4. Course Specification: Research Methodology (CPPM 704)

I. General Information:

Field	Details
1. Course Title	Research Methodology
2. Course Code	CPPM 704
3. Credit Hours	3
4. Contact Hours	4.5 (3 Theoretical + 1.5 Research/Practical)
5. Level/ Semester	Master's / First Semester
6. Prerequisite (if any)	None (Mandatory Course)
7. Program(s) in which the Course is Offered	Master of Cardiopulmonary Perfusion
8. Language of Teaching the Course	English
9. Prepared by	
10. Date of Approval	October 2025

II. Course Description:

This course introduces master's students to the fundamental principles and methods of scientific research, with a focus on health sciences and cardiopulmonary perfusion. It covers the process of formulating research questions, selecting appropriate study designs, data collection, basic biostatistics, ethical considerations, and the development of a research proposal. The course aims to equip students with the necessary skills to critically appraise literature and conduct independent research.

III. Course Intended Learning Outcomes (CILOs):

CILOs	**Referenced PILOs (I, P, M/A)**
A. Knowledge and Understanding:	
a1 Describe the different types of research designs (quantitative, qualitative, mixed methods) and their application in perfusion science.	M/A (A1)
a2 Explain the core principles of research ethics, including informed consent, confidentiality, and the role of the IRB.	M/A (A2)
a3 Identify the key components of a rigorous research proposal and scientific paper.	M/A (A3)
B. Intellectual Skills:	
b1 Formulate a clear, focused, and researchable question, hypothesis, and set of objectives for a study in the field of cardiopulmonary perfusion.	M/A (B1)
b2 Critically appraise published research articles to evaluate their methodology, results, and relevance to clinical practice (Evidence-Based Practice).	M/A (B2)
C. Professional and Practical Skills:	
c1 Conduct a systematic literature search using relevant databases and manage references effectively.	M (C1)
c2 Apply basic biostatistical tests (e.g., t-test, Chi-square) using statistical software (e.g., SPSS) to analyze simple data sets.	P (C2)
D. Transferable Skills:	
d1 Develop and present a preliminary research proposal following academic standards.	M (D1)
d2 Work effectively in a group to critique research and collaborate on proposal development.	P (D3)

IV. Course Contents:

Main Topic	Subtopics	Week	Hours	Aligned CILOs
1. Introduction and Research Question	Importance of Research, Types of Research, Formulating Problem, Objectives, and Hypotheses.	1-2	4	a1, b1
2. Literature Review and Ethics	Systematic Review Process, Reference Management, Research Ethics (IRB, Consent, Confidentiality).	3-4	4	a2, c1
3. Research Designs	Quantitative Designs (Descriptive, Analytical, Experimental - RCTs), Sampling Techniques (Size Calculation).	5-7	6	a1, b2
4. Data Collection and Biostatistics	Data Collection Tools, Validity/Reliability, Descriptive Statistics (Measures of Central Tendency/Dispersion).	9-10	4	c2
5. Inferential Statistics	Hypothesis Testing, T-Tests, Chi-Square Test, Correlation, ANOVA (Basic).	11-12	4	c2
6. Research Proposal and Dissemination	Proposal Structure, Budget, Timeline, Scientific Writing, Peer Review Process, Presenting Findings.	13-14	4	a3, d1

V. Teaching and Learning Resources:

Category	Resources
Core Textbooks	1. **Research Methodology in the Health Sciences: A Quick Reference Guide** by S. K. A. G. (2021). *McGraw Hill*. 2. **Introduction to Research in the Health Sciences** (7th Edition) by S. Polgar (Latest Edition). *Elsevier*.

Supplementary Texts	1. **Biostatistics: A Foundation for Analysis in the Health Sciences** (Latest Edition) by W. W. Daniel & J. C. Cross. *Wiley*. 2. **Designing Clinical Research** (Latest Edition) by S. B. Hulley. *Lippincott Williams & Wilkins*.
Journals & Databases	Journal of ExtraCorporeal Technology (JECT), The Lancet, NEJM, PubMed, Scopus.