A.S.D GOVERNMENT DEGREE COLLEGE FOR WOMEN(A),

KAKINADA

DEPARTMENT OF MATHEMATICS

A Brief Report

ON

ONE DAY NATIONAL WEBINAR

ON

MATHEMATICAL MODELLING AND APPLICATIONS TO REAL LIFE PROBLEMS

ON

15th December 2023

SRI.B.SURYA NARAYANA DEVARA

Convener

Lecturer in charge

Department of Physics and Mathematics

V.Geetha satya sri

Organizing secretary

Guest Faculty in Mathematics

G.Sridevi

Organizing member

Guest Faculty in Mathematics

Consolidated Report

ON

ONE DAY NATIONAL WEBINAR

ON

MATHEMATICAL MODELLING AND APPLICATIONS TO REAL LIFE PROBLEMS

ON

15th December 2023

Organized by Department of Mathematics and Physics

A.S.D GOVERNMENT DEGREE COLLEGE FOR WOMEN(A),

KAKINADA

President

(Dr. V. Anantha Lakshmi)

Principal

Vice President

(Ms.M.Suvarchala)

Vice Principal

Convener

(Sri.B.Surya Narayana Devara)

Lecturer in charge of physics and mathematics

Organizing secretar

(V.Geetha satya sri)

Guest Faculty in Mathematics

National Webinar Brochure Released by the Principal and Staff

DEPT. MINUTES RESOLUTION COPY

42 November 2023

2/11/2023

Members of Department of Mathematics held a Meeting on 2/11/2023 at 3 PM in Mathematics Department to discuss following

Agenda:-

1. To discuss about National Webinar.
2. To update department Website
3. To update faculty profiles for all Academic Records
4. To plan PG CET Coaching
5. To conduct Guest lecture on "Hermite polynomials"

Resolutions:-

1. It is resolved to conduct National Webinar on 15. December 2023.. Invited Speakers for this Programme are
   1. Prof G.P. RAJA SEKHAR Kharagpur
   2. G.V.S.R. DEEKSHITULU. JNTUK, Kakinada
2) Department Website updation for 2019-2020, 2020-2021 ~~hand over to~~ 2021, 22, 2022-23.
3) It is Resolved to Submit All faculty updated profiles to HoD Sir in the first Week of November
4) It is Resolved to plan PG CET Coaching for students who are interested higher eduction in Mathemats

Members Signature

V.G.S.L V.N.

PERMISSION LETTER

A.S.D.GOVT.DEGREE COLLEGE FOR WOMEN (A)

(Re-Accredited with 'B' Grade by NAAC) (Affiliated to Adikavi Nannaya University)

DEPARTMENT OF MATHEMATICS

CIRCULAR

The Department of Mathematics Organize a One-Day National Webinar On "**Mathematical Modelling and Applications to real Life Problems** " on 15-12-2023 in Seminar Hall

PRINCIPAL
A.S.D.GOVT.DEGREE COLLEGE (W)
AUTONOMOUS
KAKINADA

In-Charge of the Department **Principal**

BROCHURE

About the College:

AnnavaramSatyavathi Devi Government Degree College for Women (Autonomous), Kakinada, E. G. District was started in 1962 with the motto: *'Sthree Vidya Pravardhataam' means 'Women Education Shall Prosper'*. The idea came up with the inspiring words by Mahatma Gandhi, "If you educate a man, you educate an individual, but if you educate a Woman, you educate an entire family." This is the only Government Degree College for Women in the entire coastal belt of Andhra Pradesh, with a Student Managed Hostel within the campus and 4 Social Welfare Hostels within a vicinity of 2 kilometres from the College. The College is mainly equipped with Smart Campus services like Virtual Classrooms, Digital Classrooms and LMS. At present, the college has a student enrolment of above 1100. The college offers UG programmes: B.A. (History-Economics-Politics, B. Com. (General & Computer Application), B.Sc. (MPC, MPCS, M.S.Cs., CBZ, CBMB, Aquaculture Technology, Horticulture and Home Science and PG programmes: M.A. (Telugu) & M.Com. The College uses every opportunity with great care in strengthening the students to excel in their academics and get decent jobs.

The college offers following 12 UG programmes :

B.A Honours (Economics)
B.A Honours (Political Science)
B.Com Honours (General)
B.Com Honours (Computer Applications)
B.ComHonours(DigitalMarketing)
B.Sc.Honours(HomeScience)
B.Sc.Honours(Chemistry)
B.Sc.Honours(Zoology)
B.Sc.Honours(Botany)
B.Sc.Honours(Physics)
B.Sc.Honours(Computer Sciences)
B.Sc.Honours(Mathematics)
and 2 PG programmes: M.A.(Telugu) & M.Com.

A.S.D. Govt. Degree College for Women (Autonomous)
KAKINADA
(Affiliated to Adikavi Nannaya University, Rajamahendravaram)
Re-accredited by NAAC with B Grade in Cycle III

A One-Day National Webinar
on
Mathematical Modelling
and
Applications to Real Life Problems
15th December, 2023

Organized by
DEPARTMENTS OF MATHEMATICS & PHYSICS
Under Internal Quality Assurance Cell (IQAC)

Chief Patron
Dr. Pola Bhaskar, IAS
Honourable Commissioner of Collegiate Education
Andhra Pradhesh, Mangalagiri.

Patron
Dr. .C.Krishna
RJDCE Zone-II
Rajamahendravaram

President
Dr.V. Anantha Lakshmi
Principal

Vice –President
Ms. M.Suvarchala
Vice Principal

Convener
Sri B.Surya Narayana Devara
Lecturer Incharge of Physics
& Mathematics.

Advisory Committee
Ms.M.Vasantha Lakshmi
IQAC Coordinator
Incharge of Zoology Department

Dr. G.Anitha
UGCARUSA Coordinator Dept of Home Science

Dr.K. Lavanya
Academic Coordinator , Dept of Home Science

ORGANIZING COMMITTEE
V. Geetha Satyasri **K. Kranthi**

About Mathematics Department:

Mathematics department is one of the oldest departments of this college . The Department of Mathematics was established in 1962.The department has a great success in achieving good results above 80% every year . There are two sanctioned posts , the lecturers guide the students in pursuing their higher education and cracking the competitive examinations.

About the Webinar

This webinar will enrich the knowledge on Applications of Mathematics in different fields like Medical, Networking, Physical Sciences, Biological Sciences, Finance and Management etc, through Mathematical Modeling.

Mathematical Modeling uses Mathematics to analyze, make predictions or other wise provide insights into real world phenomena.

