**REFRESHER COURSE IN ADVANCED RESEARCH METHODOLOGY**

**TLC Ramanujan College in collaboration with Janki Devi Memorial College**

**December 22, 2022 to January 05, 2023.**

**DAY 1and 2 : December 22,2022 and December 23,2022**

**INTRODUCTION TO RESEARCH**

***Resource Person : Dr. Jaspreet Kaur***

The DAY 1 commenced with the illustrious resource person, Dr, Jaspreetkaur explaining the relevance of the topic ‘Introduction to Research’ for research scholars and faculties belonging to various domains. She started with six phases of the research that every scholar’s research moves through. The six phases also serve as the Chapters in the research thesis. The first step is ‘Introduction’ which comprises of problem definition wherein the researcher is not only required to explain the considered research problem but also provide a justification that why is there a need to pursue research on such topic. She explained how scholars who plan to do PhD are required to justify the gap they want to work upon after studying the work that has been published till date. Using the examples of real-life research papers, she explained how to read it and extract relevant information from it. She then went on to explain the techniques which can be used to locate topics for a ‘Systematic Literature Review’, which is the step two of research. She listed out the databases which can be used to find research papers for performing a systematic literature review. She pointed out how the topic for research needs to be narrowed down.

The next Chapter is ‘Research Design or Methodology’. She elaborated on how research design is like a blueprint that explains the sequence in which the research will occur. The methodology applied should be based on the need of the study. The various types of research design that is, exploratory research, descriptive research, and causal research were discussed in depth using various theoretical and practical examples. Descriptive and Causal Research together are also known as ‘Conclusive Research’. Dr. Kaur went ahead with the explanation regarding the three types of research design and how they are performed in a sequence, using example of a research problem. For every topic, first, there is exploration, then it is described and eventually, causal links are established. She shed light on the fact that within research design, hybrid or mixed models where the researcher uses makes use of various kinds of research techniques at one time, are coming up in contemporary times. Under exploratory research, the variables are not known and hence, they are looked for and under descriptive research, these variables are explained or described in relation to research problem.

Further, she elaborated on Causal Research that aims to establish cause-and-effect relationships among the variables that have already been identified. These relationships can be identified using moderating and mediating variables. Such research design makes use of hypothesis formulation and statistical tools. She illustrated the process of establishing such causal relationships using examples from different domains to make it more relatable to the participants. She cited an example to explain how control groups and experimental groups can be used to perform a comparative study to test the hypothesis which has been formulated on the basis of the past study or review of literature that was performed in the previous step.

Dr. Kaur then talked about the techniques which can be used to collect data for exploratory research including focused group technique, personal interview, projective techniques, ethnography etc. and whether they fall under qualitative or quantitative methods. She described how there can be a debate regarding the techniques to be used under different types of research. Techniques like lab observation and natural observation can be put under tools for descriptive research. Examples of Ikea under ethnography and other examples under experimentation and questionnaire technique were also discussed. Dr. Kaur ended the session citing many sources where scholars can find study materials and sources which can help them to learn more about various research designs. The session was a very successful one with elaborate explanation on each topic with relatable examples for participants.

**Day 3: December 24, 2022**

**RATIONALE FOR RESEARCH PUBLICATION**

**Resource Person: Dr.Vibhash Kumar**

**Session 1: Effective research writing**

The FDP started with a live session -1, on 24th December 2022. The speaker discussed the importance of research publications. He discussed that research publications are necessary for knowledge sharing with peers, essentials for academic appointments & promotions, helpful in making you proficient for future tasks, a requirement for Ph.D submission and essential assessment tools for getting funding from funding organizations.

**Session 2: Outlining steps in effective research writing 1**

The FDP started with a live session -2, on 24th December 2022. The speaker discussed the steps of wrting an effective research articles. He explained the procedure of writing a an effective research article. He discuused the steps involved in effective rsearch writing: Determine authors, Initiate the writing while experimenting, decide to publish, publications ethics, draft a working title, determine the basic format, find the appropriate journal, store sections of your paper, construct figures and tables.

