



MUGBERIA GANGADHAR MAHAVIDYALAYA

P.O.—BHUPATINAGAR, Dist.—PURBA MEDINIPUR, PIN.—721425, WEST BENGAL, INDIA

NAAC Re-Accredited B+Level Govt. aided College

CPE (Under UGC XII Plan) & NCTE Approved Institutions

DBT Star College Scheme Award Recipient

E-mail : mugberia_college@rediffmail.com // www.mugberiagangadharmahavidyalaya.ac.in

Report on Guidance for Competitive Examinations and Career Counselling offered by the Mathematics Department during July 2018 -2023

Mugberia Gangadhar Mahavidyalaya

The Department of Mathematics arranged various types of workshop and ICT based class for GATE/NET/JAM/Competitive Examination during every academic year. In the departmental routine, the teachers are taking the classess as per routine. Also many alumni are involving to the programme. Most of students are much more interest about the class and many student are qualified in NET/GATE/JAM/CAT/CTET/TET and others examinations. Several programme and activities are listed below:

The list of Career Coucesing Programme:

1. **Career Couselling for Recent Graduate / Alumni held on 14th May 2022.**
2. A International Webinar “PATHWAYS TO AMERICAN DREAM” **held on 7th May 2022**
3. **Five Days Workshop on Joint Admission Test for Master (JAM) held on 8th September to 13th September 2022.**
4. [A Workshop for NET, GATE, NBHM & TFIR syllabus with Problem & Year Wise Questions Paper Solved](#) held on & from 25th August to 26th August 2022 under DBT STAR COLLEGE Strengthening Scheme (Govt. of India).
5. [A Workshop for NET, GATE, NBHM & TFIR syllabus with Problem & Year Wise Questions Paper Solved](#), held on & from 4th January to 8th January 2023 under DBT STAR COLLEGE Strengthening Scheme (Govt. of India)
6. **Five Days Workshop on Joint Admission Test for Master (JAM) held on & from 08th -12th November, 2021.**
7. “The Two Days Workshop on NET, GATE, NBHM & TFIR syllabus” held on & from 25thAugust, 2021 to 26th August 2021.
8. Dept. of Mathematics, Mugberia Gangadhar Mahavidyalaya is going to organize a “The Five Days Workshop on NET, GATE, NBHM & TFIR syllabus” held on & from 4th January to 8th January, 2021.
9. **Five Days Workshop on Joint Admission Test for Master (JAM) held on & from 10th November to 15th November, 2019.**
10. “The Five Days Workshop on NET, GATE, NBHM & TFIR syllabus” held on & from 25th August to 26th August 2019.
11. a “The Five Days Workshop on NET, GATE, NBHM & TFIR syllabus” held on & from 2th January- 6th January, 2020.



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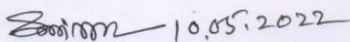
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Date: 10 May 2022

NOTICE

This is to hereby notify all the students that the Dept. of Mathematics, Mugberia Gangadhar Mahavidyalaya is going to organize a Career Counseling for Resent Graduate/ Alumni which will be held on 14th May 2022 under DBT STAR COLLEGE Strengthening Scheme (Govt. of India). All the students, faculty member and researchers are requested to be present in this Webinar.


Dr. Swapan Kumar Misra

Principal

Mugberia Gangadhar Mahavidyalaya

Principal
Mugberia Gangadhar Mahavidyalaya



21 Workshops and seminars organized in topical areas for students by the dept. supported under the scheme

Title: Career counseling for recent graduate/alumni



Department of Mathematics, Mugberia Gangadhar Mahavidyalaya organised a career counselling program entitled "Career counselling for recent graduate/alumni" on 14th May, 2022 through virtual platform using Google Meet. Dr. Swapan Kumar Misra, principal of this college inaugurated the program on virtual platform. **Mr. Tapan Mahapatra, a senior software engineer of TCS, Kolkata,** was the main speaker of this program. Total 93 students (Male: 53 and Female: 40) with 12 faculty members (Male: 10 and Female: 02) participated in this program. Most of the students of UG, PG and nearly 25 alumni were participating in this program to acquire knowledge for their future scope of career opportunity (like M.Tech, Ph.D., in Data Science or Machine Learning or Artificial Intelligence) and job opportunity in software industry. Finally, five students asked various type of questions related to industry job to the speaker and the speaker discussed their questions in details to satisfy them. The program was successful.



