Form of Undertaking for Research Ethics

Ethics are systematic norms of behaviour that are acceptable to a com- munity, profession or organization. In the conduct of science, the practices conducive to collective enquiry into natural phenomena that have developed through ages constitute ethical practices in science. Every research scholar should know and adhere to the ethical practices in scientific research.

1 Components of scientific ethics

Honesty: One has to strive for honesty in all scientific communications. Honestly report data, results, methods and procedures, and publication status. Do not fabricate, falsify, or misrepresent data. If you are probing a question and your data are inconclusive, state it unambiguously. Do not deceive colleagues, granting agencies, or the public.

Objectivity: Strive to avoid bias in experimental design, data analysis, data interpretation, and other aspects of research where objectivity is expected or required. Minimize chances of experimental results being influenced by personal bias. Avoid self-deception.

Integrity: Keep your promises and agreements; act with sincerity; strivefor consistency of thought and action. Disclose personal or financial interests that may affect research.

Carefulness: Avoid careless errors and negligence. Carefully and critically examine your own work and the work of your peers. Keep good records of research activities, such as data collection, research design, and correspondence with agencies or journals.

Openness: Share ideas, tools, resources. Be open to criticism and newideas.

Respect for Intellectual Property: A scientist should honour patents, copyrights, and other forms of intellectual property. Do not use un- published data, methods, or results without permission. If you are writing a paper and intend to use a figure, table, or other forms of scientific information that have been published, seek permission from the person or publishing company that owns the copyright. Give credit where credit is due. Properly acknowledge all contributions to the research you are publishing.

Confidentiality: Protect confidential communications, such as papers sub- mitted for publication, grants applications, etc. If you are reviewing a paper, it should be treated as a confidential document, and you should not divulge information from that manuscript to others.

Responsible Publication: Publish in order to advance research and scholarship, not to advance just your own career. Avoid wasteful and duplicative publication.

Social Responsibility: Strive to promote social good and prevent or mitigate social harms through research, public education, and advocacy. You should not apply your

knowledge in ways that can cause harm to the society and destruction of humanity. You should also propagate scientific temper among the people around you and should try to free them from various unscientific beliefs and superstitions.

Competence: You should constantly try to improve your own professional competence and expertise through lifelong learning. Take steps to promote competence in science as a whole.

Animal Care: Show proper respect and care for animals when using them in research. Do not conduct unnecessary or poorly designed animal experiments.

Human Subjects Protection: When conducting research on human sub- jects, minimize harms and risks and maximize benefits. Respect human dignity and privacy.

2 Research misconduct

Research misconduct means and includes fabrication, distortion, or plagiarism in proposing, performing, or reviewing research, or in reporting research results, breach of confidentiality, and interference with other researchers' works.

The terms above have the following meanings.

Fabrication means wilful making up fake data or results, and recording or reporting them. Scientists sometimes take recourse to such unethical practices to earn recognition, fame, and sometimes, simply a degree. Consciously avoid these.

Distortion means purposefully manipulating research materials, equipment, or processes, **or** changing or omitting data or results such that the re- search is not accurately represented in the research record. Such mal- practice often happens when a scientist's research results contradict his/her personal beliefs and assumptions.

Plagiarism means the appropriation of another person's ideas, processes, results (including formulas and computer codes) or expressions with- out giving appropriate credit. Copying and pasting passages from an- other paper, book, or homepage without acknowledgement amounts to plagiarism. Publishing or communicating the same content to mul- tiple journals/conferences amounts to 'self-plagiarism', which is also considered an offence.

Breach of confidentiality means making public data of confidential nature.

Interference means unnecessarily creating hurdles for another researcher's work by willfully damaging or concealing materials, processes, hard- ware, data, text, or similar research objects.

Research misconduct does not include honest error or honest differences in interpretations or judgements of data. Inadvertent errors, experimental mistakes, or programming bugs are not considered to be research misconduct. But one should try by all means to avoid these.

