



**Birla Institute of Technology & Science, Pilani**  
Hyderabad Campus

**ACADEMIC – GRADUATE STUDIES AND RESEARCH DIVISION**  
**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI-HYDERABAD**  
**CAMPUS**  
**SECOND SEMESTER 2021-2022**  
Course Handout Part II

Date: 21-01-2022

In addition to Part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : BITS E661 (5 – Units)  
Course Title : Research Methodology-I  
Instructor-in-Charge : K. Srinivasa Raju  
Instructor(s) : T. Vijay Kumar, Pragya Komal

**COURSE OBJECTIVE:**

This course aims at training the PhD students towards acquiring competence in methodologies and methods involved in academic research. The course will expose students to various components of scientific research which includes literature review, framing and testing hypotheses, designing research, data collection and analysis, writing reports and research proposals, and ethics.

**SCOPE OF THE COURSE:**

Topics listed in the next section, listed in several modules under Course Outline, will be covered under the course. The course will comprise lectures by the module Instructors (from engineering, sciences and Humanities discipline to give a holistic flavor to this course), working on assignment, project report submission by the PhD student and finally a comprehensive exam at the end.

**For Full time and Part Time PhD students:** Topics listed in the next section will be covered under the course as per the classes given in the time table by the team of instructors.

**For PhD Aspirants:** The course will involve self- learning by the students in addition to the inputs (as required) from the Instructor In-charge and the team of Instructors.

**LEARNING OUTCOMES:**

1. Examine the validity of a hypothesis.
2. Demonstrate the ability to use search engines to gather and review literature.
3. Apply statistical methods to analyze data for determining errors, outliers and correlation.
4. Demonstrate the ability to make an organized presentation on a research topic.

5. Apply ethical principles to situations that arise during research involving humans and animals.

### **OPERATION OF THE COURSE:**

All the registered students are expected to completely engage in the course. Student groups will be formed who will work on a research problem and in the process learn the rudiments of research. The instructors will give brief presentations before the beginning of an evaluation component and assist and monitor the progress continuously.

### **REFERENCE(S):**

1. Thomas CG (2015). Research Methodology and Scientific Writing, Springer, 2021.
2. Kothari CR, Garg G (2020). Research Methodology: Methods and Techniques. New Age International.

### **COURSE OUTLINE**

<b>Lecture number</b>	<b>Learning outcomes</b>	<b>Topics to be covered</b>
1-10	Introduction of Research Methodology: Literature survey/ Defining a problem to be addressed	<b>Approaches to Research:</b> Resources or search engines available for gathering information and literature in related area, Critical review of available literature, Problem Identification & Formulation (finding research gaps), Research Question, Concept of a research proposal
11-23	Research Design: Data Collection & analysis	Hypothesis Testing, Logic & Importance Features of a good research design, Concept of Independent & Dependent variables, Linear and Non-linear regression.  Data collection/ Sampling: Concepts of Statistical Population, Sample Size, Sampling Error, Practical considerations in sampling and sample size, Probability, Distribution functions, Data Preparation and Data Analysis
24-34	Research documentation and presentation	Structure and components of research report, seminar, and paper presentations  Writing Research papers, Essential components for Thesis writing & Scientific editing tools, Synopsis, Importance of ethics in research, Ethical issues related to publishing; Plagiarism and Self-Plagiarism, Use of anti-plagiarism software, originality in research, conflict of interest
35-38	Ethics in research	Human and animal ethics, Intellectual Property Rights, Copyrights.

**Evaluation Scheme:**

Component	Duration	Weightage (%)	Date & Time of examination /submission date	Nature of Component
Quiz	30 minutes	15	April 18, 2022 12 Noon-12.30 P.M	OPEN
Literature survey [submission of report]	NA	20	February 28,2022	OPEN
Assignment-1 [Independent & Dependent variables and related]	NA	10	March 10, 2022	OPEN
Assignment -2 [Probability related]	NA	15	March 20,2022	OPEN
Scientific article writing [submission of report]	NA	20	April 28, 2022	OPEN
Final presentation	NA	20	May 1-4, 2022	OPEN

**Chamber Consultation Hour:** To be announced by the instructor

**Notices:** All notices concerning the course will be displayed in google classroom

**Make-up Policy:** Prior information is mandatory. In case of issues of debilitating medical issues/emergencies, requests have to be supported by valid certificates.

**Academic Honesty and Integrity Policy:** Ethical conduct is expected from the students throughout the semester.

**Research Methodology Team**