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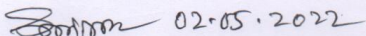
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E-mail : mugberia_college@rediffmail.com // www.mugberiangangadharmahavidyalaya.ac.in

Date: 02 May 2022

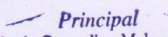
NOTICE

This is to hereby notify all the students that the Dept. of Mathematics, Mugberia Gangadhar Mahavidyalaya is going to organize a international webinar “PATHWAYS TO AMERICAN DREAM” which will be held on 7th May 2022 under DBT STAR COLLEGE Strengthening Scheme (Govt. of India). All the students, faculty member and researchers are requested to be present in this Webinar.


Dr. Swapan Kumar Misra

Principal

Mugberia Gangadhar Mahavidyalaya


Principal
Mugberia Gangadhar Mahavidyalaya



Career counselling for recent graduate/alumni

07/5/22 Workshops and seminars organized in topical areas for students by the dept. supported under the scheme

Title: Career counseling for recent graduate/alumni

(Pathway to American Dream)



International Webinar On

“PATHWAYS TO AMERICAN DREAM”

on 07th May, 2022 (at 07:30 p.m. to 08:30 p.m.) through virtual platform using Google Meet. Dr. Swapan Kumar Misra, principal of this college inaugurated the program on virtual platform. Dr. Dilip Jana, Principal Data Scientist in Walmart Company, Texas, United States was the main speaker of this program. Total 112 students (Male: 61 and Female: 51) with 14 faculty members (Male: 12 and Female: 02) participated in this program. Most of the students of UG, PG and nearly 35 alumni were participating in this program to acquire knowledge for their future scope of career opportunity (like M.Tech, Ph.D., in Data Science) and job opportunity in online industries (Amazon, Walmart, Flipcart, etc.). Finally, five students asked various type of questions related to JRE, TOEFL tests to the speaker and the speaker discussed their questions in details to satisfy them. The program was successful.



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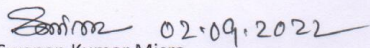
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Date: 02/09/2022

NOTICE

This is to hereby notify all the students that the Dept. of Mathematics, Mugberia Gangadhar Mahavidyalaya is going to organize a **Five Days Workshop on Joint Admission Test for Master (JAM)** which will be held on & from 8th September to 13th September 2022 under DBT STAR COLLEGE Strengthening Scheme (Govt. of India). All the students and researchers are requested to be present in the said workshop.


Dr. Swapan Kumar Misra

Principal

Mugberia Gangadhar Mahavidyalaya



Principal
Mugberia Gangadhar Mahavidyalaya

Mugberia Gangadhar Mahavidyalaya

Bhupatinagar, Purba Medinipur- 721425

ACCREDITED BY NAAC WITH GRADE B⁺

Department of Mathematics Mugberia Gangadhar Mahavidyalaya **Resolution of Departmental Meeting**

Dated: 18/08/2022

Minutes of the Departmental meeting held on 18.08.2022

Members present:

- (1) Dr. KalipadaMaity, HOD, Associate Prof. (**Coordinator**)
- (2) Dr. Manoranjan De, Assistant Prof.
- (3) Mr. Suman Giri, Sact.
- (4) Mr. Debraj Manna, Sact.
- (5) Mr. Bikash Panda, Sact.
- (6) Mr. Hiranmoy Manna, Sact.
- (7) Mr. SantuHati, Contractual teacher. (**Joint Coordinator**)
- (8) Mr. Goutam Mandal, Contractual teacher

A short meeting was arranged at 3:15 pm regarding the workshop for joint admission test for masters (JAM) in our Department. All teachers of the department joined the meeting in time. Dr. KalipadaMaity(HOD) chaired the meeting.

Decisions taken in the meeting are:

- (1) It is decided that Mr. Santu Hati will be the joint coordinator of this program and Dr.KalipadaMaity (HOD) will be program coordinator and rest teachers of the department will be the recourse persons of the program. .
- (2) The course period will be scheduled from 08 September, 2022 to 13 September, 2022
- (3) The participation students will be UG-5th Sem,and UG-3rd sem.

