

# *Scheme & Syllabi*

*for*

## *Ph.D. Course Work (Printing Technology)*

**(w.e.f. Winter Session 2024-2025)**

*(Total Credits =12)*

*Department of Printing Technology*



***Guru Jambheshwar University of Science & Technology,  
Hisar-125001***

# *Ph.D. Course Work (Scheme)*

| <b>Sr. No.</b> | <b>Course Code No.</b> | <b>Nomenclature</b>  | <b>Credits</b> | <b>Internal</b> | <b>External</b> | <b>Max. Marks</b> | <b>Exam. Duration</b> |
|----------------|------------------------|--|----------------|-----------------|-----------------|-------------------|-----------------------|
| 1.             | PPD-101                | Research Methodology   | 4              | 30              | 70              | 100               | 3 Hrs.                |
| 2.             | PPD-102                | Review of Literature and Seminar   | 2              | 50              | --              | 50                | --                    |
| 3.             | PPD- 103               | Quality Control in Printing Technology<br>(Departmental Elective Course) | 4              | 30              | 70              | 100               | 3 Hrs.                |
| 4.             | PPD-104                | Research and Publication Ethics (RPE)                                    | 2              | 15              | 35              | 50                | 2 Hrs.                |

| <b>Sr. No.</b> | <b>Course Code No.</b> | <b>Nomenclature</b>  | <b>L</b> | <b>T</b> | <b>P</b> | <b>Credits</b> |
|----------------|------------------------|--|----------|----------|----------|----------------|
| 1.             | PPD-101                | Research Methodology   | 4        | --       | --       | 4              |
| 2.             | PPD-102                | Review of Literature and Seminar   | 2        | --       | --       | 2              |
| 3.             | PPD- 103               | Quality Control in Printing Technology<br>(Departmental Elective Course) | 4        | --       | --       | 4              |
| 4.             | PPD-104                | Research and Publication Ethics (RPE)                                    | 2        | --       | --       | 2              |

***Ph.D. Course Work***  
**(Syllabi)**

## PPD-101: RESEARCH METHODOLOGY

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|---|---|
| <p>Course Code: PPD-101</p> <p>Course Credits: 4.0</p> <p>Contact Hours: 4 hours/week (4 Lectures)</p> <p>Examination Duration: 3 hours</p> | <p><b>Course Assessment Methods:</b></p> <p><b>Internal Examination (30 marks):</b> <i>Two minor tests each of 20 marks will be conducted. The highest marks obtained by a student in any of the two minor examinations will be considered. Class performance will be measured through percentage of lectures attended (04 marks), Assignments, quiz, etc., (06 marks).</i></p> <p><b>End semester examination (70 marks):</b> <i>The examiner is required to set 9 questions in all. The first question will be compulsory covering the entire syllabus and consisting of 4 short answers type questions of 3.5 marks each. In addition to that, 8 questions have to be set consisting of 2 questions from each unit. A candidate is required to attempt 5 questions in all, selecting one question from each unit and the compulsory question No. 1. All questions carry equal marks.</i></p> |
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### UNIT-I

**Introduction:** Nature, objectives and motivation of research, types of research, research approaches, significance of research, research and scientific method, importance of research methodology, criteria of good research, problems encountered by researchers in India, benefits to the society in general, and research process.

**Research problem and its formulation:** Defining the research problem: definition, types and its characteristics, necessity of defining the problem, research problem identification, literature review, scope and formulation of hypothesis, and problem formulation.

## UNIT-II

**Statistical analysis** Measure of central tendency, dispersion, mean, median, mode, range, mean deviation, standard deviation, problems, and data preparation and analysis.

**Probability distribution:** Discrete, continuous and mixed random variables, definition of probability, addition rules and condition probability, binomial, Poisson, sampling and geometric distributions, sample tests: Chi square test.

## UNIT-III

**Research Design:** Meaning of research design, need, and features of research design, parts and classifications, research design process, different research designs, basic principles of experimental design and developing a research plan.

**Modeling:** Basics of models, design of experimental set-up, use of standards and codes, type of models, model building and stages, need and types of simulation.

## UNIT-IV

**Research Report Writing:** Format of the research report, synopsis, dissertation, thesis its differentiation, references/bibliography, technical paper writing/journal report writing, Research proposal preparation: writing a research proposal and research report, writing research grant proposals.

**Computer Application for presentation:** Making presentation, use of visual aids, basic presentation skills for documentation and presentation tools: PowerPoint, Microsoft office, and knowledge of online tools.