SPEAKERS

Prof **G.P.RAJA SEKHAR**
Department of Mathematics
Indian Institute of Technology
Kharagpur

Prof **G.V.S.R.DEEKSHITULU**
Department of Mathematics
JNTUK , Kakinada

Inauguration
9.45 to 10:00 : Inauguration

Session 1:
10:00 to 11:30 : Mathematical modelling using Differential Equations

OBJECTIVES & OUTCOMES

Objectives:

The workshop is aimed to achieve the following objectives:

1. **Understanding Real-World Problems:**
    - Analyze real-life situations to identify the key elements that can be modeled mathematically.
    - Translate complex, often qualitative, problems into quantitative mathematical representations.
2. **Formulating Mathematical Models:**
    - Develop and construct appropriate mathematical models (e.g., algebraic, differential equations, optimization, or statistical models) to describe the problem.
    - Identify the assumptions, limitations, and simplifications made in constructing the model.
3. **Solving and Analyzing Models:**
    - Use various mathematical techniques (such as analytical methods, numerical methods, or simulation) to solve the formulated models.
    - Evaluate the stability, behavior, and implications of the solutions within the context of the real-world problem.
4. **Interpreting Results:**
    - Translate the mathematical outcomes into meaningful insights and actionable recommendations.
    - Understand the implications of the solutions, considering real-world constraints and complexities.
5. **Optimizing Solutions:**
    - Apply mathematical optimization techniques to improve outcomes, such as minimizing costs, maximizing efficiency, or balancing competing factors.
6. **Communicating Findings:**
    - Present the results of the modeling and analysis clearly to stakeholders, using visual aids, reports, and presentations that relate the mathematical findings to the original problem context.
    - Provide practical, data-driven insights that help inform decision-making.

Outcomes:

1. **Effective Problem Solving:**
    - The ability to solve complex, real-world problems through mathematical modeling, leading to optimized and efficient solutions.
2. **Better Decision-Making:**
    - Stakeholders and decision-makers can use the model's insights to make informed decisions in areas such as resource allocation, production planning, or policy-making.
3. **Predictive Capability:**
    - The model provides predictions about future events or behaviors, which helps in anticipating challenges or opportunities in various sectors like finance, healthcare, and engineering.
4. **Improved Understanding of Systems:**
    - Mathematical modeling deepens the understanding of the underlying dynamics of a system, whether biological, economic, or mechanical.
5. **Enhanced Analytical Skills:**
    - Development of strong quantitative and analytical thinking abilities, including proficiency in using mathematical tools to solve practical problems.
6. **Cross-Disciplinary Application:**
    - Mathematical modeling applies to a wide range of real-life problems, offering versatile solutions that can span different industries and disciplines.
7. **Innovation and Research Advancements:**
    - New models and methodologies are developed, pushing the boundaries of applied mathematics and contributing to ongoing research and innovation in diverse fields.

PROFILES OF THE RESOURCE PERSONS

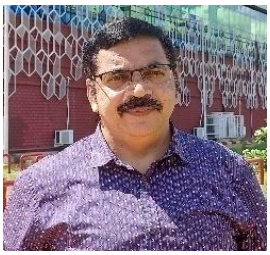
BRIEF RESUME

Dr. G.V.S.R Deekshitulu, did his B.Sc from PR Government College, Kakinada in 1992; did his M.Sc (1994) from Andhra University and qualified in CSIR-JRF in 1995. He obtained Doctorate (1998) in Applied Mathematics from Andhra University at an early age of 26 years. Sir, earlier worked as Professor in Vellore Institute of Technology (VIT)-Vellore. He joined as Professor of mathematics in University College of engineering Kakinada, JNTUK in 2013.

He has more than 25 years of experience in teaching and 28 years of research experience. His areas of research are differential equations, time scales, fractional differential and difference equations, polynomial approximations to the solutions of differentiation equations. He has guided10Ph.D.'s. He authored chapters in books, delivered invited talks at National/International level in India and abroad. He published nearly 65 research papers in International Journals of repute. He is reviewer for many international journals.

He held different positions like Head of the Department of Mathematics, Chairman- Board of Studies, Officer–In charge of Hostels, Additional Controller of examinations- PG courses, Director- Faculty Development Centre, JNTUK. He was the Co-convener of EAMCET-2021 and played an important role in the smooth conduct of EAMCET-2021. Presently he is working as Professor of mathematics and the Special Officer – School of Pharmacy studies and Technology, JNTUK.

Other than the professional skills, he writes poetry in Telugu with classical Chandassu. Hehas written 3 Satakams in Telugu.



Prof. Raja Sekhar has more than 25 years of teaching and Research experience. He has been recipient of several prestigious Awards and fellowship, to name a few are, INSA (Indian National Science Academy) Young Scientist Award, JSPS (Japan Society for Promotion of Science) Fellowship, Alexander von Humboldt Fellowship. Prof. Raja Sekhar is a fellow of Fellow of National Academy of Sciences, India; Andhra Pradesh Academy of Sciences; West Bengal Academy of Sciences and Technology. He was awarded the JBS Gold Medal by Indian Academy of Mathematical Modeling and Simulation in the year 2018

Recently, Prof. Raja Sekhar was awarded the Mathematician of the year2023 by Ponnala Trust Instituted at National Institute of Technology Warangal. Prof. Raja Sekhar has held several administrative positions at IIT Kharagpur, the recent being Dean of Faculty of Sciences at IIT Kharagpur. He was involved in curricula revision and implementation at IIT Kharagpur, along the lines of NEP2020. He was an expert speaker at NIT Rourkela during the workshop on NEP2020. He held the position of Organizing Chairman, GATE 2014; Chairman, Career Development Center, Convener, All IIT Placement Committee (AIPC), Dean (Planning and Coordination)

Prof. Raja Sekhar has visited several countries for research collaboration. To name a few, UK, Poland, Germany, Romania, Japan etc. He has more than 100 research articles published in reputed international journals. He is serving as Academic Secretary of the Indian Mathematical Society and has served as Secretary and President of the Indian Society for Theoretical and Applied Mechanics. He is also an Associate Editor of the Journal of Engineering Mathematics (Springer) and Managing Editor of Differential Equations and Dynamical Systems (Springer).