(3) Course Syllabus

Real Analysis:

Sequences and Series of Real Numbers: convergence of sequences, bounded and monotone sequences, Cauchy sequences, Bolzano-Weierstrass theorem, absolute convergence, tests of convergence for series – comparison test, ratio test, root test; Power series (of one real variable), radius and interval of convergence, term-wise differentiation and integration of power series.

Functions of One Real Variable: limit, continuity, intermediate value property, differentiation, Rolle's Theorem, mean value theorem, L'Hospital rule, Taylor's theorem, Taylor's series, maxima and minima, Riemann integration (definite integrals and their properties), fundamental theorem of calculus.

Multivariable Calculus and Differential Equations:

Functions of Two or Three Real Variables: limit, continuity, partial derivatives, total derivative, maxima and minima.

Integral Calculus: double and triple integrals, change of order of integration, calculating surface areas and volumes using double integrals, calculating volumes using triple integrals.

Differential Equations: Bernoulli's equation, exact differential equations, integrating factors, orthogonal trajectories, homogeneous differential equations, method of separation of variables, linear differential equations of second order with constant coefficients, method of variation of parameters, Cauchy-Euler equation.

Linear Algebra and Algebra:

Matrices: systems of linear equations, rank, nullity, rank-nullity theorem, inverse, determinant, eigenvalues, eigenvectors.

Finite Dimensional Vector Spaces: linear independence of vectors, basis, dimension, linear transformations, matrix representation, range space, null space, rank-nullity theorem.

Groups: cyclic groups, abelian groups, non-abelian groups, permutation groups, normal subgroups, quotient groups, Lagrange's theorem for finite groups, group homomorphisms.

It is decided that the course will be delivered by lecture, interaction and presentation by ppt. Available seat to register the program is 50. There is no course access fee for the student. Last date of registration for this program is 7th September 2022. HOD will forward the matter for approval of this program from Academic Sub-committee. Teachers are requested to prepare a routine for smooth running of course.

The meeting comes to end with a vote of thanks.



Five Days Workshop for Joint Admission Test for Masters (JAM)

Organized by

Department of Mathematics (UG & PG)

Mugberia Gangadhar Mahavidyalaya

Date: 8th September to 13th September 2022

Pythagoras Hall, Room No: 237



Under DBT STAR
COLLEGE
Strengthening
Scheme (Govt. of
India)

Day-1

1. Dr. Swapan Kumar Misra, Principal Mugberia Gangadhar Mahavidyalaya (2.15 P.M– 2.30 P.M)
2. Dr. Kalipada Maity, Associate Professor, HOD (UG & PG), Department of Mathematics, Mugberia Gangadhar Mahavidyalaya.(2.30 P.M-3.00 P.M)
3. Mr. Bikash Panda SACT Department of Mathematics (3.00-4.00P.M)

Thursday
08/09/2022

Day-2

1. Dr. Bidhan Chandra Samanta, DBT Coordinator & Associate Prof. & HOD, Department of Chemistry (2.15 P.M- 2.30 P.M).
2. Dr Manoranjan De, Assistant Professor, Department of Mathematics (2.30 P.M- 3.30 P.M)
3. Mr. Suman Giri, SACT, Department of Mathematics. (3.30 P.M- 4.30 P.M)

Friday
09/09/2022

Day-3

1. Dr Prasenjit Ghosh, IQAC Coordinator & Associate Prof. & HOD, Department of History (2.15 P.M- 2.30 P.M)
2. Dr Kalipada Maity, Associate Professor, HOD (UG & PG), Department of Mathematics, Mugberia Gangadhar Mahavidyalaya (2.30 P.M – 3.30 P.M)
3. Mr.Debraj Manna, SACT, Department of Mathematics. (3.30 P.M- 4.30 P.M)

Saturday
10/09/2022

Day-4

1. Dr Kalipada Maity, Associate Professor, HOD (UG & PG), Department of Mathematics, (2.15 P.M – 2.30 P.M)
2. Mr. Goutam kumar Mondal, Contractual Teacher , Department of Mathematics (2.30 P.M – 3.30 P.M)
3. Mr. Hironmoy Manna SACT, Department of Mathematics (3.30 P.M- 4.30 P.M)