### **Recommended Books:**

1. Agarwal, Y.P., (2004). Statistical Methods: Concepts, Application and Computation, Sterling Pubs. Pvt. Ltd., New Delhi.
2. Ganesan, R., (2011). Research Methodology for engineers, MJP Publishers.
3. Khananabis, R. & Saha, S., (2015). Research Methodology, University Press, Hyderabad.
4. Kothari, C.R., (2004). Research Methodology, Methods and Techniques, New Age International Publishers.
5. Krishnaswamy, K.N., Sivakumar, A.I. & Mathirajan, M., (2018). Research Methodology; Integration of Principles, Methods and Techniques. Pearson Education, New Delhi.
6. Kumar, R., (2005). A step-by-step guide for beginners, Pearson Education.
7. Meyer, P.L., (1970). Introductory Probability and Statistical Applications, Addison Wesley.
8. Singh, Y.K., (2006). Fundamentals of Research Methodology, New Age International Publishers.
9. Upagade V. & Shende, A., (2009). Research Methodology, S. Chand & Company Ltd., New Delhi.

## PPD-102: REVIEW OF LITERATURE & SEMINAR

|                             |   |
|-----------------------------|---|
| Course Code: PPD-102        | <b>Course Assessment Methods:</b>   |
| Course Credits: 2.0         | <b>Internal Examination (50 marks):</b> <i>It includes discussions on research ethics, presenting a seminar on review of published research or on own published reviews/survey paper or training or field work done in relevant area of research before a three members committee duly constituted by the Dean, Research and Development and headed by the Chairperson/Director or Senior teacher of the Department/School.</i> |
| Contact Hours: 2 hours/week |   |

### Detailed Contents

**Literature survey:** Overview – What is literature survey, Functions of literature survey, maintaining a notebook, developing a Bibliography, Searching for publications – Publication databases, search engines and patent databases, Find some/all of the references for a given paper, including those that are not on the web.

**How to study a scientific paper:** Summarizing papers already published: – Reading abstracts and finding ideas, conclusion, Advantages of their approach, the drawbacks of the papers (What is lacking – can be found in the sections such as future work) Generalize results from a research paper to related research problems, Comparing the approach - Identify weaknesses and strengths in recent research articles in the subject.

**Publishing a paper:** How to write a scientific paper, Structure of a conference and journal paper, abstract writing, chapter writing, discussion, conclusion, references, bibliography and In-class discussion of technical writing examples, Poster papers, review paper, Research ethics – Legal issues, copyright, plagiarism, General advice about writing technical papers in English - Tips for writing correct English.

**NOTE:** *Every student will be required to collect minimum 20-30 research papers related to the broad area of research. The area of research will be decided by the course coordinator of the Departmental Elective subject and the relevant research papers should be from the reputed journals. A report consisting of the summary of these research papers is required to be submitted at the end of the semester. The final evaluation shall be done on the basis of Seminar and report submitted. The continuous assessment will be done by the Course Coordinator on the basis of efforts made by the candidate for collecting the relevant quality research papers.*

*Reference:-*

*1. Lecture Notes and presentations*

## PPD-103: QUALITY CONTROL IN PRINTING TECHNOLOGY

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|---|---|
| <p>Course Code: PPD-103</p> <p>Course Credits: 4.0</p> <p>Contact Hours: 4 hours/week (4 Lectures)</p> <p>Examination Duration: 3 hours</p> | <p><b>Course Assessment Methods:</b></p> <p><b>Internal Examination (30 marks):</b> <i>Two minor tests each of 20 marks will be conducted. The highest marks obtained by a student in any of the two minor examinations will be considered. Class performance will be measured through percentage of lectures attended (04 marks), Assignments, quiz, etc., (06 marks).</i></p> <p><b>End semester examination (70 marks):</b> <i>The examiner is required to set 9 questions in all. The first question will be compulsory covering the entire syllabus and consisting of 4 short answers type questions of 3.5 marks each. In addition to that, 8 questions have to be set consisting of 2 questions from each unit. A candidate is required to attempt 5 questions in all, selecting one question from each unit and the compulsory question No. 1. All questions carry equal marks.</i></p> |
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### UNIT-I

1. Introduction to Printing Technology
2. Different Printing Techniques.
3. Merits, demerits and applications of different printing systems.

### UNIT-II

1. Process requirements (Substrates, ink, image carrier, press chemicals, printing machines, etc.)
2. Raw material testing methods and application.
3. Image carrier preparation methods.