PROGRAMME SCHEDULE

A.S.D GOVERNMENT DEGREE COLLEGE FOR WOMEN(A), KAKINADA

DEPARTMENT OF MATHEMATICS

ONE DAY NATIONAL SEMINAR ON

MATHEMATICAL MODELLING AND APPLICATIONS TO REAL LIFE PROBLEMS

15th December 2023

Programme schedule

Inauguration:

9:45 to 10:00 :

Inauguration

Session 1:

10:00 to 11:30 :

Introduction to the resource person Prof.G.V.S.R.Deekshitulu by Sri.B.Surya Narayana Devara

11:30 to 11:40:

Tea Break

Session 2:

11:40 to 1:00:

Introduction to the resource person Prof.G.P.Raja Sekhar by G.Sridevi

1:00 to 1:15 : Feedback from Students

1:15 to 1:30 :Vote of Thanks

REPORT

A.S.D.GOVT. DEGREE COLLEGE FOR WOMEN (A)

DEPARTMENT OF MATHEMATICS

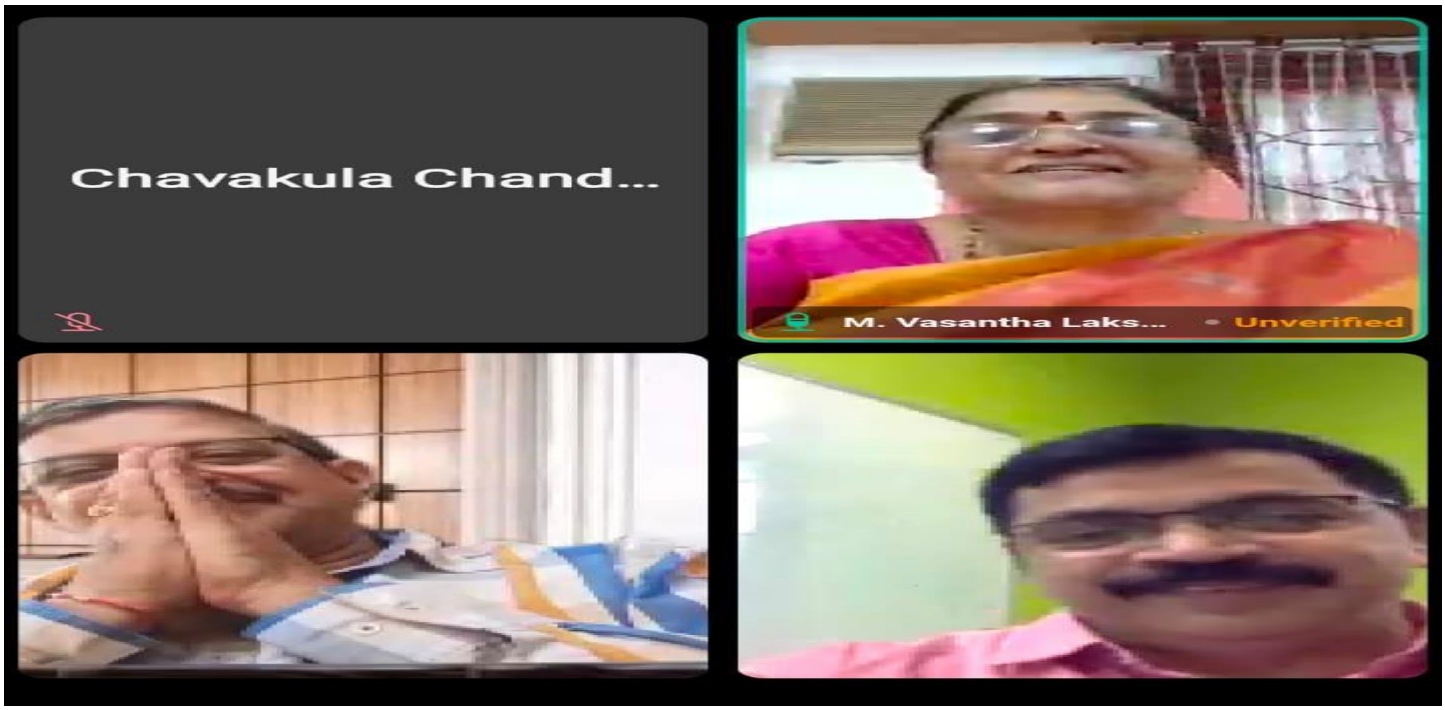
ONE DAY NATIONAL WEBINAR

ON

MATHEMATICAL MODELLING AND APPLICATIONS TO REAL LIFE PROBLEMS

Inauguration session:

On 15th December One Day National Seminar Started with Inauguration Session and all the distinguished Guests , Precedent of the event , Dr. V. Anantha Lakshmi , principal ,A.S.D.Govt Degree College For Women (A),Vice precedent Ms.M.Suvarchala , Vice Principal of the college ,IQAC Coordinator Ms.M.Vasanta Lakshmi Incharge of zoology department . Convener of this webinar Sri.B.Surya Narayana Devara Incharge of Physics and mathematics . Inauguration session Started with Prayer song by final year students .

