CENTRAL UNIVERSITY OF PUNJAB

Ph.D. (Library and Information Science)

Batch 2026

Department of Library and Information Sciences

Central University of Punjab

Vision of Central University of Punjab

The University envisions transforming the minds to serve humanity through skills and innovation driven teaching and research; values and community outreach.

Mission of Central University of Punjab

- Offer a wide range of instructional and research facilities for inter-, multi- and trans-disciplinary approaches to impart holistic learning;
- Promote skills and innovation in teaching-learning, evaluation, research and consultancy;
- Create an ignited workforce responsive to local, regional, national and global needs in tune with the requirements of academics, industry, business and administration; and
- Address the issues and concerns of the community.

Vision of Department of Library and Information Sciences, Central University of Punjab

- Developing skills required for management of Data, Information & Knowledge in Libraries and Information Centres, by applying the principles of librarianship and professional ethics;
- Developing and enhancing skill-sets in Information and Communication Technologies (ICT) required for the Information and Knowledge Management processes.

Mission of Department of Library and Information Sciences, Central University of Punjab

- To work on local and global thrust areas in the field of Library and Information Science.
- To train and equip students with the knowledge, skills and values required to work in Information and Knowledge Centres.

Graduate Attributes

Graduates shall have enhanced skills in varied aspects of conducting research in different cultural settings. Graduates shall be competent in analysing problems related to library and information science and finding gaps in the existing body of literature. Graduates shall have a scientific attitude in examining research problems and conducting research for their solutions at local and global level. Graduates shall contribute significantly in the knowledge economy of the nation.

Course Structure

Course Code	Course Title	Course Type	L	T	P	CR
LIS.706	Research Methodology	Core Course	4	0	0	4
LIS.708	Research Competencies (Practical)	Skill Based	0	0	4	2
LIS.709	Research Tools and Techniques (practical)	Skill Based	0	0	2	1
LIS.751	Research and Publication Ethics	Discipline	2	0	0	2
LIS.752	Teaching Assistantship	Core Course	0	0	2	2
UNI.753	Curriculum, Pedagogy and Evaluation	Core Course	1	0	0	1
LIS###	Choose one Elective from Course-list	Elective	-	-	-	4
	TOTAL	**-**	-	-	-	**16**
List of Electives (Scholars to choose a course from these electives)						
LIS.701	R & Python programming for Data Science Applications in Research	Elective	3	0	2	4
LIS.702	Research Trends in Information Sources, Services and Systems		4	0	0	
LIS.703	Scholarly Communication and Research Evaluation		4	0	0	
LIS.704	Information Communication and Management of Library and Information Centres		4	0	0	
LIS.705	Knowledge Management		4	0	0	
LIS.707	Applications of AI and Informetrics		4	0	0	
LIS.710	Digital Humanities for Preservation and Conservation					
LIS.711	User study and Information Literacy		4	0	0	
LIS.712	Metrics Study in Library and Information Science		4	0	0	

Course Code: LIS.706
Course Title: Research Methodology
Course type: Core Course
Total Hours: 60

L	T	P	Credit
4	0	0	4

Course Learning outcomes (CLO):
After completion of the course the students will be able to
CLO1: Develop a skill set to understand different approaches to research.
CLO2: Understand practical aspects of research design.
CLO3: Select appropriate sampling techniques in research.
CLO4: Understand aspects of data analyses and IPR issues.

Units/Hours	Contents	Mapping with CLOs
I **16 Hours**	**Research Approaches and Types** Research approaches: Logical positivism, phenomenology, ethnography, and triangulation, quantitative, qualitative; types of research and their applications: according to purpose and method. Historical Research: Primary and secondary sources of information, external and internal criticism of the source. Descriptive Research: Assessment studies, evaluation studies, ex-post facto studies, replication and meta-analysis. Experimental research: Types of experimental research designs; designing and developing appropriate experimental designs for research problems. Applied Research in LIS: Applied research in Information Science and Knowledge Management.	**CLO1**
	Reflection: Scholars will learn various research approaches and its rationale.	

II **14 Hours**	**Quantitative and Qualitative Research methods and Tools** Quantitative research methods and tools: Selection, types and application. Qualitative research methods and tools: Selection, types and application. Mixed Method: Meaning and characteristics, designs and their application.	**CLO2**
	Reflection: Scholars will understand practical aspects of research design.	
III **14 Hours**	**Sampling Techniques** Sampling design: Selecting appropriate probability and non-probability sampling techniques for qualitative and quantitative research problems	**CLO3**
	Reflection: Scholars will learn about selection of Sampling Techniques in research design according to needs and circumstances	
IV **16 Hours**	**Data Analysis and Intellectual Property Rights** Data analysis in quantitative & qualitative research: Content analysis, inductive, logical, Intellectual Property, intellectual property protection (IPP) and intellectual property rights (IPR), WIPO (World Intellectual Property Organisation) Research Data Management Tools and Methods. IPR Policy of Central University of Punjab.	**CLO4**
	Reflection: Scholars will gain proficiency in Data Analysis and Intellectual Property Rights	

Transaction Mode: Lectures, PPT, Collective thinking, YouTube, Discussion.

Suggested Readings

1. Best J.W. (1999). Research in Education. New Delhi: Prentice Hall of India Pvt. Ltd.
2. Bogdon, R., & Biklen, S. K. (2008). Qualitative Research for Education: An Introduction to Theories and Practice. New Delhi: PHI learning
3. Borg, W.R., & Gall, M.D. (1983). Educational Research – An Introduction. New York: Longman, Inc.
4. Chandra, S. S., & Sharma, R.K. (2010). Research in education. New Delhi: Atlantic Publishers and Distributers (P) LTD.
5. Christensen, L. (2007). Experimental Methodology. Boston: Allyn & Bacon.
6. Creswell, J. W. (2015). Educational Research: Planning, Conducting and Evaluating Quantitative and Qualitative Research. Boston: Pearson Publications.
7. Curtis, W., Murphy, M., & Shields, S. (2013). Research and Education. New York & London: Routledge
8. EfratEfron, S., & Ravid, R. (2013). Action Research in Education: A Practical Guide, New York: Routledge
9. Egbert, J., &Sanden, S. (2013). Foundations of Education Research: Understanding Theoretical Components. New York: Routledge.
10. Fraenkel, J.R., & Wallen, N.E. (1996). How to Design and Evaluate Research in Education. New York: McGraw Hill.
11. Gordon, P. (1996). A Guide to Educational Research. New York: Routledge
12. Kaul, L. (1984). Methodology of Educational Research. New Delhi: Vikas Publications. 13. Kilkapatrick, D.L. (2005). Evaluating training Programmes: The four Levels. San Francisco: Brrett-Kochler.
14. Kress, T. (2013). Using Critical Research for Educational and Social Change. New York & London: Routledge.
15. Lauren, B., Little, T. D., & Card, N. A. (2012). Developmental Research Methods. New York: The Guilford Press.
16. Martella, R. C., Nelson, J. R., Morgan, R. L., & Martella,N. E. (2013). Understanding and Interpreting Educational Research, New York: Routledge Guilford Press
17. Maykut, P., & Morehouse, R. (1994). Beginning Qualitative Research- A Philosophic and Practical Guide. London: The Falmer Press.
18. Miller, S. A. (2007). Developmental Research Methods. New Delhi: Sage Publications.
19. Opie, C. (2004). Doing Educational Research: A Guide for First time researchers. New Delhi: Vistar Publications.
20. Patton, M.Q. (2002). Qualitative Research and Evaluation Methods. C.A: Sage Publications.
21. Petscher, Y., Schatschneider, C., & Compton, D. L. (2013). Applied Quantitative Analysis in Education and the Social Sciences. New York & London: Routledge
22. Reason, P., & Bradbury, H. (Eds) (2006). Handbook of action research: Concise paperback edition. CA: Sage Publications.