**Session 3: Outlining steps in effective research writing 2**

The FDP started with a live session -3, on 24th December 2022. The speaker discussed about the further steps in writing a research article. Such as outlining a research article and writing the first draft. He also discussed about the manuscript revision. He covered the topic referencing style in research.

**Session 4: Reference Management 1**

The FDP started with a live session -4, on 24th December 2022.The speaker discussed about the Zotero reference manager software. He explained how referencing plays an important role in writing an effective research article.Zotero is a free reference manager tool to manage bibliographic data and related research material.

**Session 5: Reference Management 2**

The FDP started with a live session -5, on 24th December 2022. He showed using word documents how to cite the paper using Zotero and how to create a bibliography at the end of the paper using Zotero. He discussed about the different types of citation and referencing styles, such as APA, Chicago and MLA etc.

**Session 6: Reference Management 3**

The FDP started with a live session -6, on 24th December 2022. He discussed about the various types of referencing styles used in Social Sciences, Sciences, and Humanities, such as in social sciences APA, AAA, American political science association, and legal citation are used. He also dissed about IEEE, the American Chemical Society and the National library of medicine.

**Session 7: Outlining steps in effective research writing 3**

The FDP started with a live session -7, on 24th December 2022. He covered points to be keep in mind in order to write an effective paper. He discussed about how important to re-read journal instructions, prepare the final illustrations, get feedback on the manuscript and how to deal with reviews.

**Session 8: Advanced search in google scholar**

The FDP started with a live session -8, on 24th December 2022.He discussed and showed how to perform advanced research using Google scholar, how to find articles using appropriate keywords and extract phrases. He also discussed how to search year-wise articles and the latest articles using various features of Google Scholar.

**Day 5: December 26,2022**

**UNDERSTANDING RESEARCH-QUANTITATIVE ANALYSIS**

**Resource Person: Prof. C.S. Sharma**

**Session 1:Understanding Research-Quantitative Analysis Module 1**

The FDP started with a live session -1, on 26th December 2022.The speaker discussed about quantitative research. He explained that Quantitative research is an inquiry into an identified problem based on testing a theory, measured with numbers, and analyzed using statistical techniques. The goal of quantitative methods is to determine whether the predictive generalizations of a theory hold true.The Session outlines the meaning of numerical data, its nature and scope, and the ways it is gathered, observed and analyzed. The lecture probes into the potential of expanding the quantitative analysis to form a deeper understanding of efficient and effective research writing.

**Session2:Understanding Research-Quantitative Analysis Module 2**

The FDP started with a live session -2, on 26th December 2022.The speaker discussed about the topic of measurementand how measurement plays an important role in research. He discussed that measurement helps in measuring unseen and unknown but predicted by theory. He explained that measurement connects ideas with specific things.

**Session3:Understanding Research-Quantitative Analysis Module 3**

The FDP started with a live session -3, on 26th December 2022. The speaker discussed about the topic indicators and dimensions. He explained that an indicator is a sign of the presence or absence of the concept. He also explained that dimension is a grouping of specifiable aspects of the concept. He also explained the concept of objective.

**Session4:Understanding Research-Quantitative Analysis Module 4**

The FDP started with a live session -4, on 26th December 2022.He explained the concept of consistency in research. He explained the concept of measuring consistency split half method etc. He explained the method of validity of measures. He discussed about the concept of face validity. Hediscussed about the concept of validity. The day ended with an assignment and quiz to check the knowledge and understanding acquired by participants.

