COURSE WORK

DOCTOR OF PHILOSOPHY

(Ph.D.)

Department of Computer Applications

Sikkim University

6th Mile, Tadong, Gantok, Sikkim

1. Preamble

The six-months mandatory course work program is a pre-requisite for the enrolled Ph.D. students, aims to prepare them to start research activities. The course involves the activities associated with scientific research, particularly in the area of Computer Science. It introduces the essential aspects of designing, supporting, and conducting a research project. Those who successfully complete the course will be able to produce a well-developed research proposal, select an appropriate methodology with which to conduct the research, defend the methodology, understand the various tasks required to carry out the research, to find the resources needed to guide them through the research process and the documentation of its findings.

The course-work contains three subjects: Research Methodology, Proposal Preparation, and one paper related to the proposed research topic as Elective subject.

The research methodology is an integral component of any research course-work program. The necessary credit for this particular may be earned through MOOC (SWAYAM/NPTEL) platform or through the teaching offered by the Department.

Research Proposal to be prepared and presented by the candidate in supervision of subject expert/supervisor in a non-teaching mode.

Elective paper to be selective from given list based on the recommendation of the supervisor/head of the department.

2. Subject Coding Scheme

2.1 Adopted Subject Code:

CA-PHD-ABCD

2.2 Acronym used in Course Code

CA – Computer Applications

PHD – Ph.D

2.3 Coding for the Papers:

Four characters Alpha-Numeric code is used as Paper Code:

A	B	CD
C-Core Subject E-Elective S-Seminar	Semester No. (i.e. 1)	Paper Number

Ph.D. COURSE-WORK STRUCTURE (6 Months)

SEMESTER I						
SUBJECT CODE	SUBJECT NAME	L	T	P	Total Marks	CREDIT
CA-PHD-C101	Research Methodology in Computer Science*	4	0	0	100	4
CA-PHD-S102	Research Proposal Preparation & Presentation	0	0	4	100	4
CA-PHD-E1XX	Elective	4	0	0	100	4
Total:					300	12

* The necessary credit for the course may be earned through online SWAYAM/NPTEL.

CA-PHD-C101	Research Methodology in Computer Science	L-4: T-0:P-0	Marks: 100	Credit: 4

Introduction: Research and its importance, Objectives and motivation of research, Steps in scientific research, Journal Impact Factor, Indexing Databases, Open & Closed Access Journals, Peer review process, Citation, H-Index, i10 index.

Types of Research: Types, Research process and steps in it, Hypothesis, Research proposals and aspects.

Research Design: Need, Problem definition, research design concepts, research design process, errors in research.

Tools of research: Resources, Measurements for Computer Science research, Statistics, Data analysis tools.

Formulating research problems: Finding a problem, stating the problem, identifying subproblems.

Review: Literature review, Reading a paper, Critique, Survey.

Research Planning: The scientific methods, Research planning, Data analysis.

Documentation: Characteristics and organization of a paper, Writing effective paper, Pre-writing considerations, thesis writing, formats of report writing, formats of publications in research journals.

Latex: Exposure to LaTeX, Installation, MikTeX, Tex-Editors, Creating reports and articles, Latex environments, Figures, Tables, BibTeX - reference manager, Camera Ready Preparation.

Ethics of Research: Plagiarism & research ethics, Types of Plagiarism, Plagiarism checkers, IEEE-Five levels of punishment for plagiarism, UGC research & publication ethics.

Suggested Readings:

Any current literature (online & offline), Research Papers, web articles, blogs, online& offline lecture notes/slides.

CA-PHD-S102	**Research Proposal Preparation & Presentation**	**L-0: T-0:P-4**	**Proposal: 50 Presentation: 50**	**Credit: 4**

It is a 4-credit course to be undertaken by the candidate in a self-learning mode under the supervision of any prospective supervisor/subject expert. It involves literature review, state-of-the-art study, drawing motivation towards novel research ideas and write a research proposal based on the study. Candidate needs to present his proposal at the end of the semester in front of the appropriate Research Committee. There will be no sessional tests and no attendance requirement for this paper. The performance of the candidate will be evaluated based on the prepared research proposal (out of 50 marks) and presentation (out of 50 marks).

CA-PG-E1XX	Elective	L-4: T-0: P-0	Marks: 100	Credit: 4

This course will be offered by the Department. The selection of the paper to be decided by the head/supervisor of the scholar. The detailed syllabus for each subject is a mere guideline. Concerned teacher may teach any essential and latest topic as he/she considers deem fit in addition to the listed topics. Students are encouraged and free to refer any current literature to get into any latest topic in a particular paper. List of Electives papers are given below:

Sl. No	Code	Name
1	CA-PHD-E103	Data Science
2	CA-PHD-E104	Machine Learning
3	CA-PHD-E105	Artificial Intelligence
4	CA-PHD-E106	Data Mining
5	CA-PHD-E107	Cryptography & Network Security
6	CA-PHD-E108	Cloud Computing
7	CA-PHD-E109	Internet of Things
8	CA-PHD-E110	Bioinformatics
9	CA-PHD-E111	Operation Research
10	CA-PHD-E112	Digital Image Processing

The detailed content of the papers is same with the Elective-I in MCA course (2 Years) of the Department and available in Annexure-I in the 2-Year MCA syllabus.

The above list will be updated time-to-time to accommodate new research related topics on the recommendation of the supervisors and after due approval by the University.