

University of Kalyani

**Department of Library and Information Science**

**Syllabus**

**Ph.D. Course Work in Library & Information Science**

**2023-2024 session onward**

*(Approved in the DRC meeting held on 15.09.2023 under Item No. 2)*

### Course Structure

- One semester [six (6)- month) semester] sixteen (16) credits Ph.D. course work;
- The coursework is a prerequisite for Ph.D. programme;
- Eight credits (08) are assigned to the courses on Research Methodology (quantitative methods, computer applications, research ethics and review of published research in the relevant field)
- Eight credits (08) are assigned to the advanced level courses in the domain of LIS

Course Code	Course Title	Marks for Term end Examination	Internal Assessment	Presentation & Viva	Total Marks	Course Credit
LSP-CW1	Research Methodology A	30	10	10	50	4
LSP-CW2	Research Methodology B	30	10	10	50	4
LSP-CW3	Advanced level course on LIS (A)	30	10	10	50	4
LSP-CW4	Advanced level course on LIS (B)	30	10	10	50	4
Total Marks and Credits		120	40	40	200	16

### Objectives

The basic objective of the Ph.D coursework in Library and Information Science is to develop ability in the students of the course to undertake research independently by following the proper research methodologies and by maintaining the academic honour code. The specific objectives of the Ph. D. coursework in Library and Information Science are -

- to know steps and methods of research right from research question formulation to research communication;
- to understand academic honour code, and norms & guidelines related to research ethics;
- to attain ICT skills to identify quality digital information sources, to use reference management tools, and to archive research communication;
- to explore the Open Access (OA) philosophy in research, and to contribute in OA knowledge pool;
- to know major research categories in LIS research, and to understand trends in LIS research;
- to upgrade knowledge base related to the frontier areas of LIS discipline; and
- to apply skills to produce a systematic research study in an area of choice.

Course Code	Course Title	Term end Examination	Internal Assessment	Presentation & Viva	Total Marks	Course Credit
<b>LSP-CW1</b>	Research Methodology A	30	10	10	50	4

#### Learning outcome

After this course, students will be able to:

- explore steps in research
- pinpoint research problem
- know research design processes
- develop search skills
- understand quality of information sources
- germinate research communication skills
- understand academic honour code
- learn ICT-enabled tools for research including AI tools

#### Objectives

- To introduce the different methods and techniques of research
- To familiarize in the use of data organization and representation skills
- To understand trends of research communication processes
- To make researchers able to use research support tools
- To help researchers in identifying trends and directions of research in respective domain.
- To know applications of ICT in general and AI in particular as research support tools
- To understand academic honour code and research ethics

## Course Content

---

**To be conducted with a focus on the following topics:**

- Quantitative Methods
- Qualitative Methods
- Computer Applications
- Research Ethics
- Training and Field Work

## Evaluation

Term end Final examination of 30 marks (in MCQ pattern)  
(to be conducted at the departmental level)

Internal assessment of 10 marks  
(to be conducted at the departmental level in the form of a project/MCQ based test)

Presentation / Viva of 10 marks  
(topic of the project/presentation will be allotted to students by respective supervisors, and to be evaluated jointly by the internal members of the DRC in Library and Information Sc.)

## **LSP-CW1: Research Methodology A**

**Group – A (Research methodology and general statistics) :**

**1 Credit**

**Unit 1:** Introduction to Research Methodology: Research – Definition, Importance, Characteristics – Types of Research - Research question – Importance of Survey of Literature – formulation of research question and objectives – Formulation of hypothesis – types of hypothesis - Research process – research design – developing a research plan - Types of research methods

**Unit 2:** Types of data - Sources of data - Methods of collecting data – Sampling methods

**Unit 3:** Qualitative Research Methods - Various qualitative research methods – Ethnography, Historical, Narrative, Phenomenological, Case studies, Grounded theory, Content analysis, Framing analysis, Rhetorical analysis, Discourse analysis

**Unit 4:** Quantitative research methods: Frequency distribution – Presentation of data – Descriptive statistics – Correlation analysis, Qualitative Research Methods – Case Studies, Quantitative research methods: Non-parametric methods - Basic Regression analysis – Inference and hypothesis testing

**GROUP - B (Research ethics and research communication):**

**2 credits**

**Unit 1: Ethical aspects of undertaking research**

Concept of Philosophy, Basic Philosophical Assumption to Social Science Research, Major Philosophies in Social Science Research, Research Philosophy, Approaches to Theory Development in Research, Ethical Judgements in Research , Academic honour codes – global & national.

