Bharatiya Vidya Bhavan's
SARDAR PATEL INSTITUTE OF TECHNOLOGY
Munshi Nagar, Andheri (W), Mumbai – 400 058.
(Autonomous Institute Affiliated to University of Mumbai)

3.4: Research Publications and Awards

3.4.1: The Institution ensures implementation of its stated Code of Ethics for research.

Copy of the syllabus of the research methodology course work to indicate if research ethics is included

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UNIVERSITY OF MUMBAI

Syllabus for Ph.D. Course Work

(As per Credit Based Semester and Grading System with effect from the academic year 2021–2022)

Course Work Structure for Ph.D. Programme in Information Technology
under Faculty of Science and Technology
University of Mumbai

(With effect from Academic Year 2021-22)

CODE	NAME OF COURSE	CONTACT HOURS	CREDITS	EXAMINATION SCHEME				
				MID TERM TEST	END SEMESTER EXAM	TERM WORK	SEMINAR PRESENTATION	TOTAL
PhD101	Research Methodology	60	4	25	75	--	--	100
PhD102	Course suggested by Guide*	60	4	25	75	--	--	100
PhD103	Course Organised by Research Centre (as per the research area)	60	4	25	75	--	--	100
PhD104	Seminar	-	4	-	-	--	100	100
	Total	180	16	75	225	100	100	400

Grading of Research Candidates Performance

Awarding of grades to research candidates based on their performance shall be done as per the applicable ordinances and regulations for undergraduate and Post graduate programs of Engineering under the Faculty of Technology. Semester Grade Point Index (SGPI) shall be also calculated based on the ordinances and regulations applicable for engineering programs under Faculty of Technology. Approved and recognized Research Centers shall prepare Phd course work grade card after successful completion of course work and issue to candidates and one copy to University concerned section for record.

Course Code	Course Name	Credits
PhdIT101	**Research Methodology**	**06**

Module	Detailed content	Hrs.
I	**Research Methodology and Problem Identification and Formulation:** Meaning and objectives, motivation of research, types of research, research methods v/s methodology, research and scientific methods, research process and stages of research, defining and formulating the research problem, technique involved in defining a	12

	problem, importance of literature review in defining a problem, role of literature review, ways to perform literature review, methods to find open problem and research problems, critical literature review, identifying gap areas from literature study, hypothesis building	
II	**Research Design and Data Collection and Analysis:** Need of research design, concepts related to research design, different research designs, research plan, basic principles of experimental design and setup, collection of primary data, observation methods, interview methods, collection of data through questionnaire and schedules, collection of secondary data, selection of appropriate method for data collection, case study method, guidelines for developing questionnaire, successful interview, survey v/s experiment, processing and data analysis, use of statistical packages, measure of asymmetries and other measures. Fieldwork-The Nature of Field Work, Selection and Training of Investigators, Sampling Frame and Sample Selection, Field Operation, Field Administration.	12
III	**Probability Distribution and Hypothesis Testing:** Sampling and probability distribution, definitions and basic concepts of hypothesis testing, procedures of hypothesis testing, flow diagram for hypothesis testing, test of hypothesis, important parametric test, hypothesis testing of mean, proportion, tests for equality of mean and variances of two population, confidence interval, z-test, and X^2 test for goodness to fit, limitation of test of hypothesis.	12
IV	**Analysis of Variance and Covariance:** Basic principle of Analysis of Variance, ANOVA Technique, Setting up Analysis of Variance Table, short-cut method for one-way ANOVA, Coding method, Two-way ANOVA, ANOVA in Latin-square design, analysis of co-variance (ANCOVA), assumptions in ANCOVA. **Academic Ethics:** Plagiarism, exposure on anti-plagiarism tools.	12
V	**Technical Writing and IPR:** Academic writing, sources of information, assessment of quality of journals and articles, writing scientific report, structure and component of research report, types of report – technical reports and thesis, SCOPUS Index, citations, search engines beyond google, impact factor, H-Index. **IPR:** What is IPR?, importance of patents, types of IPR, process of patent.	12

References:
1. Dawson, Catherine, 2002, *Practical Research Methods,* New Delhi, UBS Publishers' Distributors.
2. Kothari, C.R.,1985, *Research Methodology-Methods and Techniques,* New Delhi, Wiley Eastern Limited.
3. Kumar, Ranjit, 2005, *Research Methodology-A Step-by-Step Guide for Beginners*, (2nd.ed), Singapore, Pearson Education.
4. Neeraj Pandey, *Intellectual Property Rights* ,1st Edition, PHI
5. *Shrivastava, Shenoy& Sharma, Quantitative Techniques for Managerial Decisions, Wiley*
6. Goode W J &Hatt P K, Methods in social research, McGraw Hill
7. Basic Computer Science and Communication Engineering – R. Rajaram (SCITECH)

Course Code	Course Name	Credits
PhdIT102	**Course suggested by Guide**	**04**
PhdIT103	**Course organized by Research Centre**	**04**

PhdIT102: Course suggested by Guide   Credits: 04

This course is to be suggested by guide/supervisor in specific domain area of research undertaken by the research candidate.

Research candidates can undertake this course in consultation with guide/supervisor as per guidelines given below;

1. Relevant course shall be successfully completed at the *Ph.D research centre* which has 6 credits.

<div align="center">**OR**</div>

1 MOOC course / NPTEL course / online courses from coursera, greatlearning, simplylearn etc. with the permission of guide / supervisor.

The guide is supposed to give 3 assignments based on the assigned course for internal evaluation purpose.

PhdIT103: Course organized by Research Centre   Credits: 04

A training course will be organized by the research centre that will be based on the statistical tools and other technologies like R, Python, SPSS, MATLAB etc.

Description: This course intends to cover technological skills required for research. This knowledge will help them to implement their designed computational methods using some statistical package or programming language. They will also learn some advanced soft computing algorithms, networking architectures, cloud computing concepts, security algorithms etc. We also intend to introduce statistical concepts used to measure social and scientific phenomenon. The exercises will focus on use of statistical software packages such as R, Python, SPSS, STATA, and Social Network Analysis.

Course Code	Course Name	Credits
PhdIT104	**Seminar**	**04**

Following guidelines for credit seminar shall be followed:

1. The research scholar will have to present seminars on the topic to the guide.
2. Seminar should be based on thrust areas in specific research domain.
3. Research scholar should do literature survey, identify the topic for seminar and finalize the same in consultation with Guide/Supervisor.
4. Report should be compiled in the standard format as per University Guidelines for report writing and present in front of pair of Examiners appointed as per Vice Chancellor's Directives.

Seminar should be assessed jointly by the pair of Internal and External Examiners

Following points must be assessed during the presentation of Credit Seminar
  i.   Quality of Literature survey and Novelty in the topic
  ii.   Relevance to the specialization
  iii. Understanding of the topic
  iv.   Quality of Written and Oral Presentation