



GUJARAT TECHNOLOGICAL UNIVERSITY

(Established by Government of Gujarat under Gujarat Act No. : 20 of 2007)

ગુજરાત ટેકનોલોજીકલ યુનિવર્સિટી

(ગુજરાત સરકારના ગુજરાત અધિનિયમ ક્રમાંક : ૨૦/૨૦૦૭ દ્વારા સ્થાપિત)

Gujarat Technological University

Ph.D. Course Work

Subject Name: Research Methodology

Subject Code: PHD20-01

Teaching Scheme:

Subject Code	Subject Name	Teaching Scheme (Credits)	Evaluation Scheme			
			University Exam Marks (External)	University Exam Hours	CEC Marks (Internal)	Total (Marks)
PHD20-01	Research Methodology	2	35	1.5 hours	15	50

Course Objective:

The objective of the course is to introduce the basic methods of conducting research, explore ideas in formulating research hypotheses & objectives and sample framework for taking up research studies in a structured manner. It is intended to facilitate for the development of an insight into different statistical tools for data analysis, interpretation and presentation of reports.

Research Methodology as a subject should help researchers to prepare the literature in chronological order and should logically analyze the concerns. This subject should help in framing the research problems to enhance the scale of understanding. In this world of global village, research papers are available in abundance; one thesis submitted by a scholar, in no way should be a repetition of a work already done. This subject should help researchers to use tools, techniques, concepts and world's best practices to present a unique research.



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Syllabus:

Module	Particulars	Teaching Hours
1	General Introduction to Research <ul style="list-style-type: none">History of Science & Technology: Importance of research, role of research, aims & objectives, research process, phases of research.	6
2	Research problem Formulation <ul style="list-style-type: none">Review of Research Literature: Purpose and use of literature review, locating relevant information, use of library & electronic databases, preparation & presentation of literature review, research article reviews, theoretical models and frame work.Identification of gaps in research, formulation of research problem, and identification of research objectives.	12
3	Research Design <ul style="list-style-type: none">Qualitative Methods: Types of hypothesis and characterization.Quantitative Methods: Statistical methods for testing and evaluation. Characterization of experiments: Accuracy, reliability, reproducibility, sensitivity, Documentation of ongoing research.	12
Total Teaching hours		30

Course Outcome:

- Ph.D. Scholar shall be fully aware about the process of research, methodology to be followed, literature surveys to be conducted, defining hypotheses to research & objectives of work to be done.

Reference Books:

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Winners of: "Most Promising University of India 2020" ❖ "1st rank Among All Universities in Gujarat 2020 by Uni Rank"

❖ "1st Rank in Gujarat State Institutional Ratings Framework (GSIRF) 2019" ❖ "National Leadership Excellence Award 2019 in Technical Education" ❖ "India's Most Trusted State University 2019 " ❖ "Outstanding University in West India 2019"

Head office : GTU Campus, Nr. Visat Three Road , Visat-Gandhinagar Road , Chandkheda, Ahmedabad - 382 424. Gujarat, India.

Phone :- +91 079-23267521/570

e-mail : info@gtu.ac.in

Website : www.gtu.ac.in



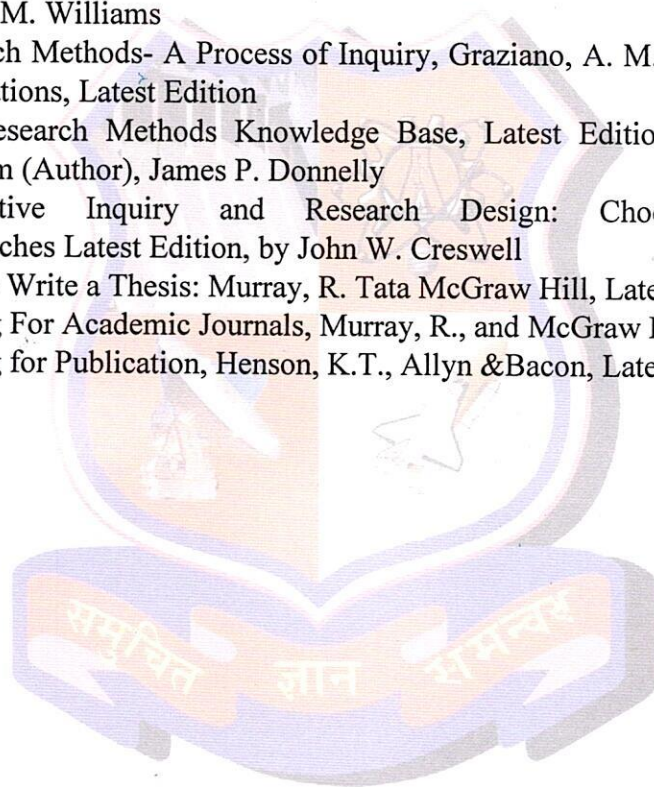
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- Research Methodology, Methods & Techniques, C.R. Kothari, Viswa Prakashan, Latest edition.
- Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, Latest Edition, by John W. Creswell
- Qualitative Research: A Guide to Design and Implementation Latest Edition, by Sharan B. Merriam, Elizabeth J. Tisdell
- The Craft of Research, Latest Edition, by Wayne C. Booth, Gregory G. Colomb, Joseph M. Williams
- Research Methods- A Process of Inquiry, Graziano, A. M., Raulin, M.L, Pearson Publications, Latest Edition
- The Research Methods Knowledge Base, Latest Edition, by William M. K. Trochim (Author), James P. Donnelly
- Qualitative Inquiry and Research Design: Choosing Among Five Approaches Latest Edition, by John W. Creswell
- How to Write a Thesis: Murray, R. Tata McGraw Hill, Latest Edition.
- Writing For Academic Journals, Murray, R., and McGraw Hill International.
- Writing for Publication, Henson, K.T., Allyn & Bacon, Latest Edition.





