applications of medical imaging.

Failure

Poor analytic skills to examine the knowledge and is barely able to demonstrate an understanding of the applications of medical imaging.

Assessment Task

3. Group Presentation Project

Criterion

3.1 Ability to develop plans to apply medical imaging techniques in research and clinical practice.

3.2 Ability to work effectively in a team while influencing others to achieve results.

Excellent

Excellent presentation skills to demonstrate in-depth applications of medical imaging techniques as a great team work.

Good

Significant presentation skills to demonstrate good applications of medical imaging techniques as a good team work.

Fair

Moderate presentation skills to demonstrate adequate applications of medical imaging techniques as some team work.

Marginal

Basic presentation skills to demonstrate some applications of medical imaging techniques with inadequate team work.

Failure

Poor presentation skills to demonstrate applications of medical imaging techniques with very limited team work.

Assessment Task

4. Examination

Criterion

4.1 Ability to examine the technical knowledge on medical imaging for research and clinical practice.

4.2 Ability to critically evaluate the applications of medical imaging for research and clinical practice.

Excellent

Excellent knowledge in medical imaging and result in examination.

Good

Significant knowledge in medical imaging and result in examination.

Fair

Moderate knowledge in medical imaging and result in examination.

Marginal

Basic knowledge in medical imaging and result in examination.

Failure

Poor knowledge in medical imaging and result in examination.

Part III Other Information

Keyword Syllabus

Medical imaging, Radiation protection, General radiography, Computed Tomography, Magnetic Resonance Imaging, Ultrasonography, Nuclear Medicine

Reading List

Compulsory Readings

	Title
1	Suar, M., Misra, N., & Bhavesh, N. S. (Eds.). (2021). Biomedical Imaging Instrumentation: Applications in Tissue, Cellular and Molecular Diagnostics. Academic Press.
2	Smith, N. B., & Webb, A. (2010). Introduction to medical imaging: physics, engineering and clinical applications. Cambridge university press.

Additional Readings

	Title
1	Other Radiology/Radiography Journals and online references.