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| Wef Academic Year | 2021-22 |
| Semester | 1 |
| Category of the Course | MLC |
| Course Name & Code | Research Methodology and IPR 3710001 |

Rationale:

The purpose of this subject is to orient the students to the scientific methodology of research and presenting their thesis. Research constitutes primarily of literature review, giving critical comments on the literature reviewed and identifying the gap, problem formulation, modelling in either an analytical or experimental setup, validating the model and solving the problem you set for yourself.

In the end, the student should be able to present and defend the solution he/she has found, simply and easily. Communicating the research outcomes is an art wherein, you do not want to either undermine or over emphasise the content, within the short time limit given for such presentations. The balance of critical technicality and overall outcomes is the key to an effective presentation. The language, content and articulation should be such as to convey in a unified manner, the gist of your work

Course Scheme:

| Teaching Scheme | | | Total Credits | Assessment Pattern and Marks | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|
| | | | | Theory | | Practical | | |
| L | T | PR | C | ESE (E) | PA(M) | ESE (V) | PA (I) | |
| 01 | 00 | 02 | 02 | 00 | 00 | 80 | 20 | 100 |

Course Content:

| Sr No | Couse Content | No of Hours |
|---|---|---|
| 1 | Unit 1: Starting Research<br>Find what is expected of you - Identify specific requirements for evaluation/review and what constitutes the completion of your work, Find where the source is available, Establish proper methods for finding the relevant material from the source<br>Analyse the question - Identify key areas in your field, Determine the nature and extension of papers that you should read<br>Identify the gaps - Learn to Critique existing knowledge and how to find the gap<br>Formulate the Problem Statement - Understand what should be the key aspects of your problem statement, your problem statement, examples of effective and ineffective Titles<br>Validation - Identify a problem and experimental/theoretical data for comparison with your model, Learn how to extrapolate/scale data for validation, Find what is the acceptable level of error and justification thereof | 6 |
| 2 | Unit 2 Finding Good Literature<br>Decide which sources you will need - Differentiate between journals, conferences, books, magazines and their quality, Understand how to establish their quality and authenticity | 6 |

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|---|---|---|
| | Finding Information - How to conduct effective searches, How to find relevant papers related to your area of research, How to capture critical information<br>Identify main ideas in scholarly literature - Understand and identify the bias, theoretical position and evidence produced<br>Write notes to organize your ideas - Compare ideas and concepts from different papers | |
| 3 | Unit 3 Writing and Presenting your Work<br>Effective technical writing - How to write Report, Paper, Developing a Research Proposal, Format of research proposal<br>Build your argument - Recognise the importance of emphasizing your point, Distinguish between your point and the evidence available, Acknowledge the evidence<br>Review and finalize your work - Know and follow the Process of reviewing and proofreading your work, Use feedback to improve your work<br>Check the logistics of your presentation- Identify the key message of your presentation, Understand the expectations and what will be the key review points<br>Develop the structure of your presentation - Understand the key components of an oral presentation, Know the usual structure of a good presentation<br>Prepare for delivery of your Oral presentation- Rehearse and time your presentation, prepare to answer questions from the audience: Fundamental concepts should be spoken from memory as the reviewer will be looking for evidence of your thorough understanding., Read more than the content you are presenting; keep sources ready on hand for reference | 7 |
| 4 | Unit 4 Intellectual Property<br>Patents, Designs, Trade and Copyright - Process of Patenting and Development: Technological research innovation, patenting, development.<br>International Scenario - International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT<br>Patent Rights - Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications<br>New Developments in IPR - Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies | 8 |

Reference Book:


1. Stuart Melville and Wayne Goddard, “Research methodology: an introduction for science & engineering students”
2. Ranjit Kumar, 2nd Edition, “Research Methodology: A Step by Step Guide for beginners”
3. Halbert, “Resisting Intellectual Property”, Taylor & Francis Ltd,2007.
4. Mayall, “Industrial Design”, McGraw Hill, 1992.
5. Niebel, “Product Design”, McGraw Hill, 1974.
6. Asimov, “Introduction to Design”, Prentice-Hall, 1962.
7. Robert P. Merges, Peter S. Menell, Mark A. Lemley, “ Intellectual Property in New Technological Age”, 2016.
8. T. Ramappa, “Intellectual Property Rights Under WTO”, S. Chand, 2008

Course Outcome:
After completion of the Course, Students will be able to:

| No | Course Outcomes | RBT Level* |
|---|---|---|
| 01 | To infer technical research documents along with various ethical aspects of research. | UN |
| 02 | To determine the research gap by reviewing existing research work. | AN |
| 03 | To select different research methodologies for technical research work | AP |
| 04 | To write and present a significant technical report/document. | AP |
| 05 | To critique research work in the form of patent and copyright | EL |

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

List of Laboratory/Learning Resouces Required:

- List of Open Source Tools/Simulator
    a. LaTeX
    b. Overleaf
- List of Useful websites/MOOCs