**Unit 2: Managing scientific conduct**

Concept of Academic Integrity: Integrity Concepts, Academic integrity; Scientific Misconduct and Research Fraud (Falsification, Fabrication, Plagiarism, Retraction: FFPR): Scientific misconduct, Research Fraud, Intellectual Honesty in Research; Redundant publications: Duplicate and Overlapping publications, Salami Slicing; Selective Reporting and Misrepresentation of Data: Selective Reporting, Misrepresentation of Data

**Unit 3: Publication ethics**

Concept of Publication Ethics, Research Ethics: Concept and Objectives, Ethics Committee, Managing Publication Ethics through Best Practices Standards: COPE, WAME; Publication & Research Misconduct: Concept of Research Misconduct, Concept of Plagiarism, Nature of Plagiarism, UGC Guidelines on Levels of Plagiarism, Plagiarism : AI vs AI; Plagiarism Detection Software-Selection of Appropriate Software, Violation of Publication Ethics, Authorship and

Contributorship - Conflict of Interest: Note on Violation of Publication Ethics, Authorship and Contributorship, Conflict of Interest; Identification of Publication Misconduct and Appeal; Concept of Publication Misconduct, Responding to allegations of possible misconduct; Predatory Journals and Publishers: Backdrop, Meaning of Predatory Journal, Characteristics of a Predatory Journal; Way to Find Predatory Journals and Publishers, Role of Academic Community to Fight Against Predatory Publication

#### **Unit 4: Scientific writing**

Structure and components of Scientific Reports, Preparation of Project Proposal, Preparation of manuscript for Seminar Presentation and Publication of Research paper, Components of Doctoral Thesis, Footnotes and Referencing Styles.

### **Group – C (ICT-enabled research support tools and services):**

**1 Credit**

#### **Unit 1: Basic ICT tools for research**

Advanced level training on Linux-based, OS, LAMP architecture, Python & R programming, Data carpentry and Statistical data management in PSPP, Reference management

#### **Unit 2: Search to research**

Search techniques, search strategies, search tools; Open Access (OA) resources - Open Access Vs Toll Access, OA types, OA services; Open Access path finder services.

#### **Unit 3: Tools for literature review**

Use of citation/reference networks in literature review; Tools and Techniques for literature review; AI based literature review.

#### **Unit 4: Data Science & statistical tools**

Statistical packages (R, Python), Statistical Computing, Advanced spreadsheet operations; Digital Access Brokers; Data Wrangling Tools & Techniques.

