SCHEME OF EXAMINATION

&

SYLLABI

for

Course Work

of

DOCTOR OF PHILOSOPHY (PhD)

in

IT/CSE/CA/ECE/MAE

Offered by

University School of Information, Communication and Technology
w.e.f. Academic Session 2023-24

GURU GOBIND SINGH
INDRAPRASTHA
UNIVERSITY

Guru Gobind Singh Indraprastha University
Sector 16C, Dwarka, Delhi – 110 078 [INDIA]
www.ipu.ac.in

Vision of the School

Create high-quality engineering professionals

Mission of the School

To serve humanity by creating professionally competent, socially sensitive engineers with high ethical values who can work as individuals or in groups in multicultural global environments.

13/08/2015

PROGRAMME OUTCOMES

PO1: Demonstrate substantive knowledge and ability to teach courses in their area of research/ specialization.

PO2: Apply analytical and methodological skills to evaluate and conduct research in their area of specialization and other related areas.

PO3: Independently design and conduct original research in their area of specialization.

PO4: Demonstrate the ability to communicate the results of their research in a clear and effective manner.

PO5: Apply the understanding for the high ethical concerns and standards in carrying out engineering research, teaching and service.

13/08/2015

Acronyms:

L: Number of Lecture hours per week
P: Number of Practical Hours per week
C: Number of credits assigned to a course / paper
NUES: Non-University Examination System (An evaluation scheme in which evaluation is conducted by a committee, a teacher or a group of teachers as described in the scheme of study)
COE: Controller of Examination of GGSIPU
RAC: Research Advisory Committee
SRC: School Research Committee

Selected Points in line of PhD ordinance 12 (2023) clause 7

1. The credit requirement for PhD course work shall be minimum of *12 credits*.
2. *"Research Methodology(credit-4)"*, *"Research & Publication Ethics(credit-2)"* & *"Seminar on Literature review & Research Proposal(credit-2)"* are compulsory courses with 8 credits in total.
3. Remaining credits requirement may be fulfilled on the recommendation of RAC from the courses offered in MTech Programme of USICT in the discipline of CSE/IT/ECE/RA or from any other online courses as mentioned in the scheme.
4. All candidates admitted to PhD programme(s) shall be required to complete coursework during the initial one or two semesters. The maximum period for completion of the course work shall be two years from the academic session in which the scholar is admitted. If a scholar fails in any course/paper, the scholar shall reappear as and when the course/paper is scheduled subsequently.
5. Evaluation of courses shall be done as per the Ordinance-12.

Anjana 13/08/2025

DETAILED SCHEME

Programme Core: To be offered in odd/Even semester						
Sr. No.	**Paper Code**	**Paper Name**	**L**	**T/P**	**Credits**	**Load (hrs./week)**
1.	PHDICT-101	Research Methodology	4	0	4	4
2.	PHDICT-102*	Research and Publication Ethics	1	2	2	2
3.	PHDICT-103*	Seminar on Literature review & Research Proposal	-	-	2	-
Programme Elective: To be offered in odd/Even semester						
4.	Any course from the scheme of M. Tech (Regular/Weekend) in IT/CSE/ECE/RA of USIC&T					
5.	Any course from NPTEL offered at (https://nptel.ac.in/). A course of 4 weeks shall be counted equivalent to 1 credit.					
6.	Any relevant course from SWAYAM offered at (https://swayam.gov.in/) A course of 4 weeks shall be counted equivalent to 1 credit.					

*NUES

1. Examination for the course(s) offered at Sr. No. 1 and 4 shall be conducted by examination division of university, as per rules laid down in PhD Ordinance 12(2023)
2. Scholars desired to study course work must submit their application duly recommended by RAC to Dean, USICT within one week of commencement of semester in prescribed proforma.
3. Scholars desired to study through online NPTEL/SWAYAM course, should get recommendation of RAC. List of course(s) recommended by various RAC shall be approved by SRC. List of approved courses along with certificate shall be forwarded to examination division for transferring the credits in marksheet/certificate.
4. If scholar failed to submit passed certificate from respective on-line portal in same semester, scholar is free to repeat a course or opt for another course from elective list (sr. no. 4-6) within maximum duration of course work as specified.