23. Scott, D., & Usher, R. (1996). Understanding Educational Research. New York: Routledge.
24. Tolmie, A., McAteer, E., & Muijs, D. (2012). Quantitative Methods in Educational and Social Research Using SPSS. Maidenhead:Open University Press
25. Wellington, J. (2015). Educational Research. New Delhi: Bloomsbury Academic.
26. Weirsma. W., & Stephen G. (2009). Research methods in Education. New York: Pearson Education

Web-resources

https://epgp.inflibnet.ac.in/

Course Code: LIS.708
Course Title: Research Competencies (Practical)
Course type: Skill Based
Total Hours: 30

L	T	P	Credit
0	0	4	2

Course Learning outcomes (CLO):

After completion of the course the students will be able to:

CLO1: Develop skills set for identifying research gaps and articulating research problems.

CLO2: Understand practical aspects of research design.

CLO3: Select tools and methods in research design according to needs and circumstances.

CLO4: Design action and applied research.

Units/Hours	Contents	Mapping with CLOs
I **6 Hours**	**Methods of Literature review in Research** Review of Literature: Concept and need, Methods, Structure of review of literature	**CLO1**
	Reflection: Scholars will learn identifying research gaps and articulating research problems.	
II **8 Hours**	**Practical aspects of Research Design** Formulate research questions, objectives and hypotheses. Select appropriate approach and design for different research topics. Design a research proposal	**CLO2**
	Reflection: Scholars will understand practical aspects of research design.	
III **8 Hours**	**Selection of Tools and Method in Research Design** Develop tools for research and standardise them. Ascertain the methods involved in data collection.	**CLO3**

	Reflection: Scholars will learn about selection of tools and methods in research design according to needs and circumstances.	
IV **8 Hours**	**Data Analysis** Analyse quantitative and quantitative data using appropriate techniques Conduct action research	**CLO4**
	Reflection: Scholars will gain proficiency in design of Action and Applied Research.	

Transaction Mode

Lecture, Hand-On Lab, Recorded Lectures, You-tube, Invited Lectures.

Evaluation criteria

Continuous Assessment: -50 Marks

- Attendance: 10
- Research Proposal: 15
- Skill Assessment (Review of Literature, Hypothesis, Data analysis skills.):25

End Term Assessment: -50 Marks

- Written Test: 30
- Viva Voce: 20

Evaluation will be done by course coordinator and two members from the department, nominated by HOD

Suggested Readings

1. Geoffrey, M. (2019). Essential of Research design and methodology.
2. Harris, D. (2019). *Literature review and research design: A guide to effective research practice*. Routledge.
3. Kayı-Aydar, H. (2019). *Positioning theory in applied linguistics: Research design and applications*. Cham, Switzerland: Palgrave Macmillan.
4. Lewis, S. (2015). Qualitative inquiry and research design: Choosing among five approaches. *Health promotion practice*, *16*(4), 473-475.
5. De Vaus, D. (2001). *Research design in social research*. Sage.
6. Hedrick, T. E., Bickman, L., & Rog, D. J. (1993). *Applied research design: A practical guide*. Sage Publications.
7. Miller, D. C., & Salkind, N. J. (2002). *Handbook of research design and social measurement*. Sage.
8. Schwartz-Shea, P., & Yanow, D. (2013). *Interpretive research design: Concepts and processes*. Routledge.

9. Leavy, P. (2017). *Research design: Quantitative, qualitative, mixed methods, arts-based, and community-based participatory research approaches*. Guilford Publications.
10. Hedrick, T. E., Bickman, L., & Rog, D. J. (1993). *Applied research design: A practical guide*. Sage Publications.
11. Sovacool, B. K., Axsen, J., & Sorrell, S. (2018). Promoting novelty, rigor, and style in energy social science: Towards codes of practice for appropriate methods and research design. *Energy Research & Social Science*, *45*, 12-42.

Course Code: LIS.709
Course Title: Research Tools and Techniques (practical)
Course type: Skill Based
Total Hours: 30

L	T	P	Credit
0	0	2	1

Course Learning outcomes (CLO):

After completion of the course the students will be able to CLO1: Develop skills set research and electronic resources.

CLO2: Utilise of various E-research tools.

CLO3: Understand various research metrics and its importance.

CLO4: Use Academic Social Networking Sites (SNSs) and Reference Management Systems.

Units/Hours	Contents	Mapping with CLOs
I **6 Hours**	**Electronic resources and Databases:** Concept, advantages, limitations. Trends in E-research E-reference sources: Indexing and Abstracting databases, Shodganga, NDLTD, E-encyclopaedias, citation databases etc.	**CLO1**
	Reflection: Scholars will learn about various aspects of E-Research and Electronic resources.	
II **8 Hours**	**Research Tools** Online survey tools, Data Visualisation tools Search engines- Academic search engines, general search engines, metasearch engine Search strategies- search operators, alerting tools, RSS feeds etc.	**CLO2**
	Reflection: Scholars will understand practical aspects of tools for research.	
III **8 Hours**	**Metric Studies and Statistical Tools** Calculation of Impact Factor for journals, h-index and g-index for authors and institutions, SCImago Journal Rank (SJR) indicator. Analysing parametric and non-parametric data using SPSS, Statistical Tests.	**CLO3**

	Reflection: Scholars will learn about various research metrics, statistical tests and its importance.	
IV 8 Hours	**Academic SNSs and Reference Management Systems** Creating Google Scholar Profile, ORCID ID, ResearchGate and Microsoft Academic Search. Creating citation styles using Mendeley and Zotero reference management systems.	**CLO4**
	Reflection: Scholars will gain proficiency in creating SNS profiles and using it for research.	

Transaction Mode: Lecture, Hand-On Lab, Recorded Lectures, Youtube, Discussion following GitHub & Stackoverflow, Invited Lectures.