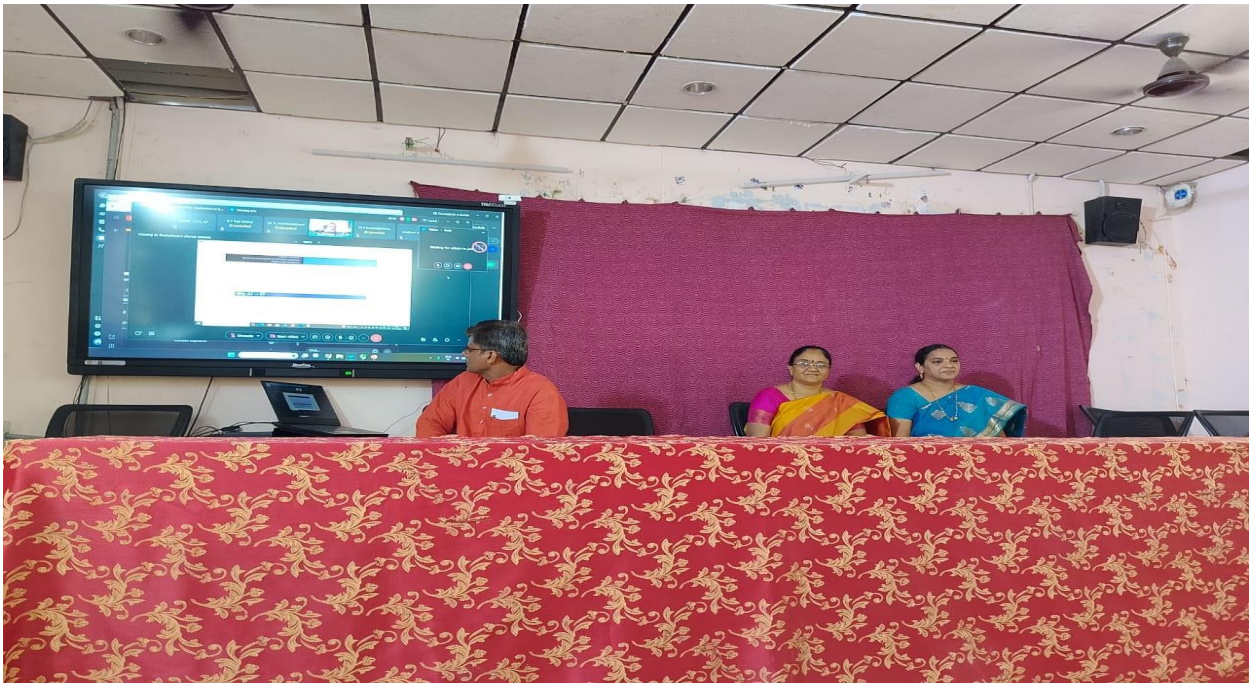


Inauguration By Principal Dr. V. Anantha Lakshmi

80 Students from I,II,III BSc were Participated in Webinar

Introduction to the Resource Person Prof.G.V.S.R.Deekshitulu by Sri.B.Surya Narayana Devara

Session 1:



Prof.G.V.S.R.Deekshitulu sir Sharing Role of Mathematical modeling

The role of mathematics

Real world problems →parameters involved →mathematical model→ solution of mathematical problems

Mathematical modeling:

Mathematical modeling is the art of translating problem from an application area into treatable mathematical formulation ,whose theoretical and numerical results provide insight answer and guidance for the originaling applications

why modeling ?

1.Gives through understanding of the system

2. Guides through the path for better design of a system

3. Now a days indispensible in real application

Using a retarded functional differential equation .imagine a biological population composed of adult

And juvenile indivividuals,

let N(t) denote the density of adults at time T

Assume that length of juvenile period is exactly H units of time for each individual assume that adults produce offspring at a per capita rate $\propto$ that their propability per unity of time of dimg is assume that a newform service the juvenile period with probability p and put r = $\propto p$

$$\frac{dN}{dt}(t) = -\ \mu N(t) + \gamma N(t-h)$$

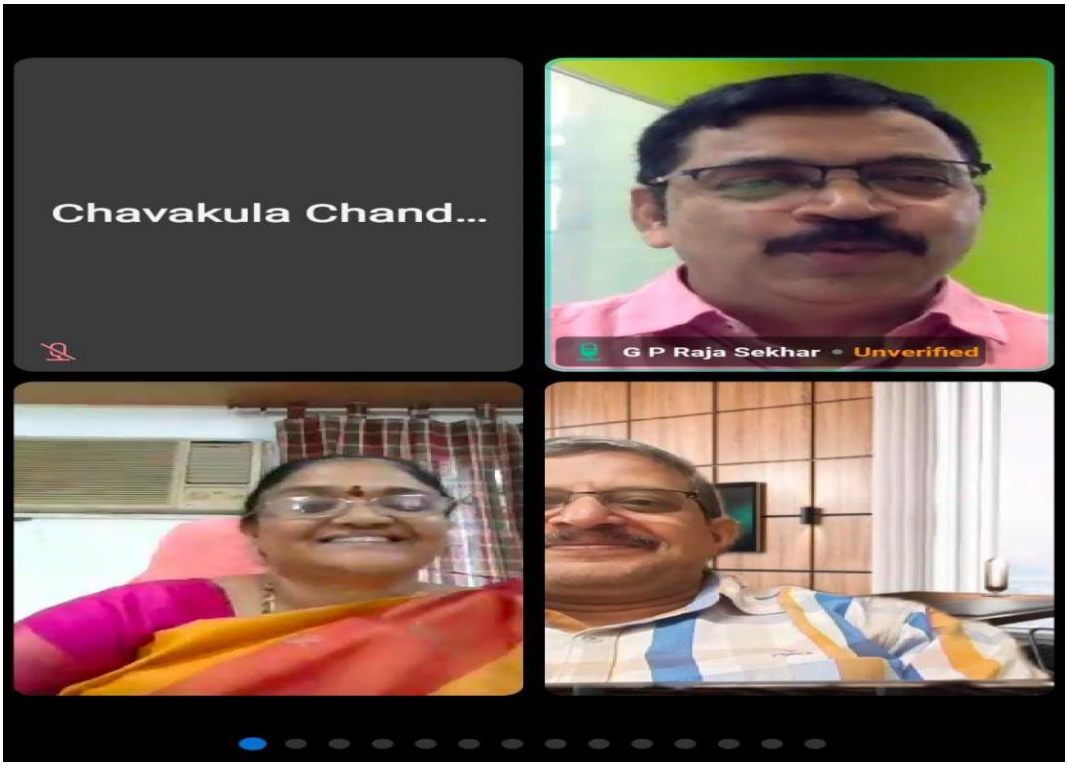
What are compartment models?