13/08/2025

Subject: Research Methodology

Paper ID:	L	T	C
Paper Code: PHDICT-101	4	0	4

Course Outcomes:

CO1: To Develop an experiment model using Probabilities set Theory.
CO2: To Develop a probability distribution function for given application.
CO3: To develop a model for Hypothesis Testing
CO4: To Develop a regression model for engineering application

Unit I

Experiments, Models, and Probabilities Set Theory, Applying Set Theory to Probability, Probability Axioms, Some Consequences of the Axioms, Conditional Probability Independence, Independent Trials, Discrete Random Variables, Probability Mass Function Cumulative Distribution Function (CDF) Functions of a Random Variable, Expected Value of a Derived Random Variable, Variance and Standard Deviation, Conditional Probability Mass Function

Unit II

Continuous random variables: The Cumulative Distribution Function, Probability Density Function, Expected Values, Gaussian Random Variables, Pairs of Random Variables: Joint Cumulative Distribution Function, Joint Probability Mass Function, Joint Probability Density Function

Unit III

Hypothesis Testing, hypothesis testing for single populations, Statistical inference about two populations. Non-parametric tests: Runs test, Mann Whitney U-test, Friedman test, Wilcoxon test

Unit IV

The Simple Regression Model. Multiple Regression Analysis: Estimation, Multiple Regression Analysis: Inference, Multiple Regression Analysis: OLS Asymptotic. Multiple Regression Analysis with Qualitative Information: Binary (or Dummy) Variables. Heteroskedasticity

Text Books:

1. Roy D. Yates, David J. Goodman, Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer Engineers, Second edition, John Wiley and Sons,2005
2. Jeffery M. Wooldridge, Introductory Econometrics, New York, South Western, 4th edition, 2002
3. Ken Black: Business Statistics for contemporary decision making, Wiley India, 5th edition,2009

Arjun 13/08/2015

Subject: Research and Publication Ethics

Paper ID:	L	T	C
Paper Code: PHDICT-102(NUES)	1	2	2

Course Outcomes:

CO1: To understand Philosophy, Ethics and Scientific conduct
CO2: To understand Publication Ethics
CO3: To understand Open Access Publishing and Publishing Misconduct
CO4: To understand Database and Indexing

THEORY

Unit–1: (8 Hrs)

Philosophy and Ethics: Introduction to philosophy: definition, nature and scope, concept, branches.
Ethics: definition, moral philosophy, nature of moral judgments and reactions
Scientific Conduct: Ethics with respect to science and research, Intellectual honesty and research integrity, scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP), Redundant publications: duplicate and overlapping publications, salami slicing, Selective reporting and misrepresentation of data

Unit-2: (7 Hrs)

Publication Ethics: Publications ethics: definition, introduction and importance, best practices/ standards setting initiatives and guidelines: COPE, WAME, etc., Conflicts of interest, Publication misconduct: definition, concept, problems that lead to unethical behaviour and vice versa, types, Violation of publication ethics, authorship and contributor ship, Identification of publication misconduct, complaints and appeals. Predatory publishers and journals

TUTORIAL/PRACTICAL

Unit-3: (8 Hrs)

Open Access Publishing: Open Access Publications and initiatives, SHERPA/ RoMEO online resource to check publisher copyright & Self-archiving policies, Software tool to identify predatory publications developed by SPPU, Journal finder/ journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggested, etc.

Publication Misconduct: Subject Specific ethical issues, FFP, authorship, Conflicts of interest, Complaints and appeals: examples and fraud from India and abroad *(Through Group Discussions)*. Use of plagiarism software like Turnitin, Urkund and other open-source software tools *(Through Software Tools)*

Unit-4: (7 Hrs)

Databases: Databases Indexing databases, Citation databases: Web of Science, Scopus, Etc.
Research Metrics: Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score. Metrics: h-index, g-index, i10 index, altimetric.

References:

1. Professional Ethics by R. Subramanian, Oxford Press
2. Textbook of Research Ethics by Loue Sana, Springer 2002
3. https://www.springer.com/gp/authors-editors/authorandreviewertutorials/submitting-to-a-journal-and-peer-review/publication-ethics/10285588

Anjana 13/08/2025

Subject: Seminar on Literature Review & Research proposal

Paper ID:	L	T	C
Paper Code: PHDICT-103(NUES)	-	-	2

Course Outcomes:

CO1: To able to review existing literature in the area of research

CO2: To able to identify research gaps/limitations of existing literature

CO3: To identify research methodology to overcome research gaps

CO4: To able to frame objectives of own research

Course Outline

- Consulting and reviewing of research papers/books/doctoral thesis/project reports etc. in the area of research.
- Regular presentation of literature review to supervisor
- Compilation and submission of research proposal consisting literature review, research gaps, methodology and objectives in the form of report.
- Presentation of research proposal before RAC for evaluation and approval.