Evaluation criteria

Continuous Assessment: -50 Marks

- Attendance: 10
- Research Proposal: 15
- Skill Assessment (Review of Literature, Hypothesis, Data analysis skills.):25

End Term Assessment: -50 Marks

- Written Test: 30
- Viva Voce: 20

Suggested Readings

1. Anandarajan, M. (Ed.). (2010). E-research collaboration: Theory, techniques and challenges. Springer Science & Business Media.
2. Anderson, T. & Kanuka, H. (2003). E-research: methods, strategies, and issues, Allyn and Bacon
3. Jankowski, N. W. (Ed.). (2010). E-Research: Transformation in scholarly practice. Routledge.
4. Bryman, A. (2018). Social Research Methods. Oxford Publication, London
5. Glänzel, W., Moed, H. F., Schmoch, U., & Thelwall, M. (Eds.). (2019). Springer Handbook of Science and Technology Indicators. Springer Nature.
6. Neuman, W.L. (2010). Social Research Methods: Qualitative and Quantitative Approaches. 7. Pears, R., & Shields, G. J. (2019). Cite them right: the essential referencing guide. Macmillan International Higher Education.

Course Code: LIS.751
Course Title: Research and Publication Ethics
Course type: Discipline
Total Hours: 30

L	T	P	Credit
2	0	0	2

Course Learning outcomes (CLO):

After completion of the course the students will be able to CLO1: Demonstrate Intellectual honesty and research integrity.

CLO2: Judge publication ethics, authorship and contributorship.

CLO3: Identify thrust areas of global research and Open access publications and initiatives.

CLO4: Analyse Research Metrics from an ethical point of view.

Units/Hours	Contents	Mapping with CLOs
I **8 Hours**	**Philosophy and Ethics alongwith Scientific Conduct** Introduction to Philosophy : definition, nature and scope, content, branches Ethics : definition, moral philosophy, nature of moral judgements and reactions 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	**CLO1**
	Reflection: Demonstration of Intellectual honesty and research integrity.	
II **7 Hours**	**Publication ethics** Publication ethics : definition, introduction and importance Best practices/ standards setting initiatives and guidelines: COPE, WAME, etc. Conflicts of interest	**CLO2**

	Publication misconduct: definition, concept, problems that lead to unethical behaviour and vice versa, types Violation of publication ethics, authorship and contributorship Identification of publication misconduct, complaints and appeals, Predatory publishers and journals	
	Reflection: Scholars will understand practical aspects of E-tools for research.	
III **8 Hours**	**Open Access Publishing & Publication Misconduct** Open access publications and initiatives SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies Software tool to identify predatory publication developed by SPPU Journal finder/journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc. Group Discussions: Subject specific ethical issues, FFP, authorship; conflicts of interest; complaints and appeals: examples and fraud from India and abroad Software tools: Use of plagiarism software like Turnitin Urkund and other open source software tools	**CLO3**
	Reflection: Ability to identify thrust areas of global research and Open access publications and initiatives along with misconduct.	
IV 7 Hours	**Databases and Research Metrics** Databases: Indexing databases; Citation database: 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, altmetrics	**CLO4**

	Reflection: Scholars will be able to analyse various research Databases' metrics from an ethical point of view.	

Transaction Mode

Lecture, Hand-On Lab, Recorded Lectures, Youtube, Discussion following Online Forums or Communities, Invited Lectures.

Suggested Readings

1. Best J.W. (1999). Research in Education. New Delhi: Prentice Hall of India Pvt. Ltd.
2. Bogdon, R., & Biklen, S. K. (2008). Qualitative Research for Education: An Introduction to Theories and Practice. New Delhi: PHI learning
3. Borg, W.R., & Gall, M.D. (1983). Educational Research – An Introduction. New York: Longman, Inc.
4. Chandra, S. S., & Sharma, R.K. (2010). Research in education. New Delhi: Atlantic Publishers and Distributors (P) LTD..
5. Creswell, J. W. (2015). Educational Research: Planning, Conducting and Evaluating Quantitative and Qualitative Research. Boston: Pearson Publications.
6. Curtis, W., Murphy, M., N Shields, S. (2013). Research and Education. New York & London: Routledge
7. Gordon, P. (1996). A Guide to Educational Research. New York: Routledge 8. Kaul, L. (1984). Methodology of Educational Research. New Delhi: Vikas Publications.
9. Kilkapatrick, D.L. (2005). Evaluating training Programmes: The four Levels. San Francisco: Brrett-Kochler.
10. Kress, T. (2013). Using Critical Research for Educational and Social Change. New York & London: Routledge.
11. Lauren, B., Little, T. D., & Card, N. A. (2012). Developmental Research Methods. New York: The Guilford Press.
12. Martella, R. C., Nelson, J. R., Morgan, R. L., & Martella,N. E. (2013). Understanding
13. Patton, M.Q. (2002). Qualitative Research and Evaluation Methods. C.A: Sage Publications.
14. Tolmie, A., McAteer, E., Muijs, D. (2012). Quantitative Methods in Educational and Social Research Using SPSS. Maidenhead:Open University Press
15. Wellington, J. (2015). Educational Research. New Delhi: Bloomsbury Academic.
16. Weirsma. W., & Stephen G. (2009). Research methods in Education. New York: Pearson Education

ELECTIVE COURSES

L	T	P	Ch
3	0	2	4

Course Code: **LIS.701**
Course Title: R & Python programming for Data Science Applications in Research
Course type: Elective
Total Hours: 75
Course Learning outcomes (CLO):
After completion of the course, scholars shall be able to:
CLO1: Learn the Various Concepts of Computer Programming
CLO2: Understand the Use of various Programming Languages and Its Syntaxes
CLO3: Learn about Various R and Python Packages for Data Science Applications in Research
CLO4: Writing Programs for Data Science Applications in Research

Units/Hours	Contents	Mapping with CLOs
I **15 Hours**	**Introduction to Programming Languages and Its Use** Programming Languages: R, Python, C#, Kotlin etc. Applications of Programming Languages: Backend of SPSS. Programming Languages for Mobile, Web App Development.	**CLO1**
	Reflection: Scholars will learn various Concepts of Computer Programming.	
II **25 Hours**	**Concepts and Syntaxes in R & Python Programming** Installation of R, R-Studio, Syntaxes and Libraries in R. Installation of Python, IDEs for Python, Syntaxes of Python. Basic Concepts of Data Structures (DS), DS in R & Python. Basic Concepts of Simple Algorithms, Implementation in R & Python.	**CLO2**

	Reflection: Scholars will understand practical aspects of E-tools for research.	
III **20 Hours**	**Data Science Applications in Various Disciplines** Arts & Humanities: Exploring Various Libraries, Packages & Projects, Research Papers, Case Studies. Sciences: Exploring Various Libraries, Packages & Projects, Research Papers, Case Studies. Social Sciences: Exploring Various Libraries, Packages & Projects, Research Papers, Case Studies. Data Visualisation: Exploring Various Libraries, Packages & Projects, Research Papers, Case Studies.	**CLO3**
	Reflection: Scholars will learn about Various R and Python Packages for Data Science Applications in research.	
IV 15 Hours	**Developing Programs for Data Analysis in Research** Version Control and IDEs Program Development for Research Data Analysis Developing R-Packages as Research Outcome Developing Python Projects in Research	**CLO4**
	Reflection: Scholars will gain proficiency in developing programs/packages for Data Science Applications in research.	

Transaction Mode

Lecture, Hand-On Lab, Recorded Lectures, Youtube, Discussion following GitHub & Stackoverflow, Invited Lectures.