Monday
12/09/2022

Day-5: **Examination (2.15 p.m- 4.15 p.m) Santu Hati** Contractual Teacher

Tuesday
13/09/2022

List of Registrar students for JAM workshop held on 8th to 13th September 2022

1	Annesha Khatua	V Sem
2	Atanu Maity	V Sem
3	Ayan Pradhan	V Sem
4	Amiyendra Maiti	V Sem
5	Amit Patra	V Sem
6	Bachaspati Mondal	V Sem
7	Bidisha Sasmal	V Sem
8	Gourangi pal	V Sem
9	Jatindranath Samanta	V Sem
10	Megha Rani Sahoo	V Sem
11	Paramita Maity	V Sem
12	Rajkumar Karan	V Sem
13	Ranajit Mandal	V Sem
14	Subhajit Giri	V Sem
15	Sonali Mandal	V Sem
16	Soumitra Das	V Sem
17	Soumyadeep Bej	V Sem
18	Subhadip Mahapatra	V Sem
19	Surajit Maity	V Sem
20	Sudeshna Maity	V Sem
21	Sudipta Mondal	V Sem
22	Suman Das	V Sem
23	Sayan Sahoo	III Sem
24	Rudra Prakash Das	III Sem
25	Sandipan Kala	III Sem
26	Shibam Majhi	III Sem
27	Sandip Kumar Paul	III Sem
28	Debanshu Roy	III Sem
29	Pritish Bag	III Sem
30	Nandini Jana	III Sem
31	Samapti Jana	III Sem
32	Somasri Sau	III Sem
33	Ayantika Jana	III Sem
34	Basanti Mondal	III Sem
35	Sonakshi Manna	III Sem
36	Tanmoy Kumar Adak	III Sem
37	Rasbihary Mal	III Sem

Department of Mathematics Mugberia Gangadhar Mahavidyalaya

The entire world is going through the grim situation owing to the COVID-19 pandemic and its new variant 'Delta' as well as 'Omicron'. In the present situation people are passing days with lots of uncertainties like threat to be infected, economic recession owing to the long period of lock down, irregularities and disruption of children's education, domestic intolerance due to no or irregular earning and old parent's physical instability as well as employment uncertainties of the educated youth. Not only these, the modern highly complicated way of life has led people in front of perpetual competition and new challenges.

In the light of this, a committee was formed under the mentorship of the Principal, Mugberia Gangadhar Mahavidyalaya, Dr. Swapan Kumar Mishra and Dr. Kalipada Maity, Asso. Prof. and hod of Department of Mathematics as Convener to conduct the program in a systematic manner. The five days "**Joint admission test for masters (JAM)**" was completed successfully under the proper guidance of Hon'ble Principal Sir Dr Swapan Kumar Mishra and Hon'ble Dr. Kalipada Maity sir (Associate Professor, HOD, NAAC Coordinator), through face-to-face program as held from, 08th -13th September, 2022 with 37 participants.

In the welcome address Dr. Kalipada Maity, Coordinator, Associate Professor, HOD, NAAC Coordinator, of Mathematics Department had briefly discussed about the relevance of organizing '**Joint admission test for masters (JAM)**' in the transition period to move towards the digital milieu along with the uncertainties owing to the covid situation. Learners should do self-analysis to find out their strengths as well as weaknesses. After complete graduation degree students have opportunity to take admission in IIT/ NIT for M.Sc in Mathematics by passing JAM examination.

Dr. Bidhan Chandra Samanta, Associate Professor, DBT Coordinator, HOD of Chemistry Department, the first speaker of the technical session of the program had discussed about the scopes and opportunities of higher studies. He ended his speech with lots of blessings and good wishes for the participants in their future life.

In the welcome address Dr. Manoranjan De, Assistant Professor, Dept of Mathematics discussed in details about different opportunities after completion of the present course along with multiple options to switch over from the present domain of discipline to some other. Most of the participants of camp were the Mathematics Learners, hence, Dr. Manoranjan De explained briefly about the necessity of earning 'Continuing Rehabilitation Education (CRE)' points for teacher trainees in different field of Mathematics for the persons with disabilities.