**Day 6 : December 27,2022**

**PLAGIARISM**

***Resource Person : Dr. Vibhash Kumar***

The illustrious resource person Dr. Vibhash Kumar extended a warm welcome to all the participants to the session on ‘Plagiarism’. He initiated by describing the literal meaning of the word ‘plagiarism’ and how it comes from the word ‘plague’ and it is like a disease that is infecting the academics, and lately, it has started impacting students as well. Hence, it is the need of the hour to equip educators with the corrective actions to curb plagiaristic behavior in classrooms. Such malpractices tend to corrupt the progression of science as the future researchers look up to the existing research work for ideas. Plagiarism can take many forms.

The resource person moved ahead by explaining the first way to reduce similarity among different works which is, paraphrasing. It means using your own words to explain a concept or idea which has been explained in an existing research work. He elaborated with an example that just maneuvering the words using synonyms does not account to paraphrasing. It involves making the notes while reading the existing study material and then describing it in your own words. He explained the correct way of providing credit to the original research work by way of citing and putting it in references. Managing references is a tedious task therefore, to ease it Dr. Vibhash introduced reference management software.

The session moved ahead as the resource person gave a practical insight by showing how to download reference management software – Zotero. He also elaborated on Zotero Chrome Connector and the additional plugins to make the user interface of the software a lot more productive. He shed light on the functions of Zotero including the maintenance of the library of research papers and adding of citations and references into the word file itself. Zotero automates the process of citation and reference management and saves human labor. Towards the end of the session, Dr. Kumar discussed the software that can be used to check the level of plagiarism in a research article. He suggested Turnitin, ithenticate and Urkund (now called Ouriginal) which can be used for the purpose and provided their practical insight as well. It was a successful session informing the participants about the menace that is, plagiarism.

**Day 7: December 28,2022**

**QUALITATIVE ANALYSIS AND NVIVO**

**Resource Person: Dr. Jaspreet Kaur**

The FDP started with a live session -1, on 28th December 2022. The speaker discussed the methods of Qualitative Analysis which integrates the techniques of Software packages, majorly focused on the interpretability of information, with a human centered approach. Primary data sets from the fields of social sciences, management and sciences were used for the session. This session was helpful in improving qualitative skills of teaching faculty and research scholars in both sciences and social sciences. The participants were trained to understand the ways of identifying a research problem and effectively analyze, present the data and its outcome.

**Day 8 : December 29,2022**

**PUBLISHING JOURNAL ARTICLES**

***Resource Person : Dr. Nikhil Kumar Rajput***

The resource person Dr. Nikhil Kumar Rajput commenced the session by giving the participants an introduction to steps involved in finding a suitable journal for one’s research article. He moved ahead and provided a practical insight to the participants by showing how to find Web of Science-indexed journals and their relevance in the academic world. He explained how to find various articles using keywords and the meaning of the various collections and citations available on it. The session moved ahead with the resource person describing a feature called ‘Manuscript Matcher’, which can be used to find the suitable ‘Web of Science’ – indexed journal, which quantifies the relationship between a submitted manuscript and a suitable journal. He depicted the same process for Scopus-indexed journals also.

He explained the various research metrics available on the portal like h-index and Total Cites which can be used to analyze the quality of a journal. Taking the example of ‘University of Delhi’, Dr. Rajput also explained the way to find out the research ranking of a certain university. The examples of illustrious researchers like ‘Abhijeet Banerjee’ and ‘C.N. Rao’ were also taken to explain the meaning of h-index and i-10 index. He also discussed about the predatory journals where researchers should not be publishing as it can’t be detrimental to their careers. He made the participants aware about various sites of publishers such as ‘Springer Suggester’ and ‘Elsevier Journal Finder’, which can be used to find journals by a particular publisher.

The next part of the session contained details about the platforms where researchers can build their profile and provide details about their research work like scholar.com, ReserachGate, Publons, Orchid and Vidwan. These platforms not only depict the profile of the researcher but also help them to communicate their research papers to a larger audience and also help in submission of articles to various journals. The meaning of Impact Factor (IF) – a very popular metric used for analysing the quality of a journal was also explained. Dr. Rajput covered the meaning of ‘peer-review process’ and ‘pre-print publication process’ towards the end of the session.