Suggested Readings

- Peng, R. D. (2016). *R programming for data science* (pp. 86-181). Victoria, BC, Canada: Leanpub.
- Tippmann, S. (2015). Programming tools: Adventures with R. *Nature*, *517*(7532), 109-110.
- Matloff, N. (2011). *The art of R programming: A tour of statistical software design*. No Starch Press.
- Brooker, P. D. (2019). *Programming with Python for Social Scientists*. Sage.

- Grus, J. (2019). *Data science from scratch: first principles with python*. O'Reilly Media.
- Chambers, J. M. (2008). *Software for data analysis: programming with R* (Vol. 2). New York: Springer.
- Kaya, E., Agca, M., Adiguzel, F., & Cetin, M. (2019). Spatial data analysis with R programming for the environment. *Human and ecological risk assessment: An International Journal*, *25*(6), 1521-1530.
- Braun, W. J., & Murdoch, D. J. (2021). *A first course in statistical programming with R*. Cambridge University Press.
- Singh, A. K., & Allen, D. E. (2017). *R in Finance and Economics: A Beginner's Guide*.
- Fox, J., & Andersen, R. (2005). Using the R statistical computing environment to teach social statistics courses. *Department of Sociology, McMaster University*, 2-4.
- Edelman, A., Wolff, T., Montagne, D., & Bail, C. A. (2020). Computational Social Science. *Annual Review of Sociology*, *46*.
- Igual, L., & Seguí, S. (2017). Introduction to data science. In *Introduction to Data Science* (pp. 1-4). Springer, Cham.

Web Resources

- https://cran.r-project.org/
- https://www.rstudio.com/
- https://pypi.org/
- https://www.anaconda.com/
- https://github.com/
- https://datascience.stackexchange.com
- https://stackoverflow.com/questions/tagged/data-science

Course Code: **LIS.702**
Course Title: Research Trends in Information Sources, Services and Systems
Course type: Elective
Total Hours: 60

L	T	P	Credit
4	0	0	4

Learning Outcomes:
After the Completion of course, the students will be able to:

CLO1: Learn about various types of information sources and its Management in the New Age.
CLO2: Conceptualise reference service, referral service and reference interview.
CLO3: Examine the different information services and products along with their recent trends and Challenges.
CLO4: Explore and Identify Problems and Research Question related to Information Sources, Services and Systems

Units/Hours	Contents	Mapping with CLOs
I **14 Hours**	**Reference and Information Sources** Information Sources - Nature, Characteristics, Types and Formats. Documentary and Non-Documentary sources of information. Categories: Primary, Secondary and Tertiary information sources. Electronic Information Resources - Subject Gateways, Web Portals. Databases: Bibliographic, Numeric, Full text, Abstracting, Indexing and Citations Databases. Evaluation of Reference sources and Web resources.	**CLO1**
	Reflection: Compare different types of information sources.	
II **16 Hours**	**Reference Services** Reference Service: Concept, types, theories and trends. Referral Service: Concept, types Reference interview. Information Users and their Information Needs: Categories of information users, Ascertaining Users' Information need. **Reflection:** Compare the different types of information needs of users.	**CLO2**

III **14 Hours**	**Information Services and Products** Information Services and products.: Concepts, definition, need and trends. Community Information Services. Alerting Services: need, techniques and evaluation (CAS and SDI). Bibliographic, referral, Inter Library Loan, document delivery and translation services.	**CLO3**
	Reflection: Discuss the practical aspects of different information services.	
IV 16 Hours	**Information Systems and Services** Study and explore National Information Systems. Study and explore International Information Systems. Study and explore Commercial Information Systems and Services. Current Issues with various Information Systems' Services and products.	**CLO4**
	Reflection: Students will explore current Research trends, methods applied for building and assessing new/old services of Special Libraries, Information & Knowledge Resource centres.	

Transaction Mode: Lectures, PPT, Collective thinking, YouTube, Discussion

Suggested Readings

- Garson, G. D. (Ed.). (1999). *Information technology and computer applications in public administration: issues and trends*. IGI Global.
- Sweetland, J. H., & Cheney, F. N. (2001). *Fundamental reference sources*. American Library Association.
- Crawford, J. (2010). *Evaluation of library and information services*. Routledge.
- Farmer, L. (Ed.). (2007). *The human side of reference and information services in academic libraries: adding value in the digital world*. Elsevier.
- Foskett, D. J. (1967). *Information service in libraries*. Archon Book Hamden, Connecticut.
- Dowell, D. R., & Fourie, D. K.(2009). *Libraries in The Information Age: An Introduction And Career Exploration (Library And Information Science Text).* Libraries Unlimited, New York.
- Singh, G. (2013). *Information sources, services and systems*. PHI Learning Pvt. Ltd..
- Katz, W. A. (2002). *Introduction to Reference Work: Reference services and reference practices*. McGraw Hill.
- Krishan, K. (2009). *Reference service*. Vikas Publishing House.
- Ranganathan, S. R. (1990). *Reference service*. Sarada Ranganathan Endowment for Library Science, Bangalore.
- Walford, A.J. (1996). *Guide to reference books*. Library Association, London.
- Woodsworth, A., & Williams II, J. F. (2018). *Managing the economics of owning, leasing and contracting out information services*. Routledge.

Course Code: **LIS.703**
Course Title: Scholarly Communication and Research Evaluation
Course type: Elective
Total Hours: 60

L	T	P	Credit
4	0	0	4

Course Learning outcomes (CLO):
After completion of the course, scholars shall be able to:
CLO1: Understand the concept of peer-review and scholarly communication.
CLO2: Understand the concept of Informetrics and related metrics.
CLO3: Understand and apply the Classical Laws of Bibliometrics.
CLO4: Understand the foundations of research evaluation.

Units/Hours	Contents	Mapping with CLOs
I **15 Hours**	**Scholarly Communication** Concept of peer review process, Migration of peer reviewed journals from print to Web-based. Digital publishing- different models. Creative Commons. Open Access Publishing and its impact.	**CLO1**
	Reflection: Discuss publishing models and impact of open access publishing.	
II **15 Hours**	**Informetrics and Scientometrics** Informetrics: Genesis, scope and definition. Bibliometrics: Tools and techniques. Librametry: Introduction, scope and definition. Concept of Webometrics and Altmetrics.	**CLO2**
	Reflection: Compare the different types of information needs of users.	
III **15 Hours**	**Classical Laws of Bibliometrics** Price's Theory: Genesis and concept. Zipf's Law: Theory and applications. Lotka's Law: Theory and applications. Bradford's Law of Scattering and its applications**.**	**CLO3**
	Reflection: Application of Classical Laws of Bibliometrics.	

IV 15 Hours	**Research Evaluation** Foundations of Research Evaluation: Concept and methods. Journal Level Metrics and Author Level Metrics. Citation Analysis. Altmetrics for research evaluation: advantages and challenges. World University Rankings: Concept and types.	**CLO4**
	Reflection: Contemplate upon research evaluation and the use of various metrics.	