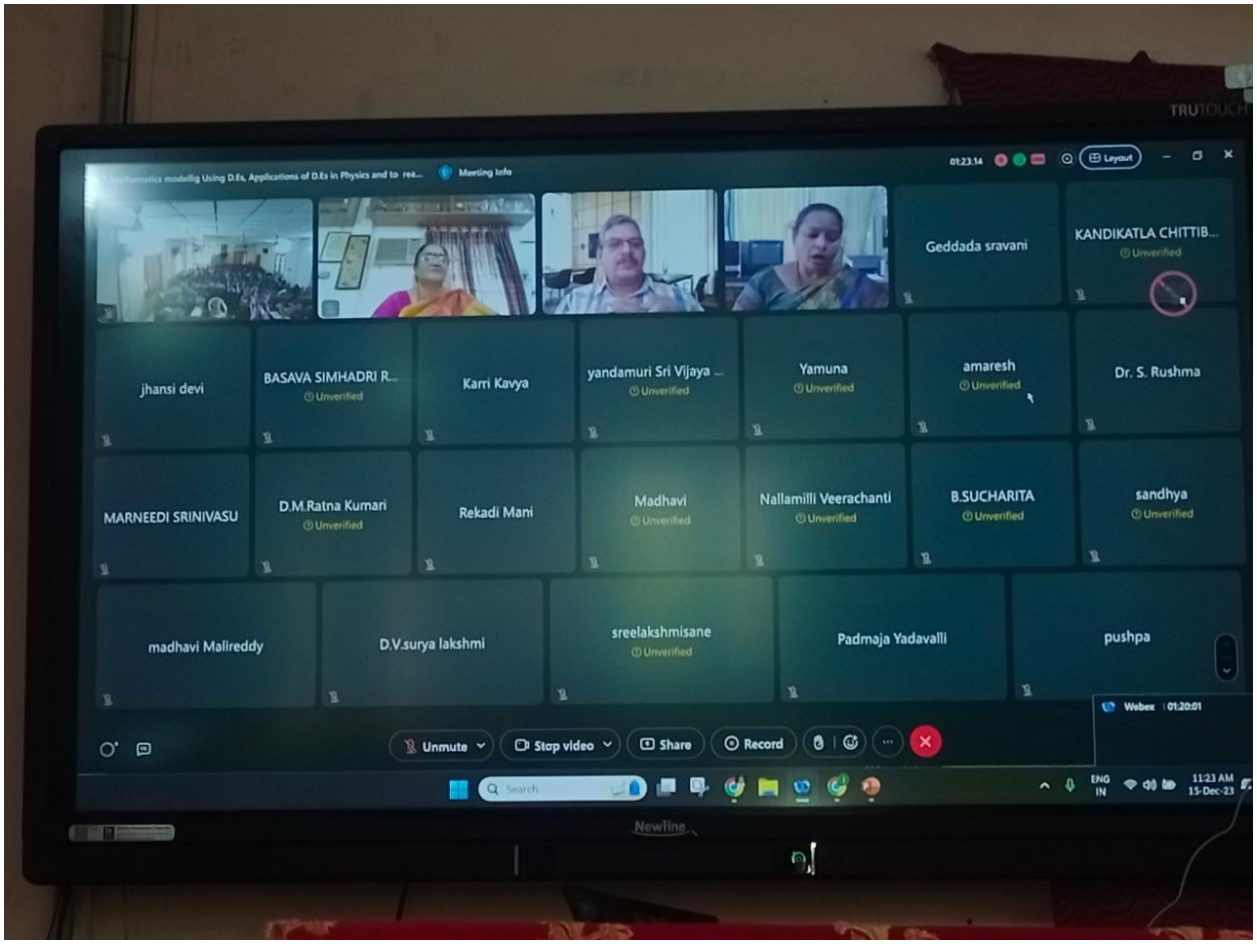
The interaction between the two species can be treated as exchange of information or Chemicals or data between two difference sets .These types of problems in which certain Exchange among .themselves is called a compartment problem .

Chemical reaction:

The law of mass action status that when there is no temperature change $\frac{dx}{dt}$ = k (a – px) (b-qr)

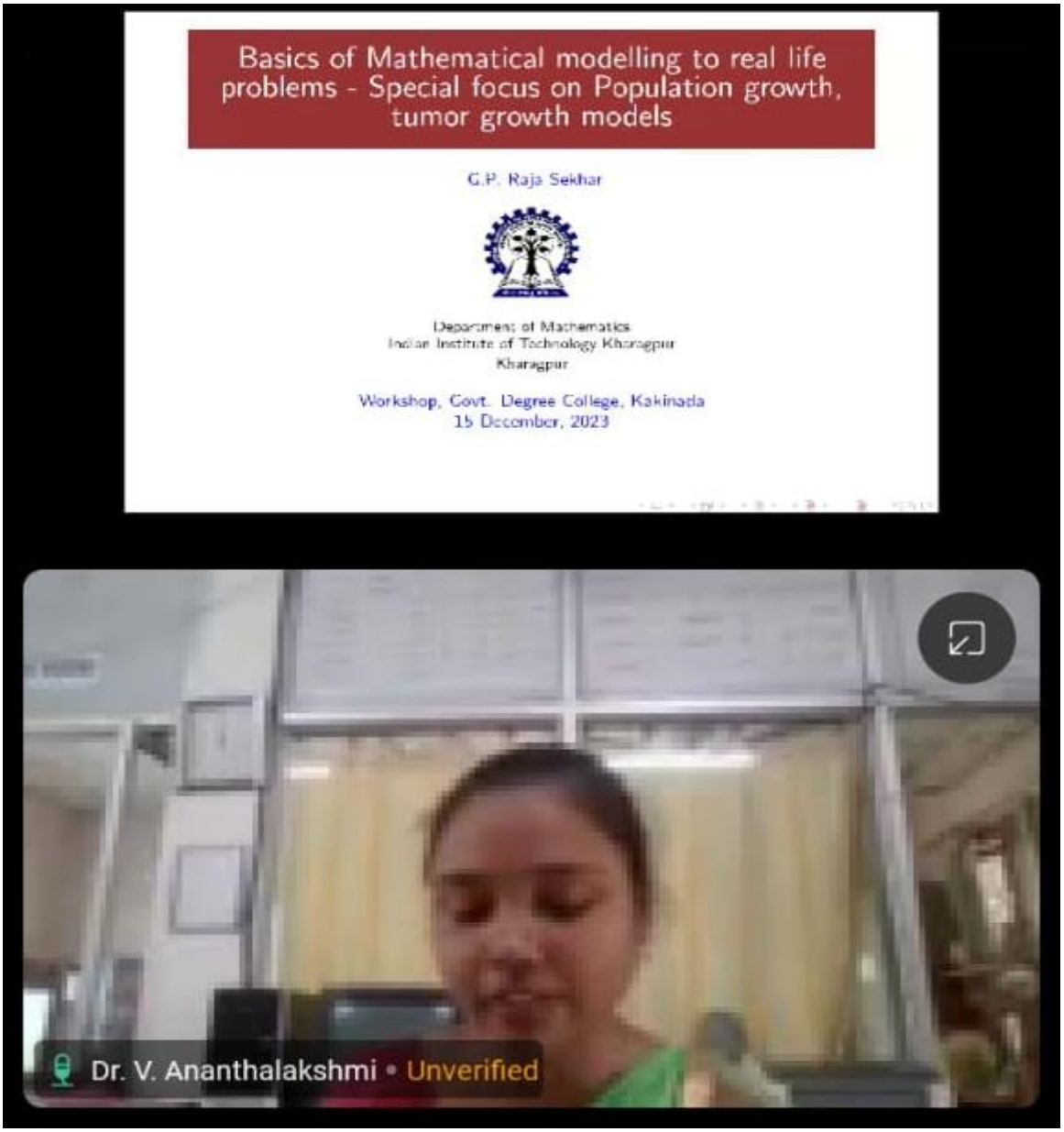
P = $\frac{M}{M+N}$ q = $\frac{N}{M+N}$





Vote of Thanks by D.V.S.Lakshmi Lecturer in Physics

SESSION 2:



Introduction to the Resource Person Prof.G.P.Raja Sekhar by G.Sridevi

Population change of species depends on

1. Current population
2. Its reproduction rate
3. Its ineraction with other species (predation or prey)

Modeling roles :

1. State or level variables
2. Source or sinks
3. Flow of material/ information
4. Control or rate flow

   Ex: x: Density of rabbits- reproduce at a rate proportional to their population.

   Y: Density of foxes – eat rabbits ,and die at constant rate

Model:

Rabbits increase at rate dx = Ax dt

Rabbits decrease at rate dx = Bx dt

Ex: Rabits born – number eated by foxes

$\frac{dx}{dt}$ = Ax – Bxy

How many foxes are reproduced – there death rate

$$\frac{dx}{dt} = -cy + Dxy$$

What is tumor:-

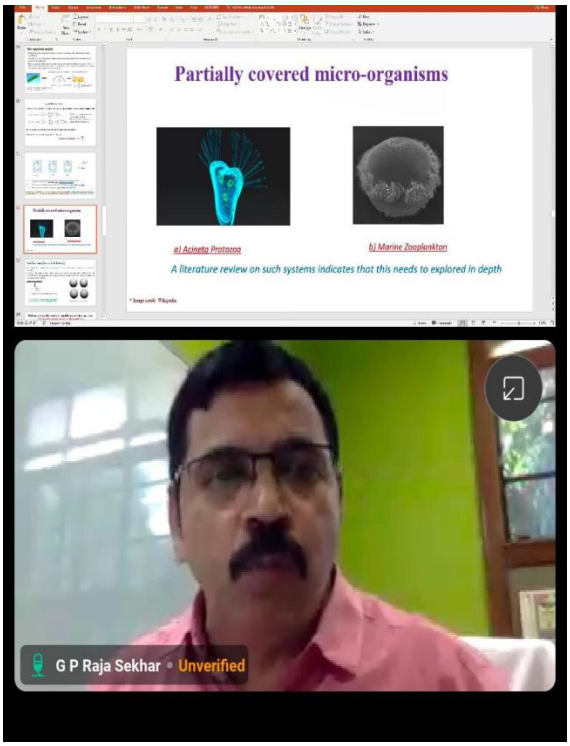
*Normal cells loosing control of biological rules and grow in an uncontrolled manner .

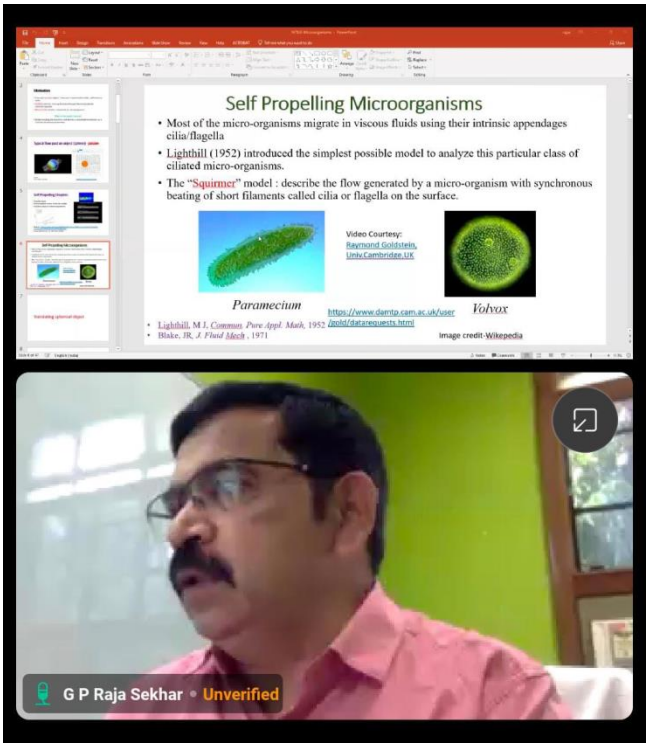
*Berrign, Malignant (Advanced stage-concerns).

Matematical Modeling related to tumor:-

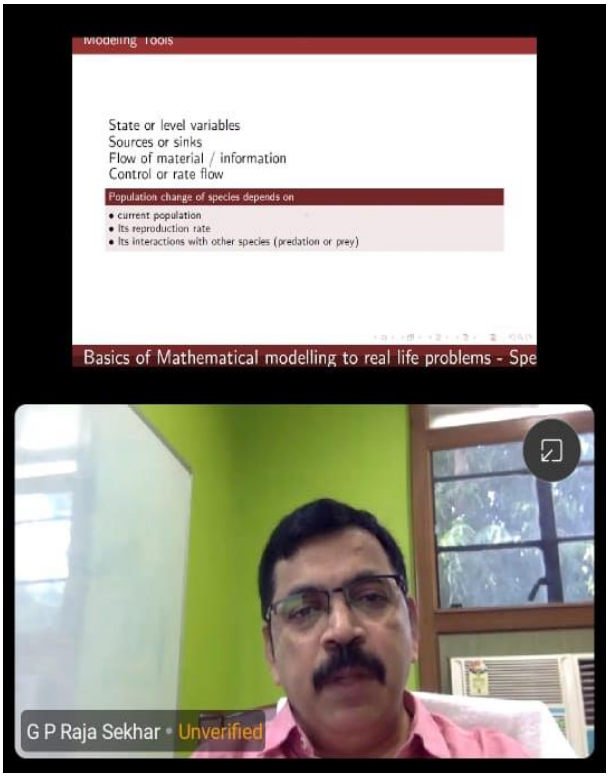
- Cell doubling one cell ,two c ell, u cell,… loading to exponential growth model.
-
- Studying growth, transport of drugs and blood borne solute macromolecules.
-

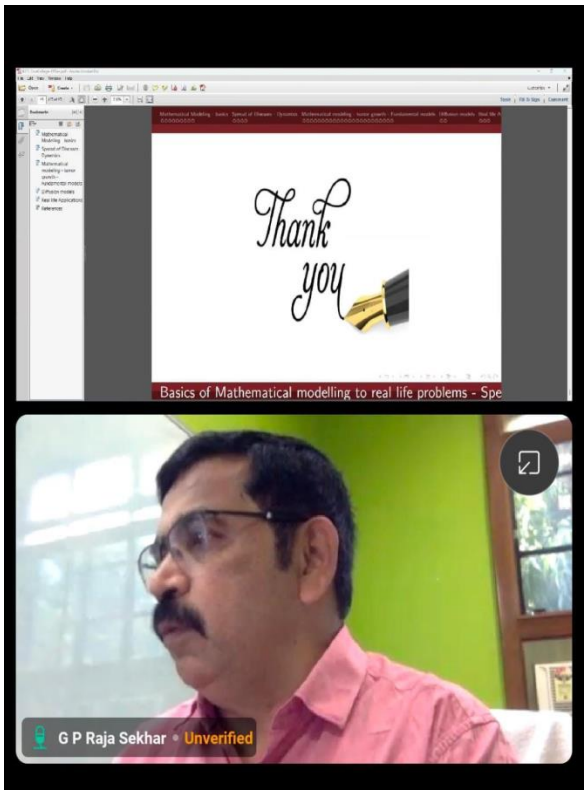
- Good afternoon to all , on behalf of A.S.D GOVT DEGREE COLLEGE FOR WOMENS (A),KAKINADA.