**Day 9: December 30,2022**

**SYSTEMATIC REVIEW AND META ANALYSIS**

**Resource Person: Prof. Jaspreet Kaur**

**Session 1: Systematic review and meta analysis -part 1**

The FDP started with a live session -1, on 30th December 2022. The speaker discussed the meaning of systematic literature and meta - analysis. Referring to it as a consolidation of literature, Dr. Kaur explained the importance of systematic literature review and the rationale of using it for writing a research paper. She further discussed about the differences between a conventional literature review, systematic literature review (SLR) and meta - analyses.

**Session 2: Systematic review and meta analysis -part 2**

The FDP started with a live session -2, on 30th December 2022. The speaker discussed the detailed process of conducting SLR and the area where meta-analysis can be done was also explained using a case study. Further, the session was based on the evidence based minimum set of reporting in SLR and Meta Analysis, that is, PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses).

**Day 10 : December 31,2022**

**LATEX**

***Resource Person : Dr. Nikhil Kumar Rajput***

The resource person Dr. Nikhil Kumar Rajput commenced the session by giving the participants an introduction of document-preparing software – LaTex. He explained that Latex might look difficult in the beginning but it has some special features that helps users to prepare high-quality documents. Most of its versions are open-source and it is available both online and offline. It helps to change the format of documents from one to another without investing a significant amount of time. He moved ahead by providing the participants with a hands-on experience of working on the online version of latex by registering for it. After that, he pasted text in the online version of latex to show the participants some features.

Dr. Rajput showed the participants the method of adding sections into a document and changing the reading mode of the document using beamer (which can be used for powerpoint slides format), letter, report, book. He then moved ahead to features like two columns which can be used to convert the text into two columns. He showed the participants the way to change the font size. The method of converting the document from one journal’s format to another one. The resource person used the example for conversion from IEEEtran to elsarticle.

A new project was created after that and the participants were familiarized with the method of adding title and subsection in addition to the features discussed above. Towards the end of the session, Dr. Rajput discussed the addition of a second author’s name in the document and the use of % sign in the document. Overall, it was an enlightening session on Latex.

**Day 12 : January 2,2023**

**LATEX (CONTINUED)**

***Resource Person : Dr. Nikhil Kumar Rajput***

The resource person Dr. Nikhil Kumar Rajput continued the session on LaTex by discussing newer features of LaTex. He explained how some of them are case sensitive and need to be applied carefully. He mentioned how it is important for a user to learn the meaning and applications of various signs used in LaTex like /,% and $. The symbols used for putting a superscript (^) and subscript (\_) were also discussed in case the user wants to involve them in their document. The resource person discussed many examples of adding subsections and subsubsections into the documents and elaborated on the usage of $ symbol. A new feature of adding paragraphs and their title was also elaborated upon by the resource person.

Dr. Rajput described the way in which images and pictures can be added in the documents in LaTex. First, the image needs to be uploaded in LaTex and then using the command begin{figure}, the picture can be added and many other features can be accessed. He mentioned that there are certain features in LaTex which can be accessed only when special packages are installed for them like the ones needed for adding figures. Moving ahead, he discussed how to add equation in the document. In order to insert equations, chrome extensions can be used like ‘LaTex Equation Generator’ and ‘MathType’. After that, the insertion of table was discussed. References and citations can also be inserted in the documents using LaTex. The document and output file in pdf form can also be shared with viewing and editing permissions just like a drive link.

Towards the end of the session, Dr. Rajput discussed various templates which can be added in the documents in which LaTex provides the users an option to pick a pre-made template suitable for certain publishing houses. He explained how LaTex can be used to prepare posters as well once the user gets a hang of it. The session ended with Dr. Rajput emphasizing the insertion of multilingual in LaTex.