Transaction Mode

Lectures, PPT, Collective thinking, YouTube, Discussion

Suggested readings

- Cronin, B. (2005). *The hand of science: Academic writing and its rewards*. Scarecrow Press.
- Leydesdorff, L. (2001). *The challenge of scientometrics: The development, measurement, and self-organisation of scientific communications*. Universal-Publishers.
- Rao, I. K. R. (2010). *Growth of literature and measures of scientific productivity: Scientometric models*. Ess Ess Publications.
- Smith, K. L., & Dickson, K. A. (2016). *Open access and the future of scholarly communication: policy and infrastructure* (Vol. 9). Rowman & Littlefield.
- Sooryamoorthy, R. (2020). *Scientometrics for the Humanities and Social Sciences*. Routledge.
- Sugimoto, C. (2016). *Theories of informetrics and scholarly communication*. De Gruyter.
- Thelwall, M. (2009). Introduction to webometrics: Quantitative web research for the social sciences. *Synthesis lectures on information concepts, retrieval, and services*, *1*(1), 1-116.

Web-based resources

- DORA Website (n.d). https://sfdora.org/ ● Web of Science Websites (n.d). https://clarivate.com/webofsciencegroup/ solutions/web-of-science/
- Lib Guides of JCU (n.d). https://libguides.jcu.edu.au/researchindicators/snip-and-sjr
- NIRF Website (n.d.). https://www.nirfindia.org/Home

Course Code: **LIS.704**
Course Title: Information Communication and Management of Library and Information Centres
Course type: Elective
Total Hours: 60

L	T	P	Credit
4	0	0	4

Course Learning outcomes (CLO):
After completion of the course, scholars shall be able to:
CLO1: Understand the concept of information communication.
CLO2: Understand the process of information transfer
CLO3: Apply various library management approaches
CLO4: Understand the role of human resources management in libraries and information centres

Units/Hours	Contents	Mapping with CLOs
I **15 Hours**	**Information Communication** Information: Concept and Generation. Information Media and Diffusion. Communication: Concept and Process. Communication Cycle, Types and Models of Communication.	**CLO1**
	Reflection: Compare the models of information communication.	
II **15 Hours**	**Transfer of Information and Information seeking behaviour** Information Transfer: Concept and Models; Impact on Library and Information Science Professionals/Users; Information Seeking Behaviour: Concept and Methods Models and Methods of Evaluation.	**CLO2**
	Reflection: Discuss the modalities in information transfer.	

III **15 Hours**	**Foundations of Library Management** Management: Concept Approaches in Library and Information Centres- Classical, Scientific, Behavioural, Modern Systems Approach; Marketing of Library and Information Products and Services	**CLO3**
	Reflection: Compare various approaches in library management.	
IV 15 Hours	**Human Resources Management in Libraries** Human Resource Management in Libraries in Information Centres- Concepts, and Application, Interpersonal Relationship, Leadership and Personality Development	**CLO4**
	Reflection: Application of HRM in various aspects of library management.	

Transaction Mode

Lectures, PPT, Collective thinking, YouTube, Discussion

Course Code: LIS.704
Course Title: Knowledge Management
Total Hours: 60 Hours

L	T	P	Cr
4	0	0	4

Course Learning Outcomes

After Successful Completion of the course, the students will be able to:

- CLO1: Conceptualise knowledge management and knowledge economy
- CLO2: Determine the various strategies deployed in knowledge management
- CLO3: Examine the tools used in knowledge management systems.
- CLO4: Justify the importance of Knowledge management in libraries and information centres

Unit/ Hours	Content	Mapping with CLOs
Unit I/ 15 Hours	**Knowledge Management:** Concept, Types of knowledge. Knowledge Economy: Characteristics features, Need Difference between Information Management and Knowledge Management. **Reflection:** Understand the relationship between different concepts of Knowledge Management.	**CLO 1**
Unit II/ 15 Hours	**Knowledge Management Process:** Capturing tacit knowledge, Knowledge codification (tools), Knowledge Mapping; Knowledge testing, Knowledge transfer. **Reflection:** Comprehend the tasks associated with knowledge management.	**CLO 2**
Unit III/ 15 Hours	**Knowledge Management System and Tools:** Knowledge management tools, Data mining. Managing knowledge workers. **Reflection:** Understand the tools of knowledge management.	**CLO 3**
Unit IV/ 15 Hours	**Knowledge Management in Library and Information Centres**. Knowledge Management Portals. Knowledge creation and knowledge architecture. Knowledge Management Systems- Nonaka's model.	**CLO 4**

	Reflection: Understand the application of knowledge management in libraries and information centres and related models.	

Transaction Mode: Lectures, PPTs, Collective thinking, Streaming Videos, Discussion

Suggested Readings

1. Anderson, Paul. (2012). *Web 2.0 and Beyond: Principles and Technologies*. CRC Press
2. Awad, Elias M (2011). *Knowledge Management*. Prentice Hall India.
3. Cappelli, Peter. (2010). *The performance effects of it-enabled knowledge management practices*. Cambridge.
4. Christee Gabour Atwood. (2009). *Knowledge Management Basics*. ASTD Pess.
5. Dalkir, Kimiz & Liebowitz, Jay (2011). *Knowledge Management Theory & Practice*. MIT Press
6. Easterby-Smith, Mark & Lyles, Marjorie A. (2011). *Handbook of organizational learning and knowledge management*. Wiley.
7. Hislop, Donald. Ed. 3rd (2013). *Knowledge Management in organization*. Oxford.
8. Holsapple, Clyde. (2013). *Handbook on Knowledge Management 1: Knowledge*
9. Jennex, Murray E. (2008). *Knowledge Management: Concepts, Methodologies, Tools and Applications*. Information Science Reference.
10. Liebowitz, Jay (2012). Knowledge Management Handbook: Collaboration and Social Matters. Springer.
11. Mohiuddin, M., Halilem, N., Kobir, A., & Yuliang, C. (Eds.). (2017). *Knowledge Management Strategies and Applications.*
12. Nazim, M., & Mukherjee, B. (2016). *Knowledge management in libraries: concepts, tools and approaches*. Chandos Publishing.
13. Rao, M. (2012). *Knowledge management tools and techniques*. Routledge.

Course Code: LIS.711
Course Title: User Study and Information Literacy
Total Hours: 60 Hours
Course Learning Outcomes

L	T	P	Cr
4	0	0	4

After Successful Completion of the course, the students will be able to:

CLO 1: Develop skills in understanding Information Literacy
CLO 2: Understand and conduct User Studies in Information Research
CLO 3: Learn about Information Seeking Behavior and factors influencing Information Seeking Behaviour
CLO 4: Understand and address National Programmes in Information Literacy, information needs of diverse communities and contribute to social development.