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Gujarat Technological University

Ph.D. Course Work

Subject Name: Research and Publication Ethics (RPE)

Subject Code: PHD20-02

Teaching Scheme:

Subject Code	Subject Name	Teaching Scheme (Credits)	Evaluation Scheme			
			University Exam Marks (External)	University Exam Hours	CEC Marks (Internal)	Total (Marks)
PHD20-02	Research Publication & Ethics	2	35	1.5 hours	15	50

Course Objective:

The objective of the course is to introduce the basics of philosophy of science and ethics, research integrity, publication ethics. It is intended to help researchers identify research misconduct and predatory publications. This subject shall help researchers understand the use of indexing and citation databases, open access publications, research metrics (citations, h-index, Impact factor, etc.) and plagiarism tools.

The researcher shall also be made aware of moral & ethics in research conduction, drafting, presentation, publication and shall maintain originality and integrity at all levels of research and impact of research with different measuring indices.



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Syllabus:

Module	Particulars	Teaching Hours
1	Philosophy & Ethics <ul style="list-style-type: none"> Introduction to Philosophy: definition, nature and scope, concept, branches Ethics: definition, moral philosophy, nature of moral judgements and reactions 	3
2	Scientific Conduct <ul style="list-style-type: none"> 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 	5
3	Publication Ethics <ul style="list-style-type: none"> 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 contributorship Identification of publication misconduct, complaints and appeals Predatory publishers and journals 	7
4	Open Access Publishing <ul style="list-style-type: none"> Open Access publications and initiatives SHERPA/RoMEO online resource to check publisher copyright and 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. 	4
5	Publishing Misconduct A. Group Discussions (2 hours)	4

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	<ul style="list-style-type: none">• Subject specific ethical issues, FFP, authorship• Conflicts of interest• Complaints and appeals: examples and fraud from India and abroad B. Software tools (2 hours) Use of plagiarism software like Turnitin, Urkund, and other open source software tools	
6	Databases and Research Metrics A. Databases (4 hours) <ul style="list-style-type: none">• Indexing databases• Citation databases: Web of Science, Scopus, etc. B. Research Metrics (3 hours) <ul style="list-style-type: none">• Impact factor of Journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score• Metrics: h-index, g index, i10index, altmetrics	7
Total Teaching hours		30

Course Outcome:

- Ph.D. Scholar shall be fully aware about the necessary tools & techniques to be used and importance of originality, integrity and ethics to be followed in research.



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Gujarat Technological University

Ph.D. Course Work

Subject Name: Self-Study Course

Subject Code: PHD20-03

Teaching Scheme:

Subject Code	Subject Name	Teaching Scheme (Credits)	Evaluation Scheme			
			University Exam Marks (External)	University Exam Hours	CEC Marks (Internal)	Total (Marks)
PHD20-03	Self-Study Course ^{®®}	4	#70	-	30 ^{®®}	100

Course Objective:

Through this course, the student shall be able to identify exact research problem, define objectives, conduct extensive literature review, develop paper writing and presentation skill, understand the chronology of the literature survey, write literature review paper, explore resources like software, laboratory equipments, books, online resources, chemicals, etc. to be used for proposed research work.

Course Structure:

Component	Description
Assignment	Minimum 2 Assignments as suggested below; (1) Writing a review paper relevant to the proposed research work (2) Software(s) to be used, laboratory planning, data survey, etc. for the proposed research work



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Presentation	A Presentation in presence of the Supervisor and DPC Members on the proposed research work (including the presentation of the Assignments)
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Guidelines:

- The University shall intimate the time period for conducting Self-Study Course (PHD20-03).
- Supervisor has to design an Assignment relevant to the Research work of the student and assess the submitted assignment and define marks out of 30.
- Supervisor and both appointed DPC members have to evaluate the presentation of the Ph.D. Scholar and define marks out of 70.
- Supervisor has to submit the following documents to the University post completion of Self-Study Course;
 - (1) Evaluated hard copy of an Assignment and Presentation
 - (2) Evaluation Sheet of total 100 marks (duly filled and signed by the Research Supervisor and both DPC Members)


Registrar