Dr. Prasenjit Ghosh, Associate Professor, IQAC Coordinator, Department of History discussed about the job opportunities of the present course and allied scopes of the same. He also advised participants to utilize their time in routine as well as rigorous practices of JAM study with peers and making a group of the common minded peers for evaluating their performance to keep themselves upgraded. And he said keep the target always high then you will get success one day.

Dr. Kalipada Maity, Coordinator, Associate Professor, HOD, NAAC Coordinator, Mathematics Department give a ppt presentation in Differential Equation field. All in all, the day's program was a grand success.

Dr., Manoranjan De, Assistant Professor, Dept of Mathematics give a ppt presentation in Function of real variables field. All in all, the day's program was a grand success

Mr Suman Kumar Giri, Sact, Mathematics Department give a ppt presentation in Linear algebra area. All in all, the day's program was a grand success.

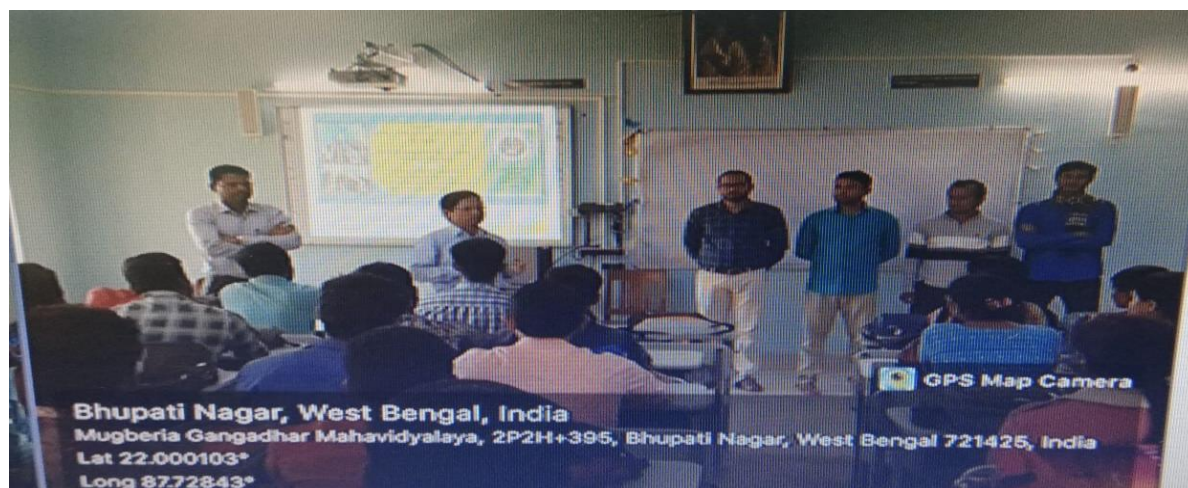
Mr Debraj Manna, Sact, Mathematics Department give a ppt presentation in Abstract algebra area. All in all, the day's program was a grand success.