Unit/Hour	Content	Mapping with CLOs
I/ 17 Hours	Information Literacy: Concepts and models of information literacy; Information literacy assessment methods; Information literacy programmes and initiatives. Overview of communication channels (Traditional and Digital); Selecting appropriate communication channels for different contexts; Evaluating the effectiveness of communication channels.	**CLO 1**
	Reflection: Learning concepts and models of Information literacy and various communication channels.	
II/ 15 Hours	User Studies in Information Research: Methods for conducting User Studies (surveys, interviews, focus groups, etc.); Overview of research paradigms and approaches; Importance of research methodologies; Analyzing and interpreting user study data.	**CLO 2**
	Reflection: Understand User Studies concept and methods for conducting User Studies research	
III 14 Hours	Information Seeking Behaviour: Theories of information seeking behavior; Factors influencing information seeking behavior; Ethnographic methods in studying information behaviour.	**CLO 3**

	Reflection: Understand various theories of Information seeking behaviour of information users and the factors influencing them	
IV **14 Hours**	National Programmes in Information Literacy: Role of Information in rural development; Participatory approaches in rural development research; Case studies on successful rural development initiatives; Empowering marginalized groups through Information and Communication Technology (ICT)	**CLO 4**
	Reflection: Understand and address information needs of diverse communities and contribute to social development.	

Transaction Mode: Lectures, PPT, YouTube, Discussion

Suggested Readings:

Andal, N. (2005). Communication theories and models. Mumbai: Himalaya Publishing House.

Bilawar & Pujar (2011). Information Literacy Models: Correlation and Conceptual Model for Higher Education. In *Towards Building a knowledge Society: Library as Catalyst for Knowledge Discovery and Management* (pp. 388-396). Ahmedabad: International Caliber INFLIBNET Center.

Creswell, /. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches.* SAGE Publications.

Debus, M. (1990). *Methodological Review: A Handbook for Excellence in Focus Group Research.* Washington D.C.: Academy for Educational Development

Devika, R. (2017). CONCEPT AND VIEWS ON USER STUDY. *Shanlax International Journal of Arts, Science & Humanities*, 252-259.

Driscoll, D. L. (2011). Introduction to Primary Research: Observations, Surveys, and Interviews. In L. C. (Ed.), *Writing spaces : readings on writing* (pp. 153-174). Anderson, South Carolina: Parlor Press.

Bauer, M. (2018). Ethnographic study of business students' information-seeking behavior: Implications for improved library practices. *Journal of Business & Finance Librarianship*, 1-10. 10.1080/08963568.2018.1449557

Case, D. O. (2006). *Looking for Information: A Survey of Research on Information Seeking, Needs, and Behavior (Library and Information Science Series).* Academic Press Inc;.

Edith D. de Leeuw, J. H. (2008). *International Handbook of Survey Methodology*.

Igwenagu, C. (2016). Fundamentals of research methodology and data collection. LAP Lambert Academic Publishing.

Forest Woody Horton, J. (2007). *Understanding Information Literacy: A Primer*. Paris: UNESCO.

GHOSH, S. B. and Kumar Das, Anup (2009). Information Literacy and Emerging Knowledge Economy in India.

Goodman, V. D. (2011). Applying Ethnographic Research Methods in Library and Information Settings. *De Gruyter Saur* .

Hjørland, B. (2000). Information seeking behaviour: What should a general theory look like? *New Review of Information Behaviour Research*.

Information Literacy Competency Standards for Higher Education. (2000). Chicago, Illinois: American Library Association

Kothari, C. R. (2004). *Research methodology: Methods and techniques.* New Age International.

Kumar, R. (2011). *RESEARCH METHODOLOGY: a step-by-step guide for beginners.* SAGE Publications.

Kundu, D. K. (2020). Models of Information Seeking Behaviour: A Comparative Study. j*ournal of Critical Library and Information Studies*, 393-405.

Lynn, P. (2008). The Problem of Nonresponse. In J. J. Edith D. de Leeuw, *International Handbook of Survey Methodology* (pp. 35-55). Routledge

Mohammed Nasser, A.-S. (2015). *Information Seeking Behavior and Technology Adoption: Theories and Trends.*

MUKHRJEE, D. B. (n.d.). Models of Information Seeking Behavior.

Punch, K. F. (2014). *Introduction to Social Research - Quantitative and Qualitative Approaches.* SAGE Publications Ltd.

Sarman & Aggarwal, D. (2017). Promotion of information literacy instruction: With special reference to government of India. *International Journal of Academic Research and Development*, 89-92.

Omerovic, S. & Milan Milutinovic, S. S. (2010). Methodology for Written and Oral Presentation of Research Results. *Journal of Professional Issues in Engineering Education and Practice*, 112-117

Shantadevi, T. (n.d.). *Information Needs And Seeking Behavior - A Practical Approach*

Thomas, S. & Mullaney, C. R. (2022). *Where Research Begins*

Wilson, T. (2006). On user studies and information needs. *Journal of Documentation*, 658-670. 10.1108/00220410610714895

L	T	P	Credit
0	0	4	2

Course Code: **LIS.752**
Course Title: TEACHING ASSISTANTSHIP
Course type: Core Course
Total Hours: 30

Course Learning Outcome (CLO):

At the end of this skill development course, the scholars shall be able to

(1) familiarise themselves with the pedagogical practices of effective classroom delivery and knowledge evaluation system

(2) manage large and small classes using appropriate pedagogical techniques for different types of content

Activities and Evaluation:

- The scholars shall attend Master degree classes of his/her supervisor to observe the various transaction modes that the supervisor follows in the classroom delivery or transaction process one period per week.
- The scholars shall be assigned one period per week under the direct supervision of his/her supervisor to teach the Master degree students adopting appropriate teaching strategy(s).
- The scholars shall be involved in the examination and evaluation system of the Master degree students such as preparation of questions, conduct of examination and preparation of results under the direction of the supervisor.
- At the end of the semester, the supervisor shall conduct an examination of teaching skills learned by the scholar as per the following **evaluation criteria**:
- The scholars shall be given a topic relevant to the Master degree course of the current semester as his/her specialization to prepare lessons and deliver in the classroom before the master degree students for one hour (45 minutes teaching + 15 minutes interaction).
- The scholars shall be evaluated for a total of 50 marks comprising *content knowledge* (10 marks), *explanation and demonstration skills* (10 marks), *communication skills* (10 marks), *teaching techniques employed* (10 marks), and classroom interactions (10).

