KONGUNADU ARTS AND SCIENCE COLLEGE
(AUTONOMOUS)
Re-accredited by NAAC with A+ Grade - 4th cycle, College of Excellence – UGC

Coimbatore - 641 029, Tamil Nadu, India

DEPARTMENT OF MATHEMATICS
supported by
DBT STAR COLLEGE SCHEME

FIVE DAY WINTER TRAINING PROGRAMME ON

PURE AND APPLIED MATHEMATICS

REPORT

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Name of the Event	FIVE DAY WINTER TRAINING PROGRAMME ON PURE AND APPLIED MATHEMATICS
Date	**27.01.2025 to 31.01.2025**
Time	10 a.m.
Chief Guest	➤ **Dr.P.VEERAMANI** Retired Professor Department of Mathematics Indian Institute of Technology Madras Chennai ➤ **Dr. M. MARUDAI** Honorary Professor Department of Mathematics Bharathidasan University Tiruchirappalli ➤ **Dr.G. NAGAMANI** Associate Professor Department of Mathematics The Gandhigram Rural Institute (GRI) (Deemed to be University) ➤ **Dr.K.BALACHANDRAN** Mentor Professor, Department of Mathematics Bharathiar University, Coimbatore ➤ **Dr. R. GNANA PRAKASAM** Lecturer in Department of Mathematics Tamil Nadu Polytechnic College, Madurai (Expert in CSIR - NET)
Venue of the Programme	Room No.C17
Objectives of the Programme	The main objective of the Winter Training Programme is to motivate the Young minds in Mathematics to understand and analyze the basic concepts of Mathematics and motivate them to pursue Research. It also helps the students to develop and attain fundamental Mathematical skills understanding which laid a strong foundation of mathematics in undergraduate level.
Outcome of the Programme	On successful completion of Winter Training Programme students will become strong in fundamentals of Mathematics which will enable them to lead higher studies. It also provided strong foundation with the potential to crack the common entrance examinations and to do their projects effectively.
Number of Beneficiaries	Students : 38, Faculty:11

REPORT OF THE PROGRAMME

The Department of Mathematics, Kongunadu Arts and Science College, organized FIVE DAY WINTER TRAINING PROGRAMME ON PURE AND APPLIED MATHEMATICS between 27.01.2025 and 31.01.2025under DBT Star College Scheme.

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DAY 1- 27.01.2025

Dr.P.VEERAMANI, Retired Professor, Department of Mathematics, Indian Institute of Technology - Madras, Chennai acted as Resource person. He introduced most of the general notations used in Real Analysis. He explained about the Abelian Groups and the Commutative, Associative & Distributive Properties involved in the Abelian group. He then talked about Additive Inverse. His discussion involved Reflexive, Symmetric / Anti-Symmetric & Transitive properties of various sets. The concept of Induction to define certain sets like Natural Numbers was also discussed. His explanation includes the Least Upper Bound (LUB) axiom and existence of LUB for open intervals. Finally he suggested some interesting books on Real Analysis and some online resources like NPTEL. It was a very interesting session.
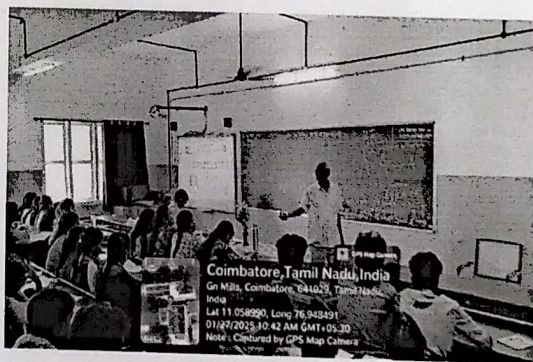
DAY 2 - 28.01.2025

Dr. M. MARUDAI, Honorary Professor, Department of Mathematics, Bharathidasan University, Tiruchirappalli was the Resource person. The lecture began with an introduction to Complex Analysis with some of the basics. His explanation involved the limit of a complex function differentiable at all points and some of the Differentiation properties of Complex Functions. He explained about Constant Functions, Analytic Functions, Entire Functions and some of the second

order partial derivatives applicable for Analytic Functions. The Rouche's theorem, Closed Curves, Schwartz Lemma was also part of his lecture.
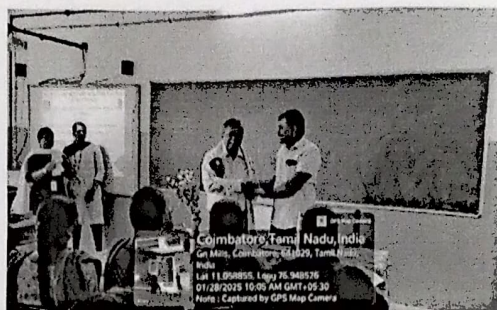