## Reading list (specific to research in LIS)

- Alimohammadi, D. (2010). *Operations research for library and information professionals*. New Delhi: Ess Ess Publications.
- Busha, Charles A. & Harter, Stephen P.: *Research Methods in Librarianship: Techniques and Interpretations*. New York: Academic Press, 1980.
- Connaway, L. S., & Powell, R. R. (2010). *Basic research methods for librarians*. Santa Barbara, Calif: Libraries Unlimited.
- Court, D., Abbas, R., Riecken, T. J., Seymour, J. L., & Tran, M.-A. L. (2018). *Qualitative research and intercultural understanding: Conducting qualitative research in multicultural settings*.
- Denzin, N. K., & In Lincoln, Y. S. (2018). *The SAGE handbook of qualitative research*.
- Egghe, L. & Rousseau, R.: *Introduction to Informetrics: Quantitative Methods in Library, Documentation and Information Science*. Amsterdam: Elsevier, 1990.
- Fujii, L. A. (2018). *Interviewing in social science research: A relational approach*.
- Garcin, T. K. (2018). *Theoretical developments in library and information science*.
- Glazier, Jack D. & Hall, Peter M., eds.: *Qualitative Research in Information Management*. Englewood, CO: Libraries Unlimited, 1992.
- Gorman, G.E. & Clayton, Peter: *Qualitative research for the information professional: a practical handbook*. 2nd ed. London: Facet Publishing, 1997.
- Hafner, Arthur W. *Descriptive Statistical Techniques for Librarians*. 2nd ed. Chicago: American Library Association, 1997.
- Hernon, Peter & Richardson, John V., eds.: *Microcomputer Software for Performing Statistical Analysis: A Handbook Supporting Library Decision Making*. Norwood, NJ: Ablex Publishing Corporation, 1988.
- Kraft, Donald H. & Boyce, Bert R.: *Operations Research for Libraries and Information Agencies: Techniques for the Evaluation of Management Decision Alternatives*. San Diego: Academic Press, 1991.
- Leckie, G. J., Given, L. M., & Buschman, J. (2010). *Critical theory for library and information science: Exploring the social from across the disciplines*. Santa Barbara, Calif: Libraries Unlimited.
- Lloyd, A., Talja, S., & Charles Sturt University. (2010). *Practising information literacy: Bringing theories of learning, practice and information literacy together*. Wagga Wagga, N.S.W: Centre for Information Studies, Charles Sturt University.
- Losee, Robert M., Jr. & Worley, Karen A.: *Research and Evaluation for Information Professionals*. San Diego: Academic Press, 1993.
- Lynam, Peter, Slater, Margaret & Walker, Rennie: *Research and the Practitioner: Dissemination of Research Results within the Library-Information Profession*. London: Aslib, 1982.
- Martyn, John & Lancaster, F. Wilfrid: *Investigative Methods in Library and Information Science: An Introduction*. Arlington, VA: Information Resources Press, 1981.
- McClure, Charles R. & Hernon, Peter, eds.: *Library and Information Science Research: Perspectives and Strategies for Improvement*. Norwood, NJ: Ablex Publishing Corporation, 1991.
- Mellon, Constance A.: *Naturalistic Inquiry for Library Science: Methods and Applications for Research, Evaluation, and Teaching*. New York: Greenwood, 1990.
- Moore, Nick: *How to Do Research*. 2nd ed. London: Library Association,
- Powell, Ronald R.: *Basic Research Methods for Librarians*. 3rd ed. Greenwich, CT: Ablex Publishing Corporation, 1997.
- Priest, S. H., In Goodwin, J., & In Dahlstrom, M. F. (2018). *Ethics and practice in science communication*.
- Prytherch, Ray: *Information Management and Library Science: A Guide to the Literature*. Brookfield, VT: Gower, 1994.
- Quinton, S., & Reynolds, N. (2018). *Understanding research in the digital age*.
- Ravichandra, R. I. K. (2010). *Growth of literature and measures of scientific productivity: Scientometric models*. New Delhi: Ess Ess Publications.
- Salganik, M. J. (2018). *Bit by bit: Social research in the digital age*.
- Slater, Margaret, ed.: *Research Methods in Library and Information Studies*. London: Library Association, 1990.
- Small, R. V., & In Mardis, M. A. (2018). *Research methods for librarians and educators: Practical applications in formal and informal learning environments*.
- Spink, A., & SpringerLink (Online service). (2010). *Information Behavior: An Evolutionary Instinct*. (Springer eBooks.)
- Stephen, Peter & Hornby, Susan: *Simple Statistics for Library and Information Professionals*. London: Library Association, 1995.

Course Code	Course Title	Term end Examination	Internal Assessment	Presentation & Viva	Total Marks	Course Credit
LSP-CW2	Research Methodology B	30	10	10	50	4

Learning outcome	Objectives
After this course, students will be able to: <ul style="list-style-type: none"> <li>• explore literature review processes;</li> <li>• know managing references;</li> <li>• understand pattern identification from literature review;</li> <li>• present findings, gaps, and overlaps in literature analysis;</li> <li>• use tools and techniques related to literature review; and</li> <li>• apply AI based tools in literature review.</li> </ul>	<ul style="list-style-type: none"> <li>• To understand the basic concepts underlying research literature reviews for different purposes, including why, for whom, and how;</li> <li>• To know searching and screening approaches to ensure quality parameters on the basis of evaluation criteria;</li> <li>• To develop skills of conducting a literature review, including reading, note taking strategies, coding/reference management; and</li> <li>• To understand the process of synthesizing and writing literature results.</li> </ul>

## Course Content

(To be conducted at the departmental level by respective supervisors)

- Overview of literature review: what, why, when
- Topic, search, criteria for evaluation, screening
- Organizing, structuring, synthesizing literature review
- Systematic literature review
- Tools for literature review (including AI based tools)
- Reference, citations, notes and bibliography management
- Writing the literature review
  - Topic/problem selection
  - Search methods/tools: keywords (and combinations) if any, databases if any, search tools used (and their limitations)
  - Screening criteria and justifications; screening result summary
  - Use of systematic literature review tools
  - AI-enabled literature review tools
  - Organization, structuring (Ramification of topic under discussion)
  - Analysis and synthesizing methods and preliminary results
  - Conclusions of the literature review analysis/results
  - Writing the literature review with references and bibliography

## Evaluation

Submission of Literature review related to research areas by following the template / instructions given by the supervisor (30 marks)

Internal assessment of 10 marks (to be decided by the supervisor)

Presentation of Literature review (10 marks)

## Reading list

- Ridley, Diana (2008) "The Literature Review: A Step-by-Step Guide for Students". Sage Study Skills. 170 pages. ISBN: 978-1-4129-3426-8 paperback.
- Fink, Arlene (2010) "Conducting Research Literature Reviews: From the Internet to Paper – 3rd Edition". Sage. 253 pages. ISBN: 978-1-4129-7189-8 paperback.
- Connaway, L. S., Radford, M. L., & Powell, R. R. (2016). *Research Methods in Library and Information Science, 6th Edition*. Oxford: Pearson Education.
- Luo, L., Brancolini, K., & Kennedy, M. R. (2017). *Enhancing library and information research skills: A guide for academic librarians*.
  - The subject teacher will provide additional readings for domain-specific literature review.

Course Code	Course Title	Term end Examination	Term paper (Text)	Term paper (Presentation & Viva)	Total Marks	Course Credit
<b>LSP-CW3</b>	Advanced level course on LIS (A)	30	10	10	50	4

#### Learning outcome

After this course, students will be able to:

- understand growth of LIS domain and its relationships with other disciplines;
- formulate research problems in their area of interests; and
- write independently methodologies and solutions for the identified research problem.

#### Objectives

- To understand the development of LIS domain as a multifaceted discipline;
- To know the frontier areas /divisions / subdivisions under the LIS domain;
- To identify possible areas for research in LIS; and
- To formulate research problems, hypotheses and methodology in selected domains.

## Course Content

(To be conducted at the departmental level)

### Research Area I: Information Sources, Systems and Services

- Information sources including digital sources; Information sources Vs. Information resources;
- Information institutions and information systems; Information Transfer Cycle; Open Knowledge Systems;
- Information Analysis and Consolidation (IA+C) – methods and products;
- Digital Information Systems (Including library networks, library consortia, institutional repositories, digital libraries, subject gateways, virtual reference systems, journal portals etc.); and
- ICT-enabled information services and products (including Personal Information Environment (PIE)).

### Research Area II: Management of Information Institutions and Systems

- Management principles and policies for information institutions and systems;
- Systems Analysis & Design (SAD) and Management Information System (MIS);
- Quality management (including TQM) for information institutions and systems (Including LIBQUAL+, COUNTER, EQUINOX, SUSHI etc.) and Information marketing;
- National and Global Information Systems; and
- Design and development of Information Systems – Factors, Methods and Evaluation.

### Research Area III: Resource Description

- Objectives and principles of bibliographic description (including FRBR objectives, Ranganathan's principles, principles of Joint Steering Committee (JSC) and IME-ICC, principles of bibliographic relationships);
- Bibliographic data elements and models of bibliographic description (Including ISBDs, FRBR, GARR, FRAD, UKOLN's analytical model, XOBIS etc.);
- Bibliographic data standards -
  - Exchange standards – ISO 2709/Z 39.2, MARC-XML, METS, MODS;
  - Content designator / Framework standards – MARC 21, UNIMARC, CCF;
  - Distributed cataloguing standards – Z 39.50, ZING, SRW; and
  - Interoperability and crosswalk.
- Electronic resource description – generic and domain-specific metadata schemas, metadata encoding, metadata harvesting, RDF-enabled metadata encoding; and
- Trends of resource description and cataloguing.

### Research Area IV: Resource Organization

- Objectives, principles and postulates of document classification;
- Changing dimensions of document classification – past, present and future;
- Depth classification schedules – methods and products;
- Online classification systems and classification of digital resources; and
- Ontology, SKOS and Library classification.



