

Guidelines for Template/Structure of Doctoral Research Synopsis/Proposal (Faculty of Science and Technology)

1. Research Proposal Title

Title should be *clear and concise* with *appropriate variables* (shows accurately the *subject/focus area* and *scope of study* through important “*keywords*” from the subject of Ph.D. registration). It may include words like

development, prediction, design, evaluation, analysis, synthesis, framework, building, decision support tool, model, identification, detection, classification, modelling, implementing, constructing, application, characterization, recognition, investigations, simulation, applying, estimating, verifying, optimizing, deployment, mechanism, etc.

The following parameters can be used to help you formulate a suitable research proposal title:

1. The purpose of the research
2. The type of the research
3. The methods used

The initial aim of a title is to capture the reader's attention and to draw his or her attention to the research problem being investigated.

Title of Research proposals should have several characteristics as follows

- Avoid using abbreviations.
- Use words that create a positive impression and stimulate reader interest.
- Use current nomenclature from the field of study.
- Identify key variables, both dependent and independent.
- Suggest a relationship between variables which supports the major hypothesis.
- Is limited to 10 to 15 substantive words.
- Do not include "study of," or similar constructions.
- Titles are usually in the form of a phrase, but can also be in the form of a question.
- Use correct grammar and capitalization with all first words and last words capitalized, including the first word of a subtitle. All nouns, pronouns, verbs, adjectives, and adverbs that appear between the first and last words of the title are also capitalized.

Simply put, a research scholar must point out several things: *(1) what; (2) how; and ideally, (3) why* in a Title of the research proposal.

2. Research Proposal Summary (250 words) followed by Keywords

3. Introduction

Origin of the proposal, Motivation for undertaking research

4. Significance/Importance of the Proposed Research in the context of the current status

Topic is critical in discipline

Aim of the proposed work is Unexplored/underexplored Importance/justification of the proposed work

5. Critical Review of Non-Patent and Patent Literature till date

(National Status and International Status)

Include Journal Articles (non-patent literature) and Patents (Indian and International) literature (granted/published). For Patent literature, you may use, for example, Google Patents Advanced Search.

Only include reported research work published in the Journals, which are listed in the globally recognized databases such as SCI/SCIE/ SCOPUS Source List/Web of Science Core Collection, UGC CARE List Group-I and UGC CARE List Group-II.

6. Research Gaps in prior work

Identify Research Gaps or Limitations in existing knowledge/Reported Literature based on the following explanatory information and fill the requisite information in the following Table 1, Table 2 and Table 3 as applicable.

Type of Research Gap	Localization Strategy
Methodology void/ conflict	Scrutinize if findings on a certain topic are inconclusive with regard to applied research methods.
Contradictory/ non-matching evidence	Synthesize key findings and determine contradictions.
Knowledge void	Analyze literature with regard to theoretical concepts (e.g., using the chart method) and look for specific gaps or under-researched areas of research.
Action-knowledge conflict OR Practical-knowledge Conflict	Collect information about action and relate this information to the knowledge base.
Evaluation void	Analyze if research findings have been evaluated and empirically verified.
Theory application void	Analyze the theories that have been employed to explain certain Phenomena and identify further theories that might contribute to the knowledge base as well.
Empirical gap	Deals with gaps in the prior research. This conflict deals with the research findings or propositions need to be evaluated or empirically verified.
Under-Researched/ under-explored sub-groups	Topic is under-researched
Un-explored/un-addressed/un-resolved sub-groups	Topic is un-explored

Table 1. Literature Search and Selection

S. N.	Journal identified and Selected (Name of Journal)	Listed in which Database: SCI/SCIE/ IEEE Xplore/SCOPUS/Web of Science, etc.	Number of Research Articles selected	Year Range of Publications (e.g., 1990 to 2023)

Table 2. Summary of Analyzed Journal Research Articles (seminal/highly original/influential) and identified research gaps

S. N.	Author	Journal	Year of Publication	Title	Research Gaps identified along with viability/ feasibility

Table 3. Summary of Analyzed Patents Literature and identified research gaps (If applicable)

S. N.	Inventors	Title of Patent	Specify Patent Country (India, UK, US, Australia, etc.)	Patent Number	Date of Publication/ Grant	Research Gaps identified along with viability/ feasibility

Mention reasons for the existence of the research gaps

7. Research Questions, Hypothesis, elements (As applicable to the Research)

Hypothesis must be Clear, corresponding to objectives and testable. Derived from residue of Review of Literature

8. Problem Definition (Formulation)

9. Research Objectives

(Align Research Objectives with Research Gaps, Research Questions, etc.)

(Research Objectives must be *specific, measurable, achievable, realistic, time constrained*)

10. Resources/facilities accessible to execute the proposal

- Resources/Facilities available or accessible to execute the proposal
- Review of expertise available with Supervisor(s)/Department in the subject of proposal

11. Research Methodology

12. Feasibility Study of the Proposed Research Work Plan

- Describe Research Design (as applicable to the specific type of Research)**

Correlational	Causal	Comparative
Quasi-Experimental	Experimental/ Laboratory	Simulation
Empirical	Meta-analytic	analytic
Applied	Basic/Fundamental	Qualitative
Quantitative	Classification	Field

(or any other type of research not covered above)

- Identify Variables (As applicable to the Research Work with justification)**

Dependent	Quantitative	Latent
Independent	Qualitative (categorical)	Continuous in time
Control	Observable	Discrete time

13. Organization of Work Elements

(Time schedule of activities giving major milestones, Time schedule of activities through Bar diagram)

14. Expected research Outcomes with beneficiaries

Outcome of research should result into Product Patent/ Process Patent/Design Patent and/or

High quality Publications in Journals listed in globally recognized databases)

(Also list the possible beneficiaries of the research)

The outcome of the conducted research in doctoral program is likely to be patented and/or publishable in the journals indexed in SCI/SCIE/ SCOPUS Source List/Web of Science Core Collection in the quartile $\geq Q3$ of JCR or SCOPUS.

15. Sustainability in Research Proposal (if applicable, please specify)

- Human sustainability
- Social sustainability
- Economic sustainability
- Environmental sustainability (issues related to energy, Carbon footprint assessment, climate and biodiversity)
- Life Cycle Assessment (LCA). LCA enables the assessment of environmental impacts of a service or product by taking into account all the stages of its life cycle according to different criteria, including but not limited to carbon dioxide CO₂ measurement.
- Reproducibility of the protocols; results; research materials: product, information, data, software, Codes, etc.
- Use of Green artificial intelligence, which seeks to reconcile powerful computing with environment friendly research
- Adoption of Eco-friendly practices

16. Originality/Novelty of the proposal (Justify one or more of the following as applicable to the Research work)

a) Incremental improvement	b) Devise New investigative methods/analysis/synthesis
c) Substantial/radical improvement	d) Devise new system/model/product/process/machine/article of manufacture/composition of matter/new and useful improvement of any of these
e) Discover new information/model/system	f) Apply New Methods/Approach/Techniques/Algorithms
g) Provide new <i>Technical Solution</i> to a Problem	h) Create New Interpretations
i) Modify existing theories/systems/models/Algorithms/Interpretations	j) Provide additional support for existing theories/models/interpretations
k) Analyze <i>phenomena/Results of Research</i> in new ways	l) Disprove the existing theories/models/interpretation
m) Generation of New Data	n) Devise new original and ornamental design for an article of manufacture
o) Invention or discovery and reproduction of any distinct and new variety of plant (Botany)	p) Any other aspect not covered above

17. Plagiarism/Similarity Check

Please include the similarity analysis report or plagiarism check report of the Entire Research Synopsis/Proposal by Urkund (or Turnitin or iThenticate or any other software available at the Knowledge Resource Centre of Sant Gadge Baba Amravati University, Amravati). This will ensure the originality of the proposed Research work.

18. Prior Approval from the IAEC registered with the CPCSEA (The Committee for Control and Supervision of Experiments on Animals) to be submitted to the Ph.D. Cell along with the Research Synopsis (If Applicable to the Research Work)

As per the "Breeding of and Experiments on Animals (Control and Supervision) Rules, 1998", an **Institutional Animal Ethics Committee (IAEC)** is needed for control and supervision of experiments on animals performed in the Institute/Research Laboratory. The IAEC must be registered with the CPCSEA.

Prior approval of the IAEC is mandatory for all types of research proposals involving small animal experimentation before the start of the study. This Committee also monitors research throughout the study and after completion of the study through periodic reports besides regular visits to the research faculty animal house and laboratories where the experiments are conducted. This also ensures compliance with all regulatory requirements, rules, guidelines and laws related to animal experiments.

A copy of the prior approval of the IAEC, which is already registered with the CPCSEA must be enclosed along with the Research Synopsis

19. Tentative Chapterization Scheme of Thesis

20. References/Bibliography

Credibility of Sources of literature: Journals used in the literature review must be indexed in the UGC- CARE Group-II (SCIE/ SSCI/ A&HCI/ SCOPUS Source List/MLA) or UGC-CARE List Group-I.

References/ bibliographies must be listed in **uniform standard style** (APA/ MLA/Chicago/IEEE/MHRA or Harvard)

Ensure that all references are properly referred to in the running text and **Seminal Research Articles** are included in the references.