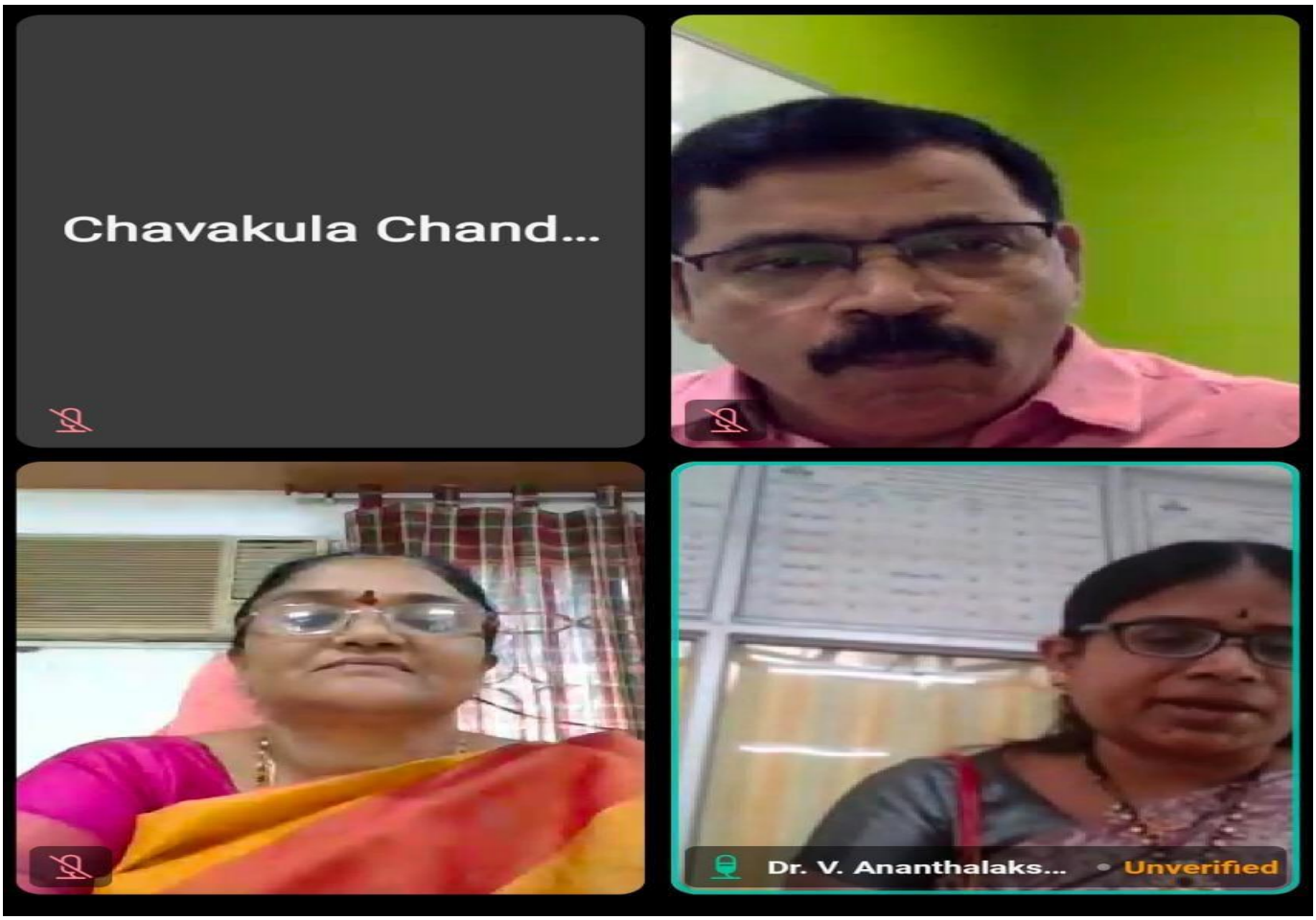




Prof.G.P.Raja Sekhar Sharing Mathematical Modelling to real world problems



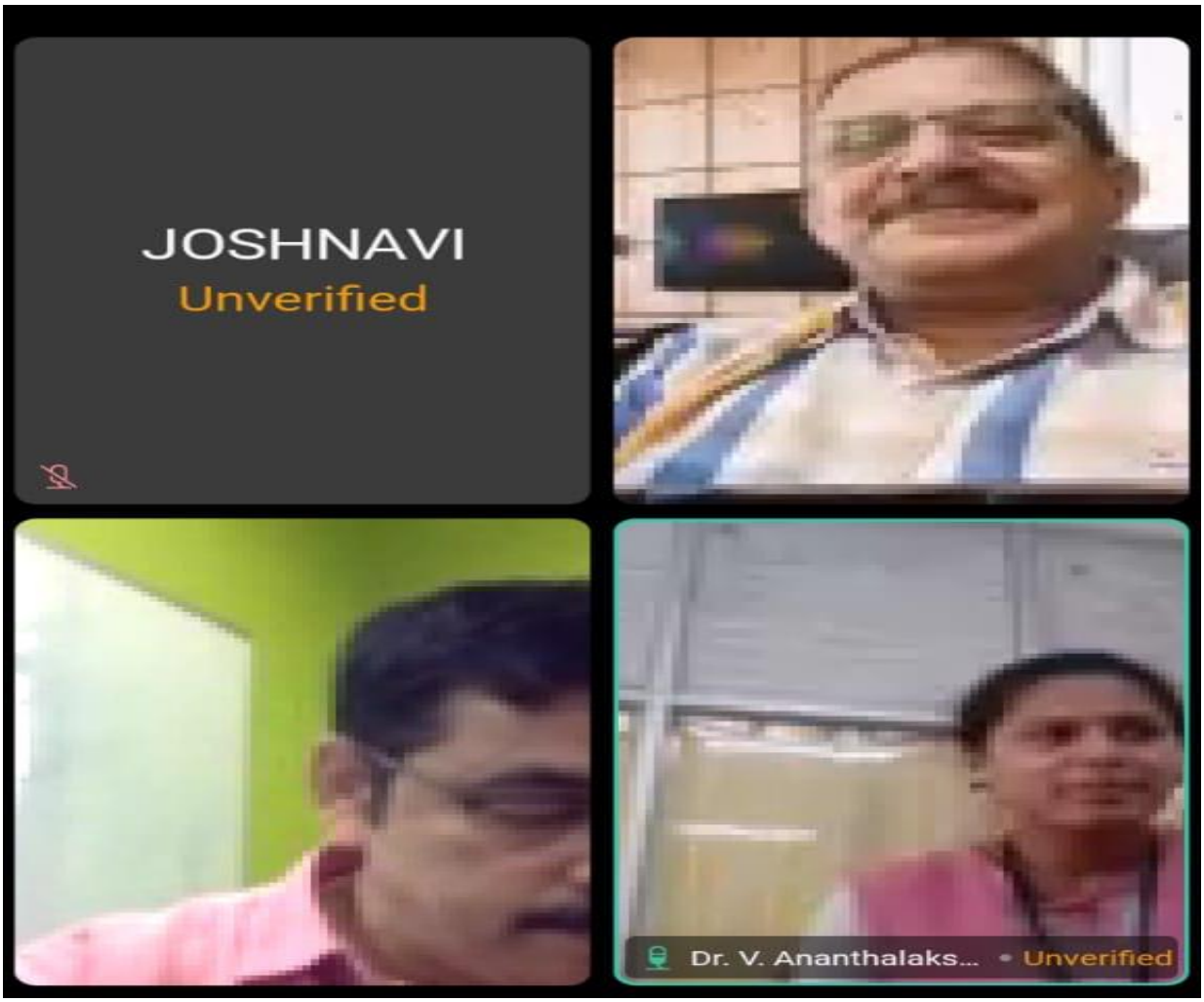




Vote of thanks by K. Kranthi Lecturer in Physics

Students were Actively Listening the Lecture

Feedback



M.Sudha III BSC MPC Gives her Feedback for Webinar

S.No.	Timestamp	Username	Name	Identification i.e Designation and Institution name	1.How would you rate the First Resource Person Prof GVSR Deekshitulu 's presentation in Scale of 5 (5 being excellent)	2. How would you rate the Resource Person Prof G.P.RajaSekhar 's presentation in Scale of 5 (5 being excellent)	3. Your opinion on the selection of topic i.e Mathematicial Modelling and applications to Real life Problems.	4 Overall feedback (write in few sentences)
1	2023/12/15 12:43:00 PM GMT+5:30	jayasrikonuku@gmail.com	Konuku Jayasri	Student	5	5	This topic is helpful for students	Excellent
2	2023/12/15 12:43:16 PM GMT+5:30	kchittibabu@gmail.com	Sri KANDIKATLA CHITTIBABU	Lecturer, GDC MUMMIDIVARAM	4	4	Nice selection	Good
3	2023/12/15 12:43:23 PM GMT+5:30	arunakumarisadasivuni673@gmail.com	Aruna Kumari. Sadasivuni	Lecturer in Mathematics, GDC(M), Srikakulam	4	4	Very relevant	Excellent
4	2023/12/15 12:43:23 PM GMT+5:30	vijayavijaya2925@gmail.com	Vijaya Lakshmi	ASD Government degree college for women	4	5	Excellent	Excellent
5	2023/12/15 12:43:32 PM GMT+5:30	devara22@gmail.com	B.Surya Narayana Devara	Lecturer in Physics ASDGDC KAKINADA	5	5	Good	Good organisation of the event
6	2023/12/15 12:43:36 PM GMT+5:30	sainikithayelugubanti@gmail.com	Y. SAI NIKITA	Student ASD Govt Degree college for women Autonomous Kakinada	5	5	Excellent	Good experience
7	2023/12/15 12:43:57 PM GMT+5:30	rayuduaruna36@gmail.com	Rayudu Jyothi	A.S.D Govt Degree College for women's	5	5	Very useful	Excellent
8	2023/12/15 12:44:00 PM GMT+5:30	nanduuu.2004@gmail.com	Velugubantla Nandini	ASD govt degree college for womens (A)	5	5	Very useful	Excellent
