Program Academic Information ADYPU Doctoral Program (Ph.D) Course Work

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Programs Academic Information, 2021-2022

Section 1: Program General Information	
Name	ADPYU Doctoral Program (Ph.D)
Level	

Section 2: Program Educational Objectives	
Broad goals that address institutional and program mission statements and are responsive to the expressed interests of various groups of program stakeholders.	
1	**Knowledge and Comprehension** a) The candidate who has completed the Ph.D. program in ADYPU will have broad overview of the subject field in general and also deep knowledge in his/her specific research area. b) The candidate will have experience in, and be able to formulate research's issues; he/she will be able to develop a theoretical foundation and framework for the research and use relevant methods of research within the filed. For the research design the candidate will have substantially good general knowledge about relevant scientific theories within the subject area. c) According to the content of the research project which is the basis for the doctoral thesis, the candidate will have knowledge about and be able to apply and choose between different methods, both qualitative and quantitative, which are state-of-the-art in the discipline, and are relevant for the research project. d) The goal is to enable a candidate to contribute in producing new knowledge and ideas, new theories, methods and finding new solution within the subject's area. e) The candidate with completed Ph.D. degree is expected to work at the national and international scientific forefront in his/ her subject's area and to be able to evaluate limitations in the current knowledge situation in subject area.
2	**Skills and Proficiency** a) A candidate, who has completed Ph.D. program in ADYPU, will be able to formulate relevant scientific tasks and issues and carry out the professional development in the field. b) The candidate will be able to carry out internationally relevant research at a higher academic level. In addition to any core field, this program includes theories and research methods used in science and technology, social sciences and humanities.

	c) A candidate with a completed Ph.D. degree in ADYPU will be able to solve and process complex tasks related to social challenges within the subject area. d) The understanding of the interdisciplinary nature of problem setting and solutions will be central to the research.
3	**General competences** a) A completed doctoral education in ADYPU provides theoretical knowledge and practical training within scientific work and methodology. b) The candidate is both nationally and internationally oriented. c) ADYPU Ph.D. education creates a basis for being a successful leader in management, planning, education and research, in addition to the specialization to the core field. d) The candidate will be able to carry out his/her research with professional independence.
4	**Application** a) The candidate should be able to consider the scope and limitations of current knowledge level and take the initiative to drive innovative applications.
5	**Synthesis and Creativity** a) Considering the current domain of application of the topic explored the candidate should take the initiatives to synthesize and create engagement in service and outreach that enhances scholarship and its public impact.

Section 3: Program outcomes

The program must then formulate a set of program outcomes (knowledge, skills, and attitudes the program graduates should have) that directly address the educational objectives and encompass certain specified outcomes.

1	Students should have a thorough knowledge of the literature and a comprehensive understanding of scientific methods and techniques applicable to their own research;
2	Students should be able to demonstrate originality in the application of knowledge, together with a practical understanding of how research and enquiry are used to create and interpret knowledge in their field;
3	Students should have developed the ability to critically evaluate current research and research techniques and methodologies;
4	Students should have self-direction and originality in tackling and solving problems;
5	Students should be able to act autonomously in the planning and implementation of research; and
6	Students should have gained oral presentation and scientific writing skills.

Ph.D Course Work							
Part A: Research Methodology							
S.No	**Module Title**	**Module Type**	**Credits**	**Contact Hours**			
				CL	**ST**	**TU**	**Total**
1	Research Methodology	CC	4	60	40	20	120
2	Qualitative & Quantitative Analysis	CC	4	60	40	20	120
3	Technical Writing	CC	2	30	15	15	60
4	Research & Publication Ethics	CC	2	30	15	15	60
Part B--Core Electives (Four Credits for each discipline)							
ENGINEERING							
S.No	**Module Title**	**Module Type**	**Credits**	**Contact Hours**			
				CL	**ST**	**TU**	**Total**
	Electrical Engineering	DE	4	60	40	20	120
	Biotechnology	DE	4	60	40	20	120
	Computer Science Engineering	DE	4	60	40	20	120
	Bioinformatics	DE	4				
MANAGEMENT							
	Financial Marketing	DE	4	60	40	20	120
	Marketing Management	DE	4	60	40	20	120
	Human Resource Management	DE	4	60	40	20	120
LAW							
	Fundamental Perspectives in Law	DE	2	30	20	10	60
	Legal Research & Methods	DE	2	30	20	10	60

Individual course information (To be prepared for all courses)

First Year
(Part A)
Research & Publication Ethics

1	**Course Title**	**Research & Publication Ethics**
2	**Level**	**Basic**
3	**Credits**	**2**
4	**Course Prerequisite**	**Master's degree in any discipline**

Learning objectives

1) The candidate will gain knowledge of the ethical principles in general or in application of specialized knowledge, results of research, creative expression, or in design processes.
2) The candidate will gain knowledge about the publication ethics and publication misconducts.

Learning outcomes:

At the end of the course students will be able to

1) understand ethical issue in the subject matter of the relevant field
2) explain the different ethical issues in real-world situation or practice
3) assess their own ethical values and the social context of problems
4) analyse ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects
5) demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work
6) integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research

Unit One: Philosophy & Ethics

1. Introduction to Philosophy: Definition, Nature and Scope, Concept, Branches
2. Ethics: Definition, Moral Philosophy, Nature of Moral Judgements and Reactions

Unit Two: Scientific Conduct

1. Ethics with respect to Science and Research
2. Intellectual Honesty and Research Integrity
3. Scientific Misconducts: Falsification, Fabrication, and Plagiarism (FFP)
4. Redundant Publications, Duplicate and Overlapping Publications, Salami Slicing
5. Selective Reporting and Misrepresentation of Data

Unit three: Publication Ethics: Definition, Introduction and Importance

1. Best Practices / Standards setting Initiatives and Guidelines: COPE, WAME, etc.
2. Conflicts of Interest
3. Publication Misconduct: Definition, Concept, Problems that lead to Unethical Behaviour and Vice Versa, Types
4. Violation of Publication Ethics, Authorship and Contributorship
5. Identification of Publication Misconduct, Complaint and Appeals 7. Predatory Publishers and Journals

Unit four: Open Access Publishing

1. Open Access Publishing and Initiatives
2. SHERP / RoMEO Online Resource to check Publisher Copyright & Self-archiving Policies
3. Software Tool to Identify Predatory Publications developed by SPPU
4. Journal Finder / Journal Suggestion Tools, viz., Elsevier Journal Finder, Springer Journal Suggester, etc.

Text & Reference books

Sr. No	Name of the book	Author	Edition / volume

1	Philosophy of Science, Routledge	Bird, A.	2006
2	A Short History of Rthics. London	MacIntyre & Alasdair	1967
3	Ethics in Competitive Research: Do not Get Scoped; Do not get	Chaddah, P	2018
4	On Being a Scientist: A Guide to Responsible Conduct in Research: Third Edition. National Academies	National Academy of Sciences, National Academy of Engineering	2009
5	What is Ethics in Research & Why is it Important. National Institute of Environmental Health Sciences, 1-10, Retrieved from https://www.niehs.nih.gov/research/r	Resnik, D. B.	2011
6	Predatory Publishers are Corrupting Open Access. Nature, 489(7415), 179 https://doi.org/10.1038/489179a	Beall, J.	2012
7	Ethics in Science Education, Research and Governance	Edited by Kambadur Muralidhar Amit Ghosh Ashok Kumar Singhvi	2019

Introduction to Physical Science

1	**Course Title**	**Research Methodology**
2	**Level**	PhD
3	**Credits**	**03**
4.	**Course Prerequisite**	**Post graduate**

Outcome related course learning objectives:

1	Enhance the knowledge of students using fundamental concepts of research technique.
2	Introduce areas of knowledge where research area is opening rapidly
3	**To understand the role of research methodology in Engineering/Science.**
4	**To understand literature review process and formulation of a research problem**
5	**To understand data collection methods and basic instrumentation**
6	**To learn various statistical tools for data analysis**
7	**To learn technical writing and communication skills required for research**
8	**To create awareness about intellectual property rights and patents**

Course Outcome:

1	Understand research methods, identify type of research and feasibility of research
2	The ability to apply knowledge of research methodology to engineering practices using analytical and experimental methods.
3	Research scholar will demonstrate the ability to design a system, component, product, and/or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4	Research scholar will demonstrate an ability to develop good proposal for his research
5	Research scholar is to be made capable to develop and implement technological modifications and contributions and propose systems and applications in their respective field. field

Syllabus details

Unit	Details
1	Unit I: Introduction to Research (06 Hours.) 1. Research Methodology: An Introduction 1 Meaning of Research, Objectives of Research, Motivation in Research Types of Research, Research Approaches, Significance of Research Research Methods versus Methodology Research and Scientific Method Importance of Knowing How Research is Done, Research Process Criteria of Good Research Problems, Encountered by Researchers in India
2	**Unit 2 Research design** Defining Research Problem Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem Meaning of Research Design ,Need for Research Design, Features of a Good Design, Important Concepts Relating to Research Design Different Research Designs Basic Principles of Experimental Designs Developing a Research Plan ,Census and Sample Survey Implications of a Sample Design Steps in Sampling Design Criteria of Selecting a Sampling Procedure ,
3	**Unit III: Data collection (06 Hours.)** Collection of Primary Data , various methods of data collection Collection of Secondary Data Difference between Survey and Experiment Processing Operations Some Problems in Processing Elements/Types of Analysis Statistics in Research Measures of Central Tendency Measures of Dispersion Measures of Asymmetry (Skewness) Measures of Relationship Simple Regression Analysis Multiple Correlation and Regression Partial Correlation Association in Case of Attributes
	Unit 4 Design of experiment (6 hr) Strategy of Experimentation, Typical applications of research experimental design, Guidelines for Designing Experiments, Linear Regression ModelsEstimation of the Parameters in Linear Regression Models,Hypothesis Testing in Multiple Regression,Confidence Intervals in Multiple RegressionPrediction of new responseRegression model diagnostics Testing for lack of fit

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5	**Unit V**:The Computer: Its Role in Research and Research Ethics, IPR and Publishing (06 Hours.) Introduction The Computer and Computer Technology The Computer System Important Characteristics The Binary Number System Computer Applications Computers and Researcher Ethics: Ethical issues. PR: intellectual property rights and patent law, techniques of writing a Patent, filing procedure, technology transfer, copy right, royalty, trade related aspects of intellectual property rights,Publishing: design of research paper, citation and acknowledgement, plagiarism tools, Reproducibility and accountability.

Text books

Sr. No	Name of the book	Author	Edition / volume
1	Practical research methods	Dawson	UBS Publishers New Delhi 2002,
2	Research Methodology methods and techniques	Kothari C.R	Wiley eastern limited, New Delhi
3	Research methodology step by step guide for beginners	Kumar, Ranjit	2005,Singapur 2 nd edition Pearson education

Reference books

Sr. No	Name of the book	Author	Edition / volume
1.	The craft of research	Wayne .C.Booth	3
2.	Practical research	Paul leedy	2nd

Course evaluation matrix

Sr. No	Outcome related Course learning Objective	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
1	Enhance the knowledge of students using fundamental concepts of research technique.	3	2	2	1	2	1	1
2	Introduce areas of knowledge where research area is opening rapidly	3	3	3	2	2	1	1

3	**To understand the role of research methodology in Engineering/Science.**	2	3	2	2	2	2	2
4	**To understand literature review process and formulation of a research problem**	2	3	2	2	3	1	2
5	**To understand data collection methods and basic instrumentation**	2	2	3	2	1	2	2
6	**To learn various statistical tools for data analysis**							
7	**To learn technical writing and communication skills required for research**							
8	**To create awareness about intellectual property rights and patents**							

1 = Objective addressed slightly 2= moderately 3= substantive

PO : Program outcome

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