**Research Area V: Bibliometrics, Informetrics and Scientometrics**

- Scopes and limitations of Bibliometrics, Informetrics and Scientometrics;
- Academic Impact Indicators;
- Data sources for studies in Bibliometrics, Informetrics and Scientometrics;
- Tools for Bibliometrics, Informetrics and Scientometrics; and
- Citation networks and data visualization tools.

Course Code	Course Title	Term end Examination	Term paper (Text)	Term paper (Presentation & Viva)	Total Marks	Course Credit
<b>LSP-CW4</b>	Advanced level course on LIS (B)	30	10	10	50	4

**Learning outcome**

After this course, students will be able to:

- understand growth of LIS domain and its relationships with other disciplines;
- formulate research problems in their area of interests; and
- write independently methodologies and solutions for the identified research problem.

**Objectives**

- To understand the growth of LIS domain and its relationships with other disciplines;
- To know the areas of multidisciplinary/interdisciplinary research in LIS;
- To identify possible areas for multidisciplinary research in LIS; and
- To understand effects of technology in fundamental principles of LIS domain.

**Course Content**

(To be conducted at the departmental level)

**Research Area I: Information Storage and Retrieval**

- Subject analysis and representations –
  - Historical and theoretical foundations;
  - Pre and post coordinate indexing; and
  - Evaluation of information retrieval systems and evaluation experiments/projects (including TREC).
- Automatic indexing systems – file Organisation processes, inverted file, text retrieval systems and software (Lucene, MGPP, HTDig, SWISH-e etc.), search strategies and techniques for CDROM databases and online systems (online databases, digital libraries, institutional repositories etc.), multimedia information retrieval;
- Vocabulary control devices –
  - Traditional, digital and integrated (including standards of monolingual (ISO-2788 / BS 5723) and multilingual (ISO 25964, SKOS) thesauri;
  - Design and development of online integrated thesauri (through open source software);
  - Taxonomy, thesaurus and ontology – comparative study;
- Models of information retrieval, Information seeking behaviour and User interfaces;
- Intelligent information retrieval (including natural language processing (NLP) systems and cross-language information retrieval);
- Multilingual information retrieval; and
- Automated subject indexing – AI/ML applications, Linked Open Data (LOD).

**Research Area II: User Studies**

- Objectives, principles and need of user studies;
- Changing dimensions of Information Seeking Models – past, present and future;
- Methodologies of user studies;
- User survey, Online survey tools; and
- User education .

**Research Area III: Automated and Digital Library System**

- Automated library system – Trends and directions, Open Library Environment, Interactive OPAC;
- Digital library system – Trends and directions, Architecture, Open access repositories;
- Standards related to Automated library system;

- Standards related to Digital library system;
- Multilingual-enabled automated and digital library systems; and
- Applications of cloud computing in LIS services.

#### **Research Area IV: Web Technologies**

- Web 2.0 tools and technologies;
- Library 2.0 – application dimensions;
- Design and development of interactive, participative and collaborative library services;
- AJAX technology, Application of Web 2.0 tools in designing automated and digital library systems; and
- Semantic web, Linked Open Data (LOD), SPARQL, Wikidata.

#### **Research Area V: Data Science, Library Carpentry, AI/ML applications**

- Software carpentry, data carpentry, Library carpentry;
- Data wrangling tools and techniques;
- Data sources, REST/API, Data extraction, Data visualization;
- Data reconciliation, NER (Named Entity Extraction), Topic modeling;
- Data carpentry for information services; and
- AI/ML horizons for knowledge organization, information retrieval and knowledge organization.

#### **Evaluation method for LSP-CW3 and LSP-CW4**

- Term end examination of 30 marks in each of these two courses
- A Research student shall write - i) one term paper on any of the listed areas in LSP-CW3 for 10 marks; ii) one term paper on any of the listed areas in LSP-CW4 for 10 marks.
- Each Term Paper will be allotted 10 marks for presentation and viva.