9	2023/12/15 12:44:05 PM GMT+5:30	akulabhavani07@gmail.com	Akula Durga Mahalakshmi	ASD Govt Degree college for womens A kakinada	5	4	Excellent excellent	Excellent
10	2023/12/15 12:44:05 PM GMT+5:30	vaidadiaruna284@gmail.com	Vaidadi Aruna	A.S.D.GOVT DEGREE COLLEGE FOR WOMEN A	5	5	Good	Good
11	2023/12/15 12:44:06 PM GMT+5:30	sivakotigunji2@gmail.com	GUNJI SIVAKOTI MA NET	LECTURER IN POLITICAL SCIENCE KRK GOVERNMENT DEGREE COLLEGE ADDANKI	4	4	Good	Good
12	2023/12/15 12:44:23 PM GMT+5:30	chagantirukminisri@gmail.com	Rukmini Sri Ch	ASD government degree college for womens kakinada	5	5	Very useful	Excellent
13	2023/12/15 12:44:31 PM GMT+5:30	kjrao2013@gmail.com	Kolli Janardhana Rao	Lecturer in Mathematics,, Government Degree College,, Kovvur,, E. G. Dist.	5	4	Very good information	Well organised,, want to attend webinars in the topic real life applications of Mathematics
14	2023/12/15 12:44:34 PM GMT+5:30	andugula.shilpa@mlrinstitutions.ac.in	Andugula shilpa	Assistant professor and MLRIT	5	5	Good selection	Very good
15	2023/12/15 12:44:50 PM GMT+5:30	ksai58719@gmail.com	B. Sai kalyani	Student	5	5	Excellent	So use ful
16	2023/12/15 12:44:51 PM GMT+5:30	lakshmisahithi1201@gmail.com	SAHITHI BOTTA	Student and A.S.D Govt.College for women's (A) kkd	5	5	Good	It's a good experience to listen this webiner
17	2023/12/15 12:44:56 PM GMT+5:30	laxmikantampanchada@gmail.com	Lakshmi Kantam Panchada	Student	5	5	Very useful	Good
18	2023/12/15 12:45:01 PM GMT+5:30	sharongrace415@gmail.com	Guda Sharon Grace	Student.ASD govt degree college for women's.Kakinada	5	5	Good	It's a good experience to listen this webinar

SAMPLE CERTIFICATE

A.S.D Govt. Degree College(Women)(Autonomous)
Kakinada

CERTIFICATE

This is to Certify that

Mummidi Ramya

ASD Government Degree College Women's Kakinada

has attended the National Webinar on " Mathematical modelling and Applications to real life Problems" held on 15th Dec.2023

Incharge Physics & Mathematics

IQAC Coordinator

Vice Principal

Principal

ASDGDCNWMM000207