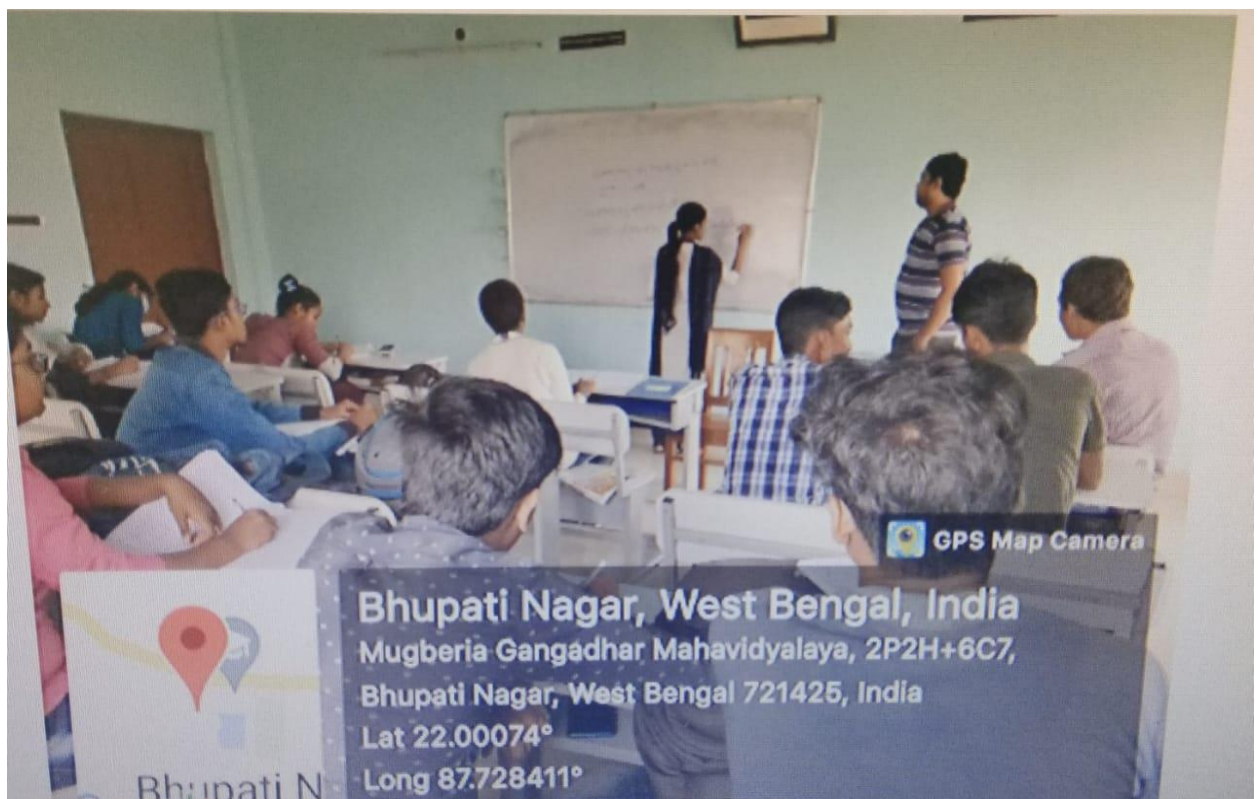
Mr Bikash Panda, Sact, Mathematics Department give a ppt presentation in Real Analysis area. All in all, the day's program was a grand success.

Mr Hironmoyee Manna, Sact, Mathematics Department give a ppt presentation in Integral Calculus area. All in all, the day's program was a grand success.

Mr Goutam Kumar Mondal, Contractual Teacher, Mathematics Department give a ppt presentation in Real Analysis area. All in all, the day's program was a grand success.

Last day of the speech of the last speaker, there was an interactive session with the participants conducted by Mr. Santu Hati, Joint Coordinator, Contractual Teacher, Lots of relevant questions were raised by the participants like further opportunities after completion M.Sc and the linked courses for further study etc. All pertinent queries of the participants were resolved by the resource persons with their insights and erudite reply. Last day Mr. Santu Hati take a examination on the JAM related syllabus. At the end of the program the vote of thanks was proposed by Dr. Kalipada Maity, Coordinator, Associate Professor, HOD, NAAC Coordinator, Department of Mathematics.







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Date: 18/08/2022

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Swapan Kumar Misra 18.08.2022

Dr. Swapan Kumar Misra

Principal

Mugberia Gangadhar Mahavidyalaya

Principal
Mugberia Gangadhar Mahavidyalaya





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Date: 04/01/2023

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Swapan 04.01.2023
Dr. Swapan Kumar Misra

Principal

Mugberia Gangadhar Mahavidyalaya

Principal
Mugberia Gangadhar Mahavidyalaya





*Participated
by*

Department of Mathematics (UG & PG)

(In collaboration with DBT STAR College strengthening Scheme (Govt. of India))

Mugberia Gangadhar Mahavidyalaya

Bhupatinagar, Purba Medinipur- 721425

ACCREDITED BY NAAC WITH GRADE *B⁺*

Affiliated to

Vidyasagar University

**Department of Mathematics
Mugberia Gangadhar Mahavidyalaya**

Dated: 18/08/2022

Minutes of the Departmental meeting held on 18.08.2019

Members present:

- (1) Dr. Kalipada Maity, HOD, Associate Prof.
- (2) Dr. Manