

Report of A Three Day Virtual workshop on Research Methodology and Data Analysis Workshop (RMDA-2021).

Department of Chemical Engineering, RGUKT, Basar Organized A Three Day Virtual workshop on Research Methodology and Data Analysis (RMDA-2021) from 24th -26th , April,2021. **Mr. Haribabu P** Asst.Professor, Head of the Department, was the Chairperson of the workshop. **Mrs.Srujana D** Asst.Professor was the Convener and **Mr.Ramaraju B** and **Mr.Vinay kumar S** Asst.Professor, Department of Chemical Engineering were the Coordinators of the workshop.

The core objective of the workshop was to equip the participants with set of skills and potentiality to undertake the research very effectively in any discipline and to turn completed research into publishable material of high quality in the form of articles, journals and books.

This workshop was designed to offer the practical guidelines and direct the researchers through all the stages of research from identifying a research problem to the submission of a dissertation, report writing and research article. The course intends to deal with variety of quantitative and qualitative research methods used in journey of research. It also gives exposure to data analysis with the help of software packages.

The workshop consists of both theory and practical. By the end of the programme they were expected to develop conceptual clarity and practical knowledge to undertake quality research and writing good research papers field-reports and project proposals etc. The workshop commenced, after the registration of participants online.

Number of resource persons were invited to deliver insightful information on various topics of contents of the workshop. The resource persons were the one with expertise in the respective fields and associated with some of the institutions of eminence. The list with detailed information about resource persons was shared as an enclosure for approval form the university for official communication. A total of 180 participants from the various fields of engineering bachelors and research scholars were the part of this workshop. All the sessions were systematically arranged keeping in mind the need of the participants.

The sessions were as follows:

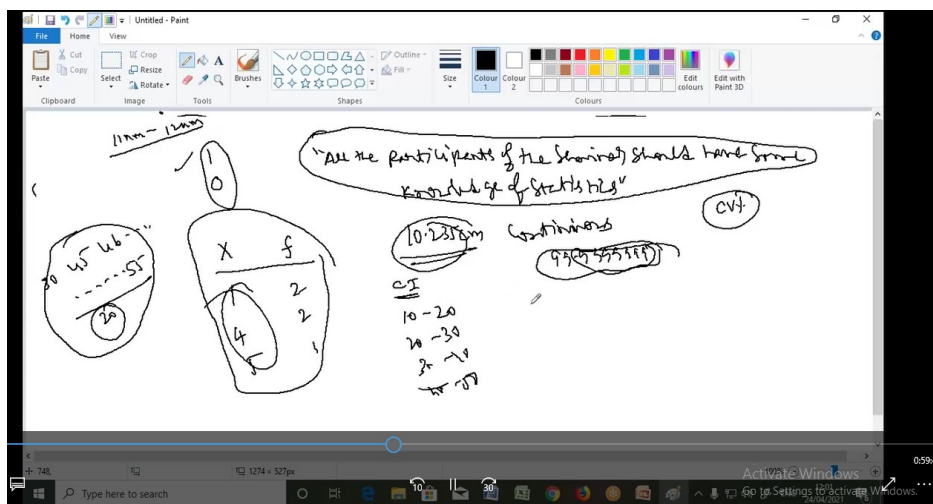
Day 1: 24th April, 2021.

Mrs.Srujana D Workshop Convener, heartily welcomed all the guests, participants, faculty members and students and gave an introductory speech about the University and Department of Chemical Engineering. She welcomed Patron Prof.Y.Rajeshwar Rao, Administrative Officer, RGUKT, Basar to address the participants and workshop RMDA-2021. Prof.Y.Rajeshwar Rao, Administrative Officer, applauded the department's effort in organizing such a meaningful event, he also encouraged the participants to take interest in the workshop and make use of it in the journey of research.

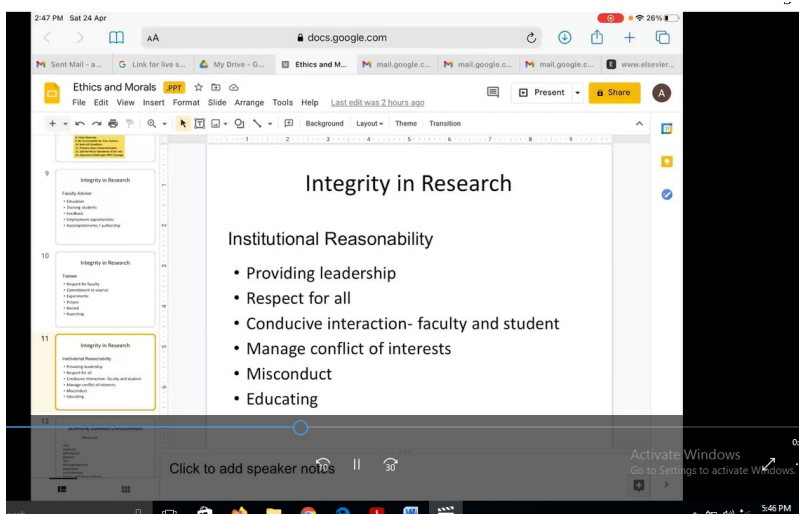
Later on Mrs. Srujana D Workshop Convener highlighted the overview of the workshop with core aims, objectives and outcomes. She has explained about the workshop to participants and assured them of a learning experience provided in this workshop through both theory and practical sessions surely equip the researchers to carry out successful research works and overcome potential challenges. She also introduced Dr.ISR Shastri, the resource person of session I: Introduction to the research methodology and methods. Dr.ISR Shastri, Head of the Department of Metallurgical and Materials Engineering, RGUKT,Basar.

Session I(Slot-I) : Introduction to the research methodology and methods was taken by Dr.ISR Shastri. He started session with the definition of research by giving daily life examples. He highlighted types of research on the basis of various parameters, importance and its characteristics. He also opened an insight about importance and procedure of conducting Quality Doctoral Research in specific to Education. He explained the importance of two key concepts such as 'research', and 'methodology' to enable participants to understand the basics of any research in any field of education. It was pointed that research is a way of thinking. Dr.ISR Shastri, highlighted different types of Researches - Quantitative, Qualitative and Mixed Method.

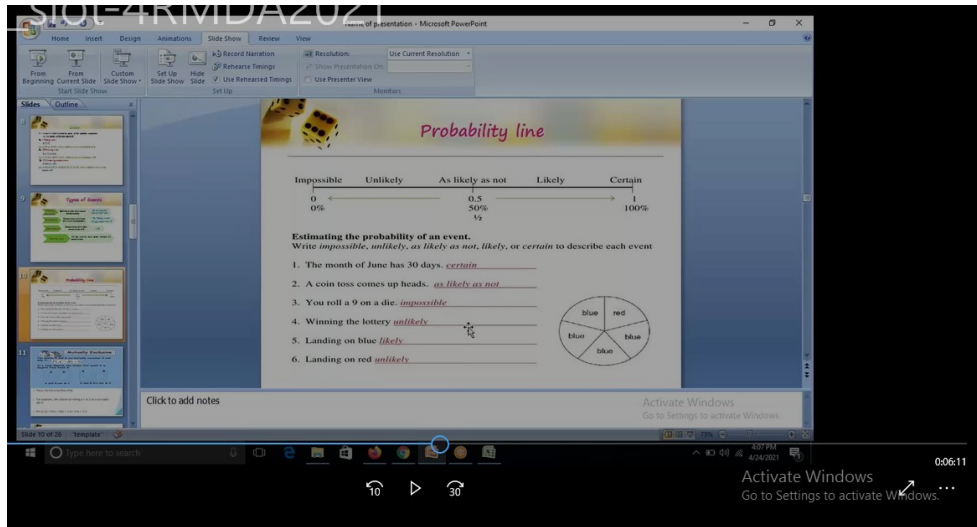
Session I(Slot-II): Data analysis various statistical tools to be used in data analysis was taken by Prof. J.Hayavadana, Professor & Head, Department of Textile Technology, University College of Technology, Osmania University, HYD. Sir began his session with **Statistics** which is the discipline that concerns the collection, organization, analysis, interpretation, and presentation of data. And he highlighted main statistical methods are used in data analysis like descriptive statistics, which summarize data from a sample using the mean or standard deviation, and inferential statistics. He explained two sets of properties of a distribution such as sample or population distributions under Descriptive statistics. And also gave insightful information on various statistical tools which are plays key role in the analysis of results. The session was ended with open question answer talk.



Session II(Slot-I): Ethics in Research: was taken by Dr. G.Devaraju, Associate Dean of Academics, Humanities and sciences, Assistant professor, Department of Physics,RGUKT, Basar. Sir started with an example of importance of Ethics in every moment of daily life. Then he deliberated his views on ethics and morality in research and integrity towards guide, towards the institution which plays major role in workplace. He also detailed about conduct and misconduct of research followed by its consequences. The session was ended with quiz type questionnaire to the participants.

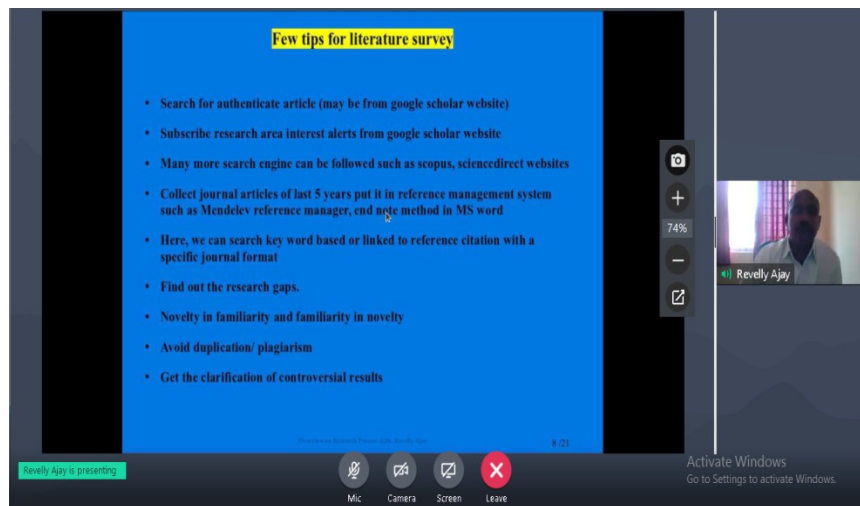


Session II(Slot-II): Hands on training on Probability of Statistics to Researchers was taken by Mrs.Srujana D, Assistant Professor, Department of Chemical engineering, RGUKT, Basar. She started the session with the example of probability then moved on to the definition and application of it in various fields. She explained the terminology and types of events of probability with daily life examples. She demonstrated various probability distributions followed by hands on training on probability distribution using functions in MS-EXCEL.



Day 2: 25th April, 2021

Session I(Slot-I): Overview on Research Process was taken by Dr. Ajay Kumar R, Assistant Professor, Department Of Metallurgical and Materials Engineering, RGUKT,Basar. He began the session with definition of research process and perspective of research in terms of UG, PG and Ph.D. students. He discussed various steps involved in Research Process. And detailed how to define a research problem, tips for literature survey and other constraints involved research process. He also highlighted the features of research proposal i.e. it shows that the proposed study has considered the available knowledge about it, viability and relevance of research is justifies; strengths and limitations of the approach are stated. And Session ended with open question and answer talk.



Session I(Slot-II): Report Writing was taken by Mr. Vinay Kumar S, Assistant Professor, Department of Chemical engineering, RGUKT, Basar. He started his session with the meaning of research report which means a condensed form or a brief description of the research work done by the researcher. He said that research report should be concise, clear, honest, complete and accurate. He also discussed the

structure of research report and the format of a research report. He also explained the chapter wise writing of research thesis and the various elements of each chapter. He also pointed out the rules of typing, difficulties in writing a report and features of a good report.

Principles of report writing

- **Consistency:** objectives, reference format, tables and figures
- **Connectivity:** section to section, chapter to chapter
- **Continuity:** the flow of the thoughts and ideas
- **Indentation:** Indented or cut into meaningful chapter or sections depending upon the structure
- **Highlighting:** major aspects or points
- **Openness:** limitations and errors
- **Clarity:** simple language and concise and direct statements should be used
- **Synthesis-analysis-synthesis**

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Activate Windows
Go to Settings to activate Windows.

Vinay Sirisala is presenting

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VS
Vinay Sirisala

Session II(Slot-I): Research Methodology and data Analytics: Digital Twin was taken by Mr.A.RaviKiran, senior Process Engineer, Grace Davision Chemicals India Pvt,Ltd, Chennai. Sir began his session with Introduction to Data Analytics tools and various elements involved with it. Then he elaborated Digital Twin and its importance in various sectors like, Engineering, Operations and information Technologies. He gave complete insight of various software like Rprogramming, matlab, aspen and chemcad etc. He explored application of Digital twin in steel manufacturing process. He interacted with the students by sharing the opportunities of data Analysts in various fields. He ended the session with clarifying the queries of the participants.

Shruthi Mudda has left.

Digital Twin GRACE

Introduction:

1. A **digital twin** is a digital representation of a physical object or system.
2. Digital twins come in different forms and can be **data-driven**, **physics-driven**, or a combination of both.
3. **Data-driven digital twins** help extend the life of current-generation products by collecting and monitoring operational data. Data generated by sensors and embedded systems, for instance, needs to be analyzed and visualized quickly to make informed decisions on the operations of a physical asset, such as predictive maintenance.
4. **Physics-driven digital twins** help companies develop next-generation products by leveraging 3D and 1D modeling and simulation – optimizing performance, saving development time, and getting to market faster.

A digital twin comprises three main elements:

1. **Past data** – historical performance data of individual machines, overall processes, and specific systems.
2. **Present data** – real-time data from equipment sensors, outputs from manufacturing platforms and systems, and outputs from systems throughout the distribution chain. It can also include outputs from systems in other business units, including customer service and purchasing.
3. **Future data** – machine learning as well as inputs from engineers.




Figure 1 Breadth of the digital twin

The operational integrity digital twin:

1. The digital twin can provide guidance on both tactical and strategic decisions around prescriptive maintenance, offering real-time recommendations to maintain uptime, adjust production to deal with failing equipment, minimize environmental impacts, mitigate production losses and prioritize safety.
2. In addition, quality and risk assessment provide a future view of equipment and asset health, risk profiles and root cause of failures to improve uptime and operational integrity.

The plant digital twin:

1. The process plant, modeled rigorously using engineering models and enhanced by AI techniques with embedded cost and risk models.
2. They are deployed offline and online, calibrated to plant operating conditions through autonomous model fitting.
3. They can be simulated dynamically to provide operator training.

The operational excellence digital twin:

1. Plant operations, from a business level to a control level, modeled and virtually viewed as planning, scheduling, control and utility models.

W. R. Grace & Co. | Confidential

Ravikiran Anapagaddi is presenting

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Session II (Slot-II): Statistical Techniques, Heuristic Approach, Correlation and Regression was taken by Mrs.Haritha Banothu, Assistant Professor, Department of Chemical engineering, RGUKT, Basar. She began her session with various statistical Techniques involved and their applications. She explained very adequately about Heuristic Approach Technique by using a case study example. She briefed correlation, types of Correlation and variables involved in it by solving numericals in EXCEL. She also explained Regression analysis and the difference between Correlation and Regression by analyzing the existed data. The session was ended with the comparing the answers between the speaker and Participants.

Statistical techniques- heuristic, correlation and regression - Microsoft PowerPoint

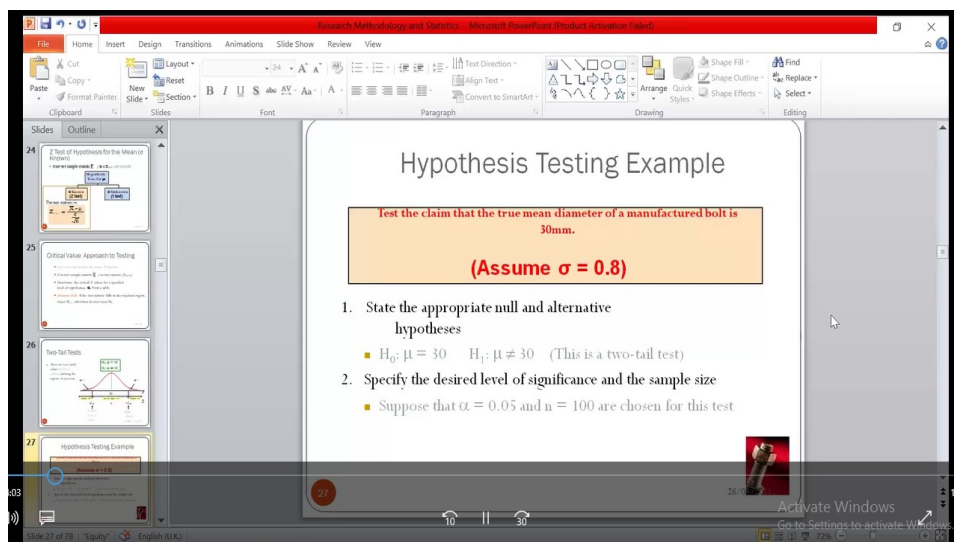
Problem:

Select the location of a branch of UBI to be selected at four places w, x, y and z with data like population(thousands) with corresponding weight factors or (density).

Locations	Distance to				population(1000's)	Weight factor
	w	x	y	z		
W	0	8	12	10	10	0.71
X	8	0	15	6	11	1.2
Y	12	15	0	11	5	1.1
Z	10	6	11	0	8	0.9

Day 3: 26th April, 2021

Session I(Slot-I&II): Research Design, Hypothesis formulation, T-test, ANOVA analysis, Regression Analysis was taken by Prof.Shashank Bansal, Assistant Professor, Department of Management Studies, ISM, Dhanbad. The entire session was filled with simple and beautiful examples which were easily understandable by the participants. He began with the meaning of hypothesis which means an intelligent guess or prediction that gives a direction to the researcher to answer his research question. She also talked about the contribution of hypothesis in the research study i.e. it gives clarity to the research problem, describes explains and predicts the expected results or outcomes, indicates the types of research, describe research design, identifies the population of the study, facilitates data collection, data analysis and data interpretation. He also explained types of hypothesis – Alternative hypothesis, null hypothesis. He highlighted t-test, z-test, ANOVA, one way ANOVA, two way ANOVA. He ended session with clarifying the doubts from participants.



Session II(Slot-I): Hands on experience on ANOVA (one-way and two way ANOVA) was taken by Mr. Srikanth K Assistant Professor, Department of Chemical engineering, RGUKT, Basar. Session-II was continuation of session-I. Sir started his session with explaining the importance of ANOVA analysis in data analysis. He explored various examples on ANOVA and techniques involving to select level of significance. He also demonstrated on analysing the data using ANOVA by hand calculations and using MS- EXCEL function as well. Students were actively participated in calculation part of the solution. The session ended with complete two way interaction between the speaker and the participants.

Step -1

1. H_0 = Dissolution time of four polymers are equal
 H_1 = At least one polymer is different from others
2. H_0 = Dissolution time of polymers with all the solvents are same
 H_1 = At least one solvent is different from others

P/S	P1	P2	P3	P4	TOTAL
S1	44	38	47	36	165
S2	46	40	52	43	181
S3	34	36	44	32	146
S4	43	38	46	33	160
S5	38	42	49	39	168
TOTAL	205	194	238	183	820

Session II(Slot-II): Research Design:Factorial Experimental Design,Replication and Randomization, Blocking was taken by Mr. Haribabu P, Assistant Professor, Head of the Department of Chemical engineering, RGUKT, Basar. He began the session with the term Research design and purpose of research design by considering a simple example. He also briefed the history involving with the design and types of research designs. Then he focused on Experimental design including types, basic principles (replication, randomization) involving with it, merits and demerits. He demonstrated the steps involving to solve design problems (latin square design and factorial design) by considering existed data examples. He drawn attention of the participants by solving numericals. And speaker ended the session by providing some more examples to solve by the participants on their own.

Basic Principles Of Experimental Designs

Professor Fisher has enumerated three principles of experimental designs:

- (1) Principle of Replication;
- (2) Principle of Randomization;
- (3) Principle of Local Control.

Principle of Replication.

- Experiment should be repeated more than once.
- The statistical accuracy of the experiments is increased

Examine the effect of two varieties of Rice.

Rice A

Rice B

Case-I



Case-II



Finally, the workshop was concluded with a vote of thanks Mrs. Srujana D, Convener of the workshop proposed Mr.Haribabu P, Head of the Department of Chemical Engineering to deliver vote of thanks. Mr.Haribabu P appreciated the convener, coordinators, faculty members and student volunteers for their restless efforts to make the event to be success. As a whole with the extended support of the management, head of the department and faculties made the event phenomenal success.



RAJIV GANDHI UNIVERSITY OF KNOWLEDGE TECHNOLOGIES - BASAR

**A Three Day Virtual Workshop
on
Research Methodology & Data Analysis**

**Organised by
Department of Chemical Engineering**



Chief Patron
Sri. Rahul Bojja, I.A.S
Vice Chancellor, RGUKT-Basar

Patron
Prof. Y. Rajeshwar Rao
Administrative Officer, RGUKT-Basar

Invitee
Prof. V.V. Basava Rao
President, IIC&E chapter
Principal, University College of Technology
Osmania University



Prof. J. Hayavadana
(HOD, Textile Technology)
Osmania University



Dr. Shashank Bansal
(Assistant Professor)
IIT Dhanbad



Mr. A. Ravikiran
(Senior Process Engineer)
Grace Davison Chemical Pvt Ltd

Convener
Mrs. Dhegam Srujana
Assistant Professor
rmworkshop21@gmail.com
Chemical Engineering
RGUKT-Basar

Scan here to register.



Register here

<https://forms.gle/9MPXVYUaXW454gVT6>

Note: Stream/Live links will be shared prior to the session only to the registered candidates via emails and social media platform also.

Advisory Committee
Mr. Shekher Sheelam (Associate Dean, Engg.)
Dr. G. Devaraju (Associate Dean, Sci. & Hum.)
Mr. Pengonda Hari Babu (HoD Chemical Engineering)

Coordinators
Mr. B.Ramaraju
Mr. S.Vinay Kumar
Chemical Engineering, RGUKT-Basar

Organising Committee
Mr. R. Prabhakar Reddy
Mr. S.Ravikumar
Mrs. B. Haritha
Mr. K.Srikanth
Dept. of Chemical Engineering
RGUKT-Basar

Timings
9.30AM-4.45PM

Date
24 April 2021 - 26 April 2021

ABOUT THE INSTITUTION

RAJIV GANDHI UNIVERSITY OF KNOWLEDGE TECHNOLOGIES (RGUKT) has been established by the Government of erstwhile combined Andhra Pradesh in 2008, and the Basar Campus has been taken over by the Government of Telangana, after due amendment of the Rajiv Gandhi University for Knowledge Technologies Act, 2008.

ABOUT THE WORKSHOP

Knowledge on research methodology is of key importance in research which provides the scientific basis to gain new knowledge and to systematically obtain information from existing body of knowledge and to analyze emerging ones. This course will provide an opportunity for participants to establish or advance their understanding of research through critical exploration of research language, ethics, and approaches. The course introduces the language of research, ethical principles and challenges, and the elements of the research process within quantitative, qualitative, and mixed methods approaches.

OBJECTIVES

Objectives of the workshop is to support and fulfill the academic needs by providing hands-on training and updating their knowledge.

- ✓ Enable the participants to define research problem;
- ✓ Developing an approach to research problem and selection of suitable research design;
- ✓ Impart capabilities for formulation and testing of hypothesis based on the nature of research;
- ✓ enable the participants to understand report writing and writing research proposals; and
- ✓ Help the participants in selecting right statistical tool out of the basket of tools available.

PEDAGOGY

A mix of pedagogical tools will be used- cases, lectures, discussions, presentations, hands on calculations.

CONTENTS OF THE WORKSHOP

- Conceptual background of research.
- Identification of research topic.
- Research process.
- Statistical tools and techniques for data analysis.
- Formulation of hypothesis.
- Correlation and Regression analysis.
- ANOVA(one way and two way).
- Research design.
- Factorial Analysis.
- Report writing.

LEARNING OUTCOMES

- ✓ Have conceptual clarity of the research process and methodology
- ✓ Get insights into different research design.
- ✓ Get familiarity with tools and techniques of decision making approach.

INTENDED AUDIENCE

- Academicians who want to enhance their research skills.
- Students and Research scholars in improving their quantitative skills.

A THREE DAY VIRTUAL WORKSHOP
ON
RESEARCH METHODOLOGY AND DATA ANALYSIS

(24th -26th April, 2021)

Organized By

DEPARTMENT OF CHEMICAL ENGINEERING



RAGIV GANDHI UNIVERSITY OF KNOWLEDGE TECHNOLOGIES

BASAR (T.S.)

About the Institution:

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About the Workshop:

Knowledge on research methodology is of key importance in research which provides the scientific basis to gain new knowledge and to systematically obtain information from existing body of knowledge and to analyze emerging ones. This course will provide an opportunity for participants to establish or advance their understanding of research through critical exploration of research language, ethics, and approaches. The course introduces the language of research, ethical principles and challenges, and the elements of the research process within quantitative, qualitative, and mixed methods approaches.

Objective of Workshop:

Objectives of the workshop is to support and fulfill the academic needs by providing hands-on training and updating their knowledge with the methods to

- enable the participants to define research problem.
- developing an approach to research problem and selection of suitable research design.
- impart capabilities for formulation and testing of hypothesis based on the nature of research.
- enable the participants to understand report writing and writing research proposals.
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Contents of the workshop :

- Conceptual background of research.
- Identification of research topic.
- Research process.
- Statistical tools and techniques for data analysis.

- Formulation of hypothesis.
- Correlation and Regression analysis.
- ANOVA(one way and two way).
- Research design.
- Factorial Analysis.
- Report writing.

Learning outcomes:

At the end of the course the participants should be able to:

- Have conceptual clarity of the research process and methodology
- Get insights into different research design.
- Get familiarity with tools and techniques of decision making approach.

Who Should Attend?

This workshop should be helpful to-

- Academicians who want to enhance their research skills.
- Students and Research scholars in improving their quantitative skills.

Pedagogy:

- A mix of pedagogical tools will be used- cases, live streaming lectures, discussions, presentations and hands on calculations.

Requirements for the course:

Personal laptops/computers with good internet connectivity.

Who can Apply??:

- PhD research scholars, graduate and Post graduate students of any university in any branch are eligible to apply.

Registration and payment details:

- Registration fee: Rs.50/- for each participant.
- Fee to be paid at SBI with A/C No:62307233017 (D. Srujana)
IFSC code: SBIN0014154
- Also to be paid through **G-Pay** or **Phonepe** at 7893088922
- Registration fee once paid will not be refunded in any case.
- E- Certificates will be provided to all the participants.

Registration link:

Interested candidates may submit their duly filled registration form along with Payment Transaction ID by clicking on

<https://forms.gle/9MPXVYUaXW454gVT6>

Note:

- Stream/Live links will be shared prior to the session only to the registered candidates via emails and social media platform group.

Time and Venue:

Date: 24th-26th April 2021

Time: 9.30am-4.45pm

Department of Chemical Engineering, Rajiv Gandhi University Of Knowledge Technologies,
BASAR.

Important dates:

Last date of receipt of registration form: 20th April 2021.

Workshop Dates: 24th-26th April, 2021

Chief patron:

Shri. Rahul Bojja, I.A.S

Vice Chancellor, RGUKT- Basar.
Basar.

Patron:

Prof. Y.Rajeshwar Rao

Administrative Officer, RGUKT-

Invitees:

Prof. Basava Rao, President, IChE,
Principal, OUCT, Osmania University

Details of Resource Persons

1. Prof. J.Hayavadana Professor & Head, Department of Textile Technology University College of Technology, Osmania University, HYD.
2. Dr. Shashank Bansal Assistant professor, Department of Management Studies Indian Institute of Technology (ISM), Dhanbad.
3. Mr. A. Ravikiran
M. Tech (IIT Madras), Senior Process Engineer,
Grace Davision Chemical, India Pvt Ltd, Chennai.

Advisory committee:

Mr. Shekar Sheelam (Associate Dean of Engineering)

Dr. G. Devaraju (Associate Dean of Sciences and Humanities).

Mr. P.Haribabu; Asst.Professor, Head of the Department (CHE), RGUKT- Basar

Convener:

Mrs. D. Srujana; Asst. Professor, Dept of Chemical Engineering

Ph.No-7893088922,9441586624

Mail:rmworkshop21@gmail.com,srujana.dhegam@gmail.com & RTCH160315@rgukt.ac.in

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S.Vinay kumar; Asst.Professor Ph.No-9441202536

Organizing Committee:

Mr. Prabhakar Reddy,

Mr. Ravi Kumar Saga,

Mrs. Haritha B,

Mr. Srikanth K

Department of Chemical Engineering, RGUKT- Basar

Three days Online Workshop on Research Methodology and Data Analysis
(24th-26th, April, 2021)

Programme Schedule

Day 1-24th April 2021		
Session	Themes	Speakers
9.30-9:40	Inaugural session	
9:40-9:45	Address by Patron. RGUKT Basar	Prof. J.
9:45-9:55	Introduction about the Workshop	Mrs. S
10:00-11:15	Introduction to the research methodology and methods	Dr. ISH HoD, Materi
Break		
11:30-12:45	Data analysis various statistical tools to be used in data analysis	Prof. J Profes UCT(
Lunch break		
14:00-15:15	Ethics in Research	Dr. G. Assoc Physic
Break		
15:30-16:45	Hands on Training on Probability of Statistics to Researchers	Mrs. S Assist of Che
Day 2-25th April 2021		
10.00-11:15	Overview on Research Process	Dr. R. Assist Depart Engg.
Break		
11:30-12:45	Report Writing: Publishing, Conf. Proceeding, Magazine , Journal, Transactions, Book Chapter and Book	Mr. V Assist of Che
Lunch break		
14.0 –15:15	Data Analytics with a case study	Mr. A Senior Grace
Break		
15:30- 16:45	Heuristic and Simulation modeling	Mrs. P Assist of Che
Day 3-26th April 2021		
9:30- 11:00	Research Design, Hypothesis formulation	Prof. S Asst. p Dept o IIT (IS
Break		
11:15- 12:45	T-test, ANOVA Analysis, Regression Analysis.	Prof. S Asst. p Studie
Lunch break		
14:00-15:30	Hands on experience on ANOVA (one-way and two way ANOVA)	Mr. Sri Assist of Che
Break		
15:45-16:30	Factorial Experimental Design: Replication and Randomization, Blocking	Mr. Ha Assist of Che
16.30-16.45	Vote of Thanks	Mr. H Assist of Che