Course Code: **UNI.753**
Course Title: Curriculum, Pedagogy and Evaluation
Course type: Core Course
Total Hours: 15

L	T	P	Credit
1	0	0	1

Course Learning outcomes (CLO):

After completion of the course, scholars shall be able to:

CLO1: analyse the principles and bases of curriculum design and development

CLO2: examine the processes involved in curriculum development

CLO3: develop the skills of adopting innovative pedagogies and conducting students' assessment

CLO4: develop curriculum of a specific course/programme

Units/Hours	Contents	Mapping with CLOs
I **4 Hours**	**Bases and Principles of Curriculum** Curriculum: Concept and Principles of curriculum development, Foundations of Curriculum Development. Types of Curriculum Designs- Subject centred, learner centred, experience centred and core curriculum. Designing local, national, regional and global specific curriculum. Choice Based Credit System and its implementation.	**CLO1**
II **4 Hours**	**Curriculum Development** Conceptual understanding of Pedagogy. Pedagogies: Peeragogy, Cybergogy and Heutagogy with special emphasis on Blended learning, flipped learning, Dialogue, cooperative and collaborative learning Three e- techniques: Moodle, Edmodo, Google classroom	**CLO2**
III **3 Hours**	**Curriculum and Pedagogy** Assessment Preparation: Concept, purpose, and principles of preparing objective and subjective questions.	**CLO3**

	Conducting Assessment: Modes of conducting assessment – offline and online; use of ICT in conducting assessments. Evaluation: Formative and Summative assessments, Outcome based assessment, and scoring criteria.	
IV 4 Hours	**Learners' Assessment** Assessment Preparation: Concept, purpose, and principles of preparing objective and subjective questions. Conducting Assessment: Modes of conducting assessment – offline and online; use of ICT in conducting assessments. Evaluation: Formative and Summative assessments, Outcome based assessment, and scoring criteria.	**CLO4**

Transaction Mode

Lecture, dialogue, peer group discussion, workshop

Evaluation criteria

There shall be an end term evaluation of the course for 50 marks for a duration of 2 hours. The course coordinator shall conduct the evaluation.

Suggested Readings

- Allyn, B., Beane, J. A., Conrad, E. P., & Samuel J. A., (1986). *Curriculum Planning and Development*. Boston: Allyn & Bacon.
- Brady, L. (1995). *Curriculum Development*. Prentice Hall: Delhi. National Council of Educational Research and Training.
- Deng, Z. (2007). Knowing the subject matter of science curriculum, *Journal of Curriculum Studies*, 39(5), 503-535. https://doi.org/10.1080/00220270701305362
- Gronlund, N. E. & Linn, R. L. (2003). *Measurement and Assessment in teaching*. Singapore: Pearson Education
- McNeil, J. D. (1990). *Curriculum: A Comprehensive Introduction*, London: Scott, Foreman/Little
- Nehru, R. S. S. (2015). *Principles of Curriculum*. New Delhi: APH Publishing Corporation.
- Oliva, P. F. (2001). *Developing the curriculum* (Fifth Ed.). New York, NY: Longman
- Stein, J. and Graham, C. (2014). *Essentials for Blended Learning: A Standards-Based Guide*. New York, NY: Routledge.

Web Resources

- https://www.westernsydney.edu.au/__data/assets/pdf_file/0004/467095/Fundamentals_of_Blended_Learning.pdf
- https://www.uhd.edu/academics/university-college/centersoffices/teaching-learning-excellence/Pages/Principles-of-a-FlippedClassroom.aspx
- http://leerwegdialoog.nl/wp-content/uploads/2018/06/180621-Article-The-Basic-Principles-of-Dialogue-by-Renate-van-der-Veen-andOlga-Plokhooij.pdf

L	T	P	Credit
4	0	0	4

Course Code: LIS.712
Course Title: Metrics Study in Library and Information Science
Course type: Elective
Total Hours: 60
Course Learning Outcomes (CLO):
After completion of the course, scholars shall be able to**:**
CLO1: Understand the concept of Research Metrics
CLO2: Understand the Bibliometrics and Scientometrics laws and Indicators
CLO3: Understand the different Metrics tools and Indicators
CLO4: Understand the data Visualization tools and their applications

Units/Hours	Contents	Mapping with CLOs
I/ 15 Hours	**Introduction to Research Metrics** Concept, Meaning and Purpose Overview of Librarmetrics, Bibliometrics, Scientometrics, Informetrics, Altmetrics Historical Development and Theoretical Foundations Key Concepts and Terminologies used in Metric Studies Citation Databases: Web of Science, Scopus, Dimensions, PubMed, etc.	**CLO1**
	Reflection: Discuss the concept of Research Metrics, Overview of different metrics, Citation database	

II/ 15 Hours	**Bibliometric and Scientometrics Laws and Indicators** Laws of Bibliometrics (Lotka's law, Bradford's law, Zipf's law, Price's law) Metrics Indicators: Authors Level (h-index, i10-index, g-index, m-index etc.) Journal Level (Journal Impact Factor, SNIP, SJR, Cite Score) and Article Level Metrics (Articles Citations, AAS, Download Counts, Views, Readers Uses and Mentions) Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA)	**CLO2**
	Reflection: Application of laws of Bibliometrics, Metrics Indicators and reviews of metrics analysis	
III/ 15 Hours	**Bibliometrics, Scientometrics, Informatrics, Webometrics, Altmetrics** Concept, Origin, Need and Purpose Terms and Terminology used in different metrics Data Sources, Tools and Indicators Challenges and Opportunities in Metrics Research Citation Networks and Academic Impact Indicators	**CLO3**
	Reflection: Discuss about different metrics and Research Citation Network	
IV/ 15 Hours	**Data Visualization Tools in Metrics Studies** Principles of Data Visualization Tools for Data Visualization: Biblioshiny (Bibliometrix, R-Package), VOSviewer, CiteSpace, PlumX Metrics etc. Hands-on Training / Data Demonstration for Data Visualization	**CLO4**
	Reflection: Discuss visualization tools and their applications in metrics studies.	

Transaction mode: Lectures, PPT, Peer Discussion, Scholarly Thinking, etc.

Suggested Readings:

- **Cronin, B. & Sugimoto, C.R. Ed. (2014).** Beyond bibliometrics: harnessing multidimensional indicators of scholarly impact. Cambridge, Mass, MIT Press.
- **Rao, I.K.R. (2010).** Growth of literature and measures of scientific productivity: Scientometrics models. New Delhi: Ess Ess Publications.
- **Braun, T. (2007).** The impact factor of scientific and scholarly journals: Its use and misuse in research evaluation: a selection of papers reprinted mainly from the journal Scientometrics, Budapest, Akademiai Kiado.
- **Egghe, L. (2005).** Otkaian Power laws in the information production process: Lotkanian. Informatics. Amsterdam, Elsevier/ Academic Press.
- **Egghe, L., & Rousseau, R. (2004).** Introduction to informetrics: quantitative methods in library, documentation, and information science. Amsterdam, Elsevier Science Publishers.

Web -based resources:

❖ LibGuidesofJCU(n.d). https://libguides.jcu.edu.au/researchhindicators/snip-and-sjr

DORA Website (n.d). https://sfdora.org/ Web of Science Websites (n.d). https://clarivate.com/webofsciencegroup/ solutions/web-of-science/

L	T	P	CR
4	0	0	4

Course Code: LIS.707
Course Title: Applications of AI and Informetrics
Course type: Elective
Total Hours: 60 Hours
Course Learning Outcomes (CLOs): By the end of this course, scholars will be able to:

- **CLO 1:** Critically evaluate the foundational theories of informetrics and their evolution in the era of big data.
- **CLO 2:** Apply NLP and text-mining techniques to extract metadata, topics, and sentiments from scholarly literature.
- **CLO 3:** Design and deploy machine learning models to predict citation impact and identify emerging research frontiers.
- **CLO 4:** Synthesize and visualize complex science mapping networks using advanced AI-integrated tools (e.g., VOSviewer, CiteSpace, Python libraries).

Units / Hours	Contents	Mapping with CLOs
Unit I *15 Hours*	**Foundations of Informetrics and Artificial Intelligence** Evolution of metric studies: Bibliometrics, Scientometrics, Webometrics, and Altmetrics. Informetrics in the era of Big Scholarly Data. Introduction to Artificial Intelligence and Machine Learning paradigms relevant to LIS. Integrating AI with traditional quantitative science studies: Scope, limitations, and ethical considerations. ***Reflection:*** *Scholars will critically evaluate traditional informetric laws to analyse through the lens of AI-driven scholarly datasets.*	CLO 1
Unit II *15 Hours*	**NLP and Text Mining in Scholarly Data** Text-mining workflows for academic databases. Natural Language Processing (NLP) basics: Tokenization, Lemmatization, and stop-word removal in academic texts. Topic Modeling (e.g., Latent Dirichlet Allocation - LDA) to identify research themes. Sentiment analysis in peer-review texts and citation contexts. Introduction to Transformer models (e.g., BERT, SciBERT) for bibliometric data extraction. ***Reflection:*** *Reflect on the qualitative context of citations, understanding "why" and "how" a paper is cited using sentiment analysis.*	CLO 2

Unit III *15 Hours*	**Predictive Modeling and Impact Assessment** Dynamics of citation networks and scholarly communication. Algorithmic approaches to predict future citation impact and h-index trajectories. Identifying emerging research frontiers and "sleeping beauties" in science using machine learning. Anomaly detection: Using AI to identify unethical practices, citation cartels, and academic paper mills. Algorithmic bias in the evaluation of Global South research. ***Reflection:*** *Scholars will explore the ethical dimensions of predictive metrics and human bias in research evaluation.*	CLO 3
Unit IV *15 Hours*	**Advanced Science Mapping and Visualization** Structural aspects of science mapping: Co-citation analysis, bibliographic coupling, and co-authorship networks. AI-enhanced network visualization tools: VOSviewer, CiteSpace, and Gephi. Practical introduction to Python libraries (NetworkX, Pandas, Matplotlib) for custom informetric analysis. Interpreting temporal and spatial knowledge graphs. Presenting data: Designing impactful research visual abstracts. ***Reflection:*** *Synthesize and visually narrate the evolution of a specific research paradigm, turning raw data into a coherent story.*	CLO 4

Suggested Readings:

- *Measuring Scholarly Impact: Methods and Practice* by Ding, Y., Rousseau, R., & Wolfram, D. (Springer)

Core Journals

- *Scientometrics* (Springer)
- *Journal of Informetrics* (Elsevier)
- *Quantitative Science Studies* (MIT Press).

L	T	P	CR
4	0	0	4

Course Code: LIS.710
Course Title: Digital Humanities for Preservation and Conservation
Course Type: Elective
Total Hours: 60
Course Learning Outcomes (CLOs): After completion of the course, the scholars will be able to:

- **CLO 1:** Analyze the theoretical frameworks of Digital Humanities (DH) and their application in cultural heritage preservation.
- **CLO 2:** Apply advanced digitization workflows, digital forensics, and imaging techniques for fragile and historical archives.
- **CLO 3:** Implement complex metadata standards, text encoding, and Linked Open Data (LOD) principles for digital archives.
- **CLO 4:** Formulate long-term digital preservation strategies to combat software obsolescence, utilizing standard frameworks like the OAIS Reference Model.

Units / Hours	Contents	Mapping with CLOs
Unit I *15 Hours*	**Foundations of Digital Humanities and Cultural Heritage** Introduction to Digital Humanities: Evolution, scope, and intersection with Library and Information Science. The GLAM sector (Galleries, Libraries, Archives, Museums) in the digital age. Theoretical frameworks of digital preservation vs. physical conservation. Ethics of digitization: Copyright, traditional knowledge, and open access. Decolonizing the Archive: Utilizing DH to ethically curate marginalized and indigenous histories. ***Reflection:*** Scholars will critically reflect on the dynamics of the archive, what gets digitized, and how do digital platforms are utilised?	CLO 1

Unit II *15 Hours*	**Advanced Digitization and Digital Forensics** Project planning and workflows for mass digitization of rare manuscripts and artifacts. Advanced imaging techniques: Multispectral and hyperspectral imaging for recovering faded or damaged texts. Introduction to 3D scanning and photogrammetry for artifact conservation. Optical Character Recognition (OCR) and Handwritten Text Recognition (HTR) for historical scripts (e.g., Gurmukhi, Persian, Sanskrit). Digital Forensics in LIS: Rescuing data from obsolete legacy media. ***Reflection:*** Scholars will evaluate the loss of "materiality", when a 400-year-old manuscript is digitized, what is permanently lost in translation?	CLO 2
Unit III *15 Hours*	**Metadata, Semantics, and Text Encoding** Advanced metadata schemas for cultural heritage: Dublin Core, VRA Core (Visual Resources Association), and METS/MODS. Introduction to the Text Encoding Initiative (TEI) and XML for scholarly digital editions. Semantic Web and Linked Open Data (LOD) in DH: Creating knowledge graphs for historical figures and events. Crowdsourcing and citizen science in transcription and metadata enrichment. Designing user interfaces and immersive experiences (AR/VR) for digital archives. ***Reflection:*** Scholars will analyze how structured metadata and markup languages (like TEI) describe text, and represent an interpretation for future research.	CLO 3

Unit IV *15 Hours*	**Digital Preservation and Archiving Strategies** The challenge of digital decay, bit rot, and technological obsolescence. In-depth study of the Open Archival Information System (OAIS) Reference Model. Strategies for long-term preservation: Emulation vs. Migration vs. Hardware preservation. Trusted Digital Repositories (TDR) and certification standards (e.g., ISO 16363). Preserving "Born-Digital" artifacts: Web archiving, social media archiving, and archiving digital literature. ***Reflection:*** Scholars will discuss the feasibility of preserving the "Digital Dark Age". How to archive digital culture (like Twitter/X movements or dynamic websites) for the future?	CLO 4

Suggested Readings

Warwick, C., Terras, M., & Nyhan, J. (Eds.). (2012). *Digital Humanities in Practice*. Facet Publishing.

Harvey, R., & Weatherburn, J. (2018). *Preserving Digital Materials* (3rd ed.). De Gruyter Saur.

Schreibman, S., Siemens, R., & Unsworth, J. (Eds.). (2016). *A New Companion to Digital Humanities*. John Wiley & Sons.

Besser, H. (2003). *Introduction to Imaging: Issues in Constructing an Image Database*. Getty Research Institute.

Digital Scholarship in the Humanities (Oxford University Press) - The premier journal for DH research.

Journal of Cultural Heritage (Elsevier) - Focuses on conservation and preservation technologies.

D-Lib Magazine (Archives) - Classic papers on digital library research and preservation.

The American Archivist (Society of American Archivists) - Excellent for archival theory and born-digital preservation.

CCSDS (2012). *Reference Model for an Open Archival Information System (OAIS)*. Recommended Practice, Issue 2.

TEI Consortium: *TEI: P5 Guidelines* (Available online at tei-c.org) - Essential for understanding text encoding.