**Day 13: January 3,2023**

[**PRACTICING ADVANCED SEARCHING THROUGH GOOGLE SCHOLAR**](https://apps.arm.rcmoocs.in/learning/course/course-v1:JANKI_DEVI_MEMORIAL_RAMANUJAN_COLLEGE+FDP_241+2022_12/block-v1:JANKI_DEVI_MEMORIAL_RAMANUJAN_COLLEGE+FDP_241+2022_12+type@sequential+block@520776cd80f74754a50524cd3f869cc2)

**Resource Person: Ms. Bhavya Ahuja**

This session included four modules and two session which focused on advanced search tools. The speakers informed about on practicing advanced searching through Google Scholar. The speaker explained about the method to reduce the results and how to get more relevant searches though many examples. In the second session, Speaker also discussed about the usage and importance of Zotero. Zotero is an important reference management tool.She discussed about the tools and functions of Zotero application. She discussed how it can be integrated with other application such as word document.

**Day 14: January 4,2023**

[**OER AND CREATIVE COMMON LICENSE**](https://apps.arm.rcmoocs.in/learning/course/course-v1:JANKI_DEVI_MEMORIAL_RAMANUJAN_COLLEGE+FDP_241+2022_12/block-v1:JANKI_DEVI_MEMORIAL_RAMANUJAN_COLLEGE+FDP_241+2022_12+type@sequential+block@2bfa3803a5a6480cb20b49eed62c2a20)

**Resource Person: Dr. Nikhil Kumar Rajput**

Day 14 consisted of 4 sessions. Speaker discussed about the open educational resources and its application in making teaching learning more effective. Speaker explained we can use Wikipedia, guteberg.org., MITandOpenCourseWare etc as an OER. He explained that MOOCs can also be created using these educational resources. Dr. Rajput explained that Creative Commons copyright licenses and tools forge a balance inside the traditional “all rights reserved” setting that copyright law creates. The tools give everyone from individual creators to large companies and institutions a simple, standardized way to grant copyright permissions to their creative work. It facilitates a pool of content that can be copied, distributed, edited, remixed, and built upon, all within the boundaries of copyright law.

**Day 15 : January 5,2023**

**INTELLECTUAL PROPERTY (IP) RIGHTS**

***Resource Person : Ms. Anupama Yadav***

The resource person Ms. Anupama Yadav commenced the session by extending a warm greeting to all the participants. She began by discussing the meaning of the term ‘Intellectual Property Rights.’ IP Protection Act can be extended to literary works, musical works, inventions and discoveries, words/phrases and symbols and industrial designs. Moving ahead, she discussed the types of intellectual property (tangible/intangible), people who can create intellectual property and eight forms of IP (such as copyright patent, design, trade mark, trade secret, geographical indication, plant-bleeders right and semi-conductor integrated circuit layout design). She cited examples for each of them to make the content more relatable. In the next part, she discussed about various aspects related to patents such as meaning, body and steps involved in the process of obtaining patents. Using the example of needle-free glucose monitoring, the meaning of prior art search was discussed.

Continuing with the same example, she provided a hands-on experience of patents.google.com to the participants. After that, she discussed various filters like synonyms, search fields, status, patent office etc. Websites like USPTO (United States Patent and Trademark Office) and their options like PatFT and AppFT were also shown to the participants. Ms. Yadav took the session forward by introducing Indian websites for patents and depicted the method of applying for patents and checking the application status.

In the next part of the session, the resource person shed light on the meaning of Copyright and the kinds of artworks which can be protected under Copyright laws. She elaborated on the types of rights available under copyright laws and the process of registration of copyrights concluding it with discussing the relevant case studies. The remedies available to a person in case of copyright infringement were also discussed. The session concluded with the illustrious resource person Ms. Anupama Yadav discussing the steps to be followed while registering for a copyright and provided a hands-on experience to the participants for the same.