### **UNIT-III**

1. Quality control, Quality Assurance & Quality management.
2. Print quality control methods and application.
3. Quality control aids and equipments.

### **UNIT-IV**

1. Enhancing print quality of conventional and digital printing.
2. Quality control and print productivity
3. Latest developments in Print quality control systems.

#### Text & Reference Books:

1. Miles South worth and Donna South worth. Quality and Productivity in the Graphic Arts. Graphic Arts Publishing Company (1980).
2. Douglas C. Montgomery, Introduction to Statistical Quality Control, John Wiley(1985).
3. Brian Rothery, ISO 9000, Productivity and Quality Publishing Private Ltd.
4. Kelvin Tritton, Colour Control for Lithography, PIRA International.
5. Mortimer, AColour Reproduction in Printing Industry PIRA International.
6. Phil Green Quality Control for Print Buyers, blue Print.
7. J.P Casey (Ed) Pulp and Paper Chemistry and Chemical Technology, Vol II Wiley Inter science.
8. Ronald E. Todd, Printing Inks - Formulation Principles, Manufacture and Quality Control Testing Procedures. PIRA International.
9. H.L Apfelberg and M.J. Apfleberg, Implementing Quality Management in Graphic Arts, GATF.

## PPD-104: RESEARCH AND PUBLICATION ETHICS

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|---|--|
| <p>Course Code: PPD-104</p> <p>Course Credits: 2.0</p> <p>Examination Duration: 2 hours</p> | <p><b>Course Assessment Methods:</b></p> <p><b>Internal Examination (15 marks):</b> <i>Two minor tests each of 10 marks will be conducted. The highest marks obtained by a student in any of the two minor examinations will be considered. Class performance will be measured through percentage of lectures attended (02 marks), Assignments, quiz, etc., (03 marks).</i></p> <p><b>End semester examination (35 marks):</b> <i>The examiner is required to set 5 questions in all. The first question will be compulsory covering the entire syllabus and consisting of 5 short answers type questions of 3 marks each. In addition to that, 4 questions have to be set considering 2 questions from each unit. A candidate is required to attempt 3 questions in all, selecting one question from each unit and the compulsory question No. 1. Except Q. No. 1, all questions carry equal marks.</i></p> |
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### UNIT-I

**PHILOSOPHY AND ETHICS:** Introduction to philosophy: definition, nature and scope, concept, branches. Ethics: definition, moral philosophy, nature of moral judgments and reactions.

**SCIENTIFIC CONDUCT:** Ethics with respect to science and research. Intellectual honesty and research integrity. Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP). Redundant publications: duplicate and overlapping publications, salami slicing. Selective reporting and misrepresentation of data.

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

## UNIT-II

**OPEN ACCESS PUBLISHING:** Open access publications and initiatives. SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies. Software tool to identify predatory publications developed by SPPU. Journal finder/journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggester, etc.

**PUBLICATION MISCONDUCT:** (A) Group Discussion: Subject specific ethical issues, PFP, authorship. Conflicts of interest. Complaints and appeals: examples and fraud from India and abroad. (B) Software tools: Use of plagiarism software like Turnitin, Urkund and other open-source software tools.

**DATABASES AND RESEARCH METRICS:** Databases: Indexing databases. Citation databases: Web of Science, Scopus, etc. Research Metrics: Impact Factor of Journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score. Metrics: H-index, g-index, i10 index, altmetrics.

### References

1. Bird, A. (2006). *Philosophy of science*. London, U.K.: Routledge.
2. MacIntyre, A. (2002). *A short history of ethics: A history of moral philosophy from the Homeric age to the twentieth century* (2nd ed.). London: Routledge.
3. Chaddah, P. (2018). *Ethics in competitive research: Do not get scooped; do not get plagiarized* (1st ed.). <https://www.worldcat.org/isbn/9789387480865>
4. National Academies of Sciences, Engineering, and Medicine. (2009). *On being a scientist: A guide to responsible conduct in research* (3rd ed.). Washington, DC: National Academies Press.
5. Resnik, D. B. (2011). What is ethics in research & why is it important. *National Institute of Environmental Health Sciences*, 1–10.  
<https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm>
6. Beall, J. (2012, September). Predatory publishers are corrupting open access. *Nature*, 489(7415), 179. <https://doi.org/10.1038/489179a>
7. Indian National Science Academy (INSA). (2019). *Ethics in science education, research and governance* (1st ed.). [http://www.insaindia.res.in/pdf/ethics\\_book.pdf](http://www.insaindia.res.in/pdf/ethics_book.pdf)