#### **Reading list (LSP-CW3 & LSP-CW4)**

- Antoniou, G. & Harmelen, F.V.: *A semantic web primer*. Cambridge: MIT Press, 2004.
- Atherton, P.: *Handbook for information systems and services*. Paris: Unesco, 1977.
- Baeza-Yates, R. & Riberio-Neto, B.: *Modern information retrieval*. New York: ACM Press, 1999.
- Bean, C.A. & Green, R. eds.: *Relationships in the organization of knowledge*. Dordrecht: Kluwer Academic Publishers, 2001.
- Bhattacharya, G.: *Information sciences: a unified view through a system approach*. Calcutta: IASLIC, 1979.
- Boll, John J.: *The future of AACR2*. Cataloguing and Classification Quarterly, 12(1), 3-34, 1990.
- Borgman, C.L.: *From Gutenberg to global information infrastructure: access to information in the networked world*. Cambridge: MIT Press, 2000.
- Broughten, V.: *Faceted classification as a basis for knowledge organization in a digital environment: the Bliss bibliographic classification as a model for vocabulary management and the creation of multidimensional knowledge structures*. The New review of Hypermedia and multimedia, 7(1), 67-102, 2001.
- Buchanan, B.: *Theory of library classification*. London: Clive Bingley, 1979.
- Chen, S.S.: *Digital libraries: the life cycle of information*. Columbia: BE Publishers, 1998.
- Craven, T.C.: *String indexing*. Orlando: Academic Press, 1986.
- Crawford, W. & Gorman, M.: *Future libraries: dreams, madness, and reality*. Chicago: American Library Association, 1995.
- Crawford, W.: *Bibliographic displays in online catalogue*. London: Knowledge Industry, 1986.
- *CyberDewey: the first well-organized Internet directory*. <available at <http://www.anthus.com/CyberDewey/CyberDewey.html>>
- EQUINOX – *Library performance measurement and quality management system*. <available at <http://equinox.dcu.ie>>
- Evans, G.E.: *Management techniques for libraries* (2<sup>nd</sup> ed.), 1993.
- Flynn, R.R.: *An introduction to information science*. New York: Marcel Dekker, 1987.
- Foskett, A.C.: *Subject approach to information* (5<sup>th</sup> ed.), 1996.
- Fugmann, R.: *Subject analysis and indexing: theoretical foundation and practical advice*. Frankfurt: Verlag, 1983.
- Gilchrist, A.: *From classification to knowledge organization*, 1997.
- Grogan, D.J.: *Science and technology: an introduction to the literature* (4<sup>th</sup> ed.), 1983.
- Heaney, M.: *Object-oriented cataloguing*. Information Technology and Libraries, 14(3), 135-153, 1995.
- IFLA: *Functional requirements for bibliographic records: final report*. Munchen: K.G. Saur, 1998 <available at <http://www.ifla.org/VII/s13/frbr/frbr.pdf>>

- Lazer, P.: *Information system design and management*, Sarada Ranganathan lectures, 15, 1982.
- LibQUAL+ <available at <http://www.libqual.org>>
- Machlup, F.: *Knowledge: its creation, distribution and economic significance V1: 1980, V2: 1982 & V3: 1984*).
- McGarry, K.J.: *The changing context of information* (rev. ed.), 1993.
- Milstead, J.L.: *Use of thesauri in the full-text environment* <available at <http://www.jelem.com/useof.htm>>
- Needham, C.D.: *Organization of knowledge in libraries: introduction to library classification and cataloguing* (2<sup>nd</sup> ed.). London: Andre Deutsch, 1971.
- Salton, G.: *Automatic text processing: the transformation, analysis and retrieval of information by computer*. Reading, MA: Addison-Wesley, 1989.
- Seal, A. ed.: *Introducing the online catalogue*. London: The British Library, 1984.
- Stuart, R.D. & Eastlick, J.T.: *Library management* (3<sup>rd</sup> ed.), 1988.
- Svenonius, E.: *The conceptual foundations of descriptive cataloguing*. New York: Academic Press, 1989.
- Svenonius, E.: *The intellectual foundation of information organization*. Cambridge: MIT Press, 2000.
- Taylor, A.G.: *Authority files in online catalogues: an investigation of their value*. *Cataloguing and Classification Quarterly*, 9(3), 29-56, 1998.
- Tenopir, C.: *Use and users of electronic library resources: an overview and analysis of recent research studies*. <available at <http://www.clir.org/pubs/reports/pub120/pub120.pdf>>
- Van Rijsbergen, C.J.: *Information retrieval* (2<sup>nd</sup> ed.). London: Butterworth, 1979.