DAY 3 - 29.01.2025

Dr.G. NAGAMANI, Associate Professor, Department of Mathematics, The Gandhigram Rural Institute (GRI) (Deemed to be University) was the Resource person. Her lecture was more inclined towards the logical aspects of Real Analysis which includes the concept of subsets, how N is a subset of R, how Real Numbers are a subset of C, Negation statements, statements on Symmetric & Anti-Symmetric Relations. Then explored the mathematical statements based on a conditional approach. Categorization of proofs — Direct proofs, Indirect proofs based on Negation principles like Contradictions or Contrapositives and Inductive proofs. She then talked about Limits, Continuity, Differentiability & Integrability.

DAY 4 – 30.01.2025

Dr.K.BALACHANDRAN, Mentor Professor, Department of Mathematics Bharathiar University, Coimbatore was the resource person. He began his lecture with function, limit and definition of a derivative. He explained with some examples of directly proportional and inversely proportional relations. He explained First Order Linear Differential Equations with some examples like the Newton's Laws of Motion and also described Non-Linear Ordinary / Partial Differential Equations with some examples like the second order pendulum equation. He described that it is relatively simple to solve First Order Equations compared to the rest. He then explained there are a lot of open problems in the field of Differential Equations. He briefly explained the "Three Body Problem" in particular

saying that it is a Differential Equation involving the Sun, the Earth, and the Moon, and that it is still unsolved. He said that there're a lot of potential avenues for Research in the field of Differential Equations, and encouraged everyone to pursue those further.
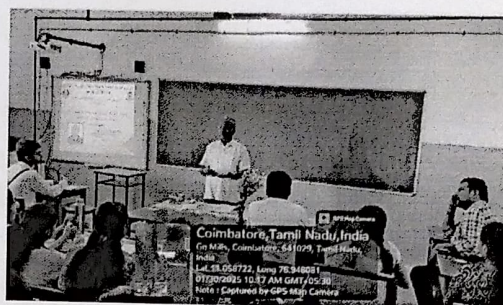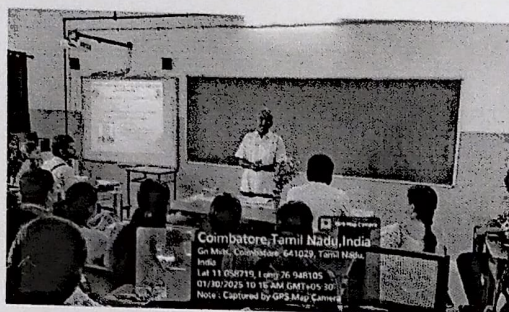
DAY 5 - 31.01.2025

Dr. R. GNANA PRAKASAM, Lecturer in Department of Mathematics, Tamil Nadu Polytechnic College Madurai, (Expert in CSIR - NET)

He explained Closure Property, Associative Property, Identity Property and Inverse Property. He solved the nth root of unity is a group under multiplication. Then explained about General Linear and Special Linear Groups are Cyclic Group, order of a group, the number of elements in a group, the Euler-Phi Function. He then solved a lot of NET & JAM exam problems. He explained about some concepts like the Normalizer of an element, Index of a Group, Subgroups, Number of Generators, Lagrange's theorem, the converse of the theorem, how the converse is true only in a finite Abelian Group, how it is true in a cyclic manner, how such Cyclic Groups are unique, how the number of elements of order "m" can be defined by the Euler-Phi Function only if m divides n where "n" is the order of a group.

Signature of

Department Coordinator

Dr. C. Ravichandran, M.Sc.,M.Phil.,Ph.D.,PGDCA.,
Assistant Professor of Mathematics
Department Co-ordinator, DBT STAR COLLEGE SCHEME
Kongunadu Arts and Science College (Autonomous)
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Signature of

Head of the Department

Dr. V. KOKILAVANI, M.Sc., M.Phil., Ph.D.,
Associate Professor and Head,
Department of Mathematics,
Kongunadu Arts and Science College(Autonomous),
Coimbatore