A finding of research misconduct means that there is a significant departure from accepted practices followed by the relevant research community, that the misconduct is committed intentionally, or knowingly, or recklessly, and the allegation is proven by a significant volume of evidence. A finding of research misconduct may not only result in termination of studentship at Kalinga Institute of Industrial Technology (KIIT) Deemed

to be University, but termination of research career of the student.

3 Dissemination of research results

Many ethical issues arise out of authorship of scientific papers. In general the following guidelines apply.

3.1 Academic authorship

A majority of research is carried out by groups, each comprising a faculty member and his (or her) supervised students. In some cases, more than one faculty member may guide a student. The principle governing the order of authorship of papers that result from such a work should be to recognize the relative weightage of the contribution from the individuals participating in a specific piece of work

In a multi-authored paper, two of the authors assume prominent roles.

The first author: Except for experimental physics papers that involve hundreds of authors, in most papers the first author is considered to be the one who has maximum contribution both in terms of generatingthe idea and carrying out the work.

The corresponding author: The person who communicates the paper to the journal, and is responsible for answering all queries regarding the paper (including responses to the reviewers' comments).

In the initial stage of research association with a faculty member, a stu- dent normally undergoes the phase of becoming familiar with the broad research area, learning the methodology of research, doing literature survey, identifying the problem, learning the operation of any relevant equipment, and absorbing the 'culture' of the discipline. In this phase, the student's contribution may be in the form of simulating systems, writing programs, collecting data, or helping in the execution of experiments formulated by the faculty member. The student's contribution in this phase may be recognized through co-authorship in papers resulting from the work. After the end of that phase, it is expected that the greater share of the intellectual contribution comes from the student, so that the student can logically become the first author. But if the supervisor still has to generate the ideas and the student carries out the procedures as per instruction, the supervisor should be the first author of the paper resulting from such work.

In the matter of order of authorship, the supervisors' judgement is final. All the coauthors of a paper should have access to the experimental/ observational/ computational results and should be able to check if the manuscript does adequately and accurately reflect the same. After a pa- per is published, if any dispute arises regarding the validity of the results, all the authors of the paper have to take responsibility.

The data generated by any earlier work may be used in any subsequent work with due reference and acknowledgement. But such data should not be reported in a dissertation/thesis in a manner implying to have beengenerated by the student's own research.

Single-authored papers: A research work that leads to the PhD (or mas- ter's) degree of a student is supposed to be the joint work of the student and the supervisor. Naturally they should be co-authors of papers coming out of such work. However, if a student carries out a part of the research work independently without any intellectual support from his (or her) su- pervisor, the supervisor may allow him/her to communicate the work as a single-authored paper. But in such a case, prior written consent of the thesis supervisor(s) must be taken. If such a work needs to be considered for inclusion in the student's dissertation/thesis, it can only be done with the approval of the concerned supervisor(s). Publication of a piece of work as a single authored paper without the knowledge of the supervisor is consideredto be scientific malpractice.

3.2 Interdisciplinary and collaborative research

Multi-investigator research teams may consist of people from different disciplines who perform different, specialized functions in an integral research plan. In collaborative work with other institutions, one or more faculty members of an Institute, along with their students, carry out research work jointly with one or more faculty members and/or researchers of another organisation. In such situations, the following guidelines apply.

- The Principal Investigators involved in the project have special responsibilities to ensure the overall cohesiveness and validity of the work and the resultant publications on which they appear as co-authors. ThePIs shall be accountable in case of disputes regarding the validity ofthe results.
- All authors in a group effort have a shared responsibility for the veracity and the originality of the published result and the methodology as well as the data acquisition and analysis procedures.
- Each author in a group should have access to the manuscript prior to its submission for publication, and should agree to his or her inclusion as a co-author. It is the responsibility of the corresponding author to ensure that all the participants in the programme know that the paper is being prepared for publication in a target journal.
- Early in the project, each research group should define appropriate practices for the maintenance of data after publication of the papers.
- If a student researcher participates in an interdisciplinary collaborative work (in which some parts of the work are carried out by others), he (or she) can include it in his (or her) PhD dissertation/thesis only after clearly demarcating his (or her) own contribution from the others', and with due acknowledgment of the contribution of the others.

4 Unethical publishing practices

Sometimes scientific workers fall prey to the lure of quick career advancement and indulge in wrong practices when publishing their work. Some of the situations that are recognized as unethical are listed below.

1. Submitting the same paper to different journals without telling the editors

2. Not informing a collaborator of your intent to file a patent in order to make sure that you are the sole inventor
3. Including a colleague as a co-author in a paper in return for a favour, even though the colleague did not make a serious contribution to the paper
4. Trimming outliers from a data set without discussing your reasons in the paper
5. Using an inappropriate statistical technique in order to enhance the significance of your research
6. Conducting a review of the literature that fails to acknowledge the contributions of other people in the field or relevant prior work

The following situations are also treated as research misconduct:

1. Any researcher publishes another co-researcher's work without including him (or her) as coauthor or even acknowledging him (or her).
2. A student communicates a paper containing the work carried out as part of the thesis/project/dissertation without the supervisor's con- sent.
3. A supervisor communicates a paper out of the work carried out by a student, without including the student as a co-author.

5 Maintenance of research data

All researchers must keep a record of all experiments conducted by them and data thereof in a laboratory log-book with date, and get them duly authenticated by their corresponding supervisors periodically. This is required because, in the event of a dispute regarding the reported results, the Editor of the journal, or a scientific ethics committee (either at the national levelor at the Institute level) may demand to see the raw data.

When a student completes the requirements of a degree and leaves the Institute, he (or she) can take a copy of the data/results obtained throughhis (or her) own work; and, can use these for his (or her) future research onlyif they are not needed to be kept confidential under contractual obligation with the sponsors of the research project. The original data should be maintained by the concerned faculty members also, and can be used for their future work.

In a research project, the principal investigator (PI) is responsible for the collection, management and retention of research data. PIs should adopt an orderly system of data organization and should communicate the chosen sys- tem to all members of a research group. For long-term research projects, in particular, PIs should establish and maintain procedures for the protection of essential records in the event of a natural disaster or other emergency.

In case of research conducted without external funding (including re- search by master's and doctoral students) the responsibility of the maintenance of research data lies with the scholar as well as his/her supervisor. Research data must be archived for a minimum of three years after the final project close-out, with original data retained wherever possible. If any charges regarding the research arise, such as allegations of scientific misconduct or conflict of interest, data must be retained until such charges are

fullyresolved. Data should be retained long enough because such disputes may arise years after the work is reported.

6 Arbitration procedure

In the event of a claim arising out of the matters related to plagiarism, authorship, including but not limited to sequence of name, omission, deletion, lack of acknowledgment, unethical practices such as falsehood, claim without evidence, willful misinterpretation, failure to discharge expected nor-mal responsibilities by any researcher and maintaining appropriate levels of ethics, standard, integrity and commitment, a committee comprising the Dean (Academic), the Dean (R&D), and the Head of the concerned School/Department, and three professors including two from outside the concerned Department shall arbitrate the dispute and recommend the course of action. The inquiry shall be performed in full knowledge of, and with prior notification to, the involved persons alleged of misconduct, so as to provide them adequate opportunity to defend. Depending on the seriousness of the case, the Vice Chancellor may appoint an external committee to recommend the action to be taken by the Institute in such a case.

I have read the document and agree to abide by its provisions.

Name and Signature of the Scholar (If Applicable)	**Name and Signature of the Supervisor/Principal Investigator**	**Name and Signature of the Co-Supervisor/Co-Principal Investigator (If Applicable)**
Date:	**Date:**	**Date:**