

7 Days Workshop on Research Based Pedagogy Tools (RBPT)

1.8.2022 - 8.8.2022

Report

The Context:

The students of science need to develop a sense of enquiry, a scientific temper and develop problem solving capabilities using their creativity. This is the need of the hour as India needs brilliant future researchers in.

Aim: The purpose of RBPT workshop is to introduce students on research methodology, data collection, data analysis and research ethics. Thus, the main purpose of RBPT workshop is to prepare socially relevant research project by the use of RBPT methods.

Beneficiaries: 44

Program Coordinator: The workshop coordinator was Dr Anjali Oudhia, Professor & Head Physics. The workshop was designed by Dr Oudhia who has been trained as trainer of the RBPT technique in National workshops organized by IISER Pune and British Council of India.

Methodology: The workshop was divided into two sessions each day. Each Day a specific step of research methodology was discussed through lectures and activities. Every Day the first session was a lecture session delivered by one of the faculty members of our department through PPTs. The second session was based on a relevant activity related to the lecture delivered. Various techniques like brain storming, group discussions, demonstrations, and fulfilled competitions were used in the Activity sessions. The programed schedule and purpose was explained to all beforehand.

It was Departmental in-house workshop program conducted by all the faculty member of physics department. There was no registration charge had taken for this program.

DEPARTMENT OF PHYSICS GOVT. NAGARJUNA PG COLLEGE OF SCIENCE, RAIPUR (CG) RBPT WORKSHOP SCHEDULE			
Date	time	Program	Resource Person
1st August 2022	2:30pm to 3:00pm	Inauguration	
	3:00pm to 4:00pm	Foundation Of Research	Dr. Vinod Dubey
	4:00pm to 4:30pm	Activity	Dr. Anjali Oudhia
2nd August 2022	2:30pm to 3:30pm	problem Identification and formulation	Dr. B.G. Sharma
	3:30pm to 4:00pm	Activity	Dr. Anjali Oudhia
3rd August 2022	2:30pm to 3:30pm	Research Design and Sampling	Dr. Sameer Thakar
	3:30pm to 4:00pm	Activity	Dr. Anjali Oudhia
4th August 2022	2:30pm to 3:30pm	Research Database & Ethics	Dr. B. Verma
	3:30pm to 4:00pm	Activity	Dr. Anjali Oudhia
5th August 2022	2:30pm to 3:30pm	Data Collection Analysis	Dr. Alok Luka
	3:30 to 4:00pm	Activity	Dr. Anjali Oudhia
6th August 2022	2:30pm to 3:30pm	Characterization tools	Smt Rashmi Toppo
	3:30pm to 4:00pm	Activity	Dr. Anjali Oudhia
8th August 2022	2:30pm to 3:30pm	RBPT project	Dr. Anjali Oudhia
	3:30pm to 4:00pm	project Presentation	
Daily Reporting of lectures			Dr. P.k. Dewangan Dr. Neetu Singh
Daily Reporting of Activities			Dr. B.G. Sharma Smt. Rashmi Toppo

Activities:

The research-based pedagogy tools workshop took place on 1.8.2022 to 8.8.2022 at Department of Physics of the Government Nagarguna Post Graduate College of Science, Raipur (C.G.) in E-class room. Following resource persons had discussed the topic as per the list given below.

□ 1st August 2022

The topic for the first session was 'Foundation of Research'. The Resource Person of the session was Dr. Vinod Dubey professor of Physics in Government Nagarguna Post Graduate College of Science Raipur (C.G.). He discussed about the purpose of research that is to discover answer to questions through the application of scientific procedures. The main aim of research is to find out the truth which is hidden and which has not been discovered yet.

Activity Session: the 2nd session was conducted by Dr. Anjali Oudhia professor and Head of the Department of Physics in Government Nagarguna Post Graduate College of Science Raipur (C.G.). She introduced the basics of 'Research based pedagogy tool' (RBPT) and discussed how to select the context for research using the SMART approach where 'S' stands for Specific, 'M' stands for Meaningful, 'A' for achievable, 'R' for relevant and 'T' for time bound. She asked students to look around and search for problems faced by either by them or by the society in general, and then try to find out how they, as a physics student, can help solving them.

□ 2nd August 2022

The topic for the first session was 'Problem identification and formulation'. The Resource Person of the session was Dr. B.G. Sharma Assistant professor of Physics in Government Nagarguna Post Graduate College of Science Raipur (C.G.). He explained the process of problem identification and formulation as problems of research issues or concerns studied by researchers. In physics, a problem is an issue to researchers that is to be researched within the domain of physics. He discussed about how to identify a research problem? In order to do that researchers have to ask themselves, to help locate their research problem for their thesis, ask themselves such questions as:

- What was the issue/problem you want to study?
- What is the concern being addressed "behind" this study?
- Why do you want to undertake this study?
- Why is this study important to the scholarly community?

Activity Session: the 2nd session was taken by the Dr. Anjali Oudhia professor and Head of the Department of Physics in Government Nagarguna Post Graduate College of Science Raipur (C.G.). In this session students came with a problem which they wanted to be solved as the RBPT project. As a first step of selecting a problem and then reaching to the root cause of it, she discussed a method called the root cause analysis of research. This was a brain storming session in which participants discussed the chosen problem and used the Root Cause Analysis Method to pin point the actual cause of the problem.

□ 3rd August 2022

The topic for the session was 'Research Design and Sampling'. The Resource Person of the session was Dr. Sameer Thakar professor of Physics in Government Nagarguna Post Graduate College of Science Raipur (C.G.). He discussed about what is Research Design. Research design is the framework of research methods and techniques chosen by a researcher to conduct a study.

Activity Session: In this session Dr Anjali Oudhia introduced the concept of ‘Hypothesis’. What are various types of Hypothesis and how to write a good Hypothesis. Hypothesis is the next step after defining the problem statement. After analysis of the problem statement students did the exercise to get to the root cause of the problem using the SMART tool. In this session the student were asked to write the root cause of their chosen problem and its solution, which forms the Hypothesis of their project. The solution was analyzed in this session so that student can create proper design for their research with a proposed solution. The students were asked to do a SWOC analysis of themselves so that they can describe their strengths, weaknesses, along with the Opportunities and Challenges they face in order to plan and choose a perfect research design. The research design was also analyzed using the SMART method.

□ 4th August 2022

The topic for the session was ‘Research Design and Ethics’. The Resource Person of the session was Dr. B.Verma Assistant professor of Physics in Government Nagarguna Post Graduate College of Science Raipur (C.G.). He discussed about Indexing Databases and Research Ethics. He told the Citation Database in which citation is the text reference and acknowledgement of a documented information.

Activity Session: This session was a one to one interaction session with students in which the RBPT trainer Dr Anjali Oudhia interacted with the students individually in order to discuss the difficulties each one was facing in their research design and suggested some solutions to resolve their problems. These one to one sessions were quite fruitful as the students performed brilliantly and proposed various innovative solutions which was most suited as per their current knowledge and capabilities.

□ 5th August 2022

The topic for the session was ‘Data collection Analysis’. The Resource Person of the session was Dr. Alok Luka Assistant professor of Physics in Government Nagarguna Post Graduate College of Science Raipur (C.G.). He discussed about data collection that is the process of gathering, measuring, and analyzing accurate data from a variety of relevant sources to find answers to research problems, answer questions, evaluate outcomes, and forecast trends and probabilities.

Activity Session: The daily activity session of the day was very interesting as a fun filled activity was organized for students to make them realize how to observe and collect data scientifically. The students were asked to make simple paper airplanes at the first place and then as the second step they were asked to modify their planes in order to make them fastest, stable and perfect.

The students discussed strategies in groups and came out with modified designs. A competition of fastest and best plane was organized and the winners declared. The students were asked to explain the probable reasons of better performance of their planes scientifically. This whole exercise was for developing a sense of inquiry and keen observation in students. Which is the main objective of the RBPT workshop.

□ 6th August 2022

The topic for the session was ‘Characterization tools’. The Resource Person of the session was M.S. Rashmi Priya Toppo Assistant professor of Physics in Government Nagarguna Post Graduate College of Science Raipur (C.G.). She discussed about Materials Characterization in which a material's chemical, microstructure and physical properties are probed, measured and determined using a variety of analytical

methods, techniques and tools. Material characterization used for Material testing and characterization, it is a key function in assessing and ensuring the quality, properties, and behavior of a polymer or composite, and is thus an important step in guaranteeing the quality and success of your finished product.

She talked about various method of material characterization like (1) Scanning Electron Microscopy (SEM) (2) X-ray Photoelectron Spectroscopy (XPS) (3) Time-of-Flight Secondary Ion Mass Spectrometry (ToF-SIMS) (4) Focused Ion Beam (FIB) (5) X-Ray Diffraction (XRD) (6) Transmission Electron Microscopy (TEM) (6) Atomic Force Microscopy (AFM) (7) UVvisible Spectroscopy(UV-vis).

Activity Session: This was the last session before the students were asked to complete their RBPT projects. This session was a problem solving interactive session conducted by Dr Anjali Oudhia. Students discussed the final step of their RBPT project i.e. the Hypothesis validation. Students came up with various types of researches, some involved only theoretical analysis of various theories, some needed synthesis of new materials, some research projects dealt with search for structure of new unknown material. Students discussed their plans and methods for the validation of Hypothesis.

□ 8th August 2022:

This was the valedictory session in which the students presented their RBPT projects and submitted it to the department. The following RBPT Projects were completed during the workshop by 19 students of the department:

