Macao Polytechnic University

Faculty of Applied Sciences

PhD of Computer Applied Technology

Module Outline

Academic Year <u>2022/2023</u>   Semester <u>1</u>

Learning Module	Research Methodology and Ethics		Class Code		COMP8121
Pre-requisite(s)	Nil				
Medium of Instruction	English			Credit	3
Lecture Hours	45 hrs	Lab/Practice Hours	0 hrs	Total Hours	45 hrs
Instructor	Dr. Xiaochen Yuan		E-mail	xcyuan@mpu.edu.mo	
Office	A313, Chi Un Building, Main Campus		Telephone	8599-6434	

Description

This module introduces the systematic investigation that attempts to establish facts on a scientific basis. The investigation involves discovery, interpretation, development, and execution of methods that are generic in nature, yet highly applicable to research in information technology and computer applied technology. Topics covered include review of a published article, literature review, identifying a research problem, reliability, validity, data collection, simulation, optimization, graphical modeling, research ethics, and research methods specific to information technology. In particular, practical research methodology, documentation, and transferrable skill, especially for the computing technology and engineering, will be investigated. Furthermore, it is also important to formulate ways to write research proposals and academic papers.

Learning Outcomes

After completing the learning module, students will be able to:

1. Maintain the professional standards among all students on upholding the integrity of academic research;

2. Acquire the important issues about research ethics, including the responsibility for research, ethical vetting, and scientific misconduct;

3. Carry out critical review of the literature on a selected area of research interest in computer

science and engineering;

4.   Design and carry out an advanced research project following a professional methodology;

5.   Identify the distinct research activities required over the research project cycle, and conduct good quality research in computer science and engineering;

6.   Articulate and harmonise ideas both in written and oral communications.

Content

1. Introduction to Research   **6.0 hours**

     1.1.   Concepts of research

     1.2.   The need for research

     1.3.   Types of research

     1.4.   Steps in conducting research

2. Research in IT   **9.0 hours**

     2.1.   Qualities of a Computer Scientist / Engineer

     2.2.   Meaning of Research in IT

     2.3.   Objectives of Research

     2.4.   Motivations in Research

     2.5.   Types of Research

     2.6.   Research Approach

     2.7.   Significance of Research

     2.8.   Level of Research

     2.9.   Research Process

     2.10.   Critical Thinking in Research

3. Literature Review   **6.0 hours**

     3.1.   Roles of literature review or survey

     3.2.   Why the need for literature review?

     3.3.   How to carry out a literature review

4. Technical Writing   **12.0 hours**

     4.1.   Categories of Academic Writing

     4.2.   Thesis Writing

     4.3.   Journal Articles Writing

     4.4.   Conference Papers Writing

     4.5.   Research Proposals

5. Professional Ethics   **6.0 hours**

     5.1.   Honor System

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    5.2.   Research Integrity

    5.3.   Research Misconduct

    5.4.   Self-Plagiarism

    5.5.   Responsible Conduct in Research (RCR)

6.   Research Topics   **6.0 hours**

    6.1.   Introduction to related research topics

Teaching Method

Lectures, case studies, group discussion.

Attendance

Attendance requirements are governed by the "Academic Regulations Governing Doctoral Degree Programmes of Macao Polytechnic University." Students who do not meet the attendance requirements for the module will not be permitted to sit the final examination and shall be awarded an 'F' grade.

Assessment

The learning module is graded on a 100 point scale, with 100 being the highest possible score and 50 being the passing score.

	Item	Description	Percentage
1.	Assignment	Literature Survey	25%
2.	Assignment	Project Proposal	25%
3.	Project	Knowledge assessment	50%
		Total Percentage:	100%

Teaching Material(s)

Textbook(s)

No recommended textbook, the learning materials will be provided to students during the classes.

Reference

Reference book(s)

1.   Trochim W. M. K., Connelly J. P., Arora K. (2015) The Research Methods Essential Knowledge Base, 2nd Ed., Wadsworth Publishing.

2.   Walliman N. (2011) Operating Research Methods - The Basics, Routledge (Taylor & Francis Group).

3.   Deb D., Dey R., Balas V. E. (2019) Engineering Research Methodology - A Practical Insight for Researchers, Springer Nature Singapore.

4. O'Leary Z. (2017) The Essential Guide to Doing Your Research Project, 3rd Ed., SAGE Publications Ltd.

Website(s)

5. ACM Code of Ethics, https://www.acm.org/about/code-of-ethics
6. IEEE Computer Society SE Code of Ethics, http://www.computer.org/cms/Computer.org/ Publications/code-of-ethics.pdf
7. NAS Responsible Conduct in Research, http://w.astro.berkeley.edu/~kalas/labs/ documents/On_being_a_scientist.pdf
8. S. Rajasekar et al, Research Methodology, http://arxiv.org/pdf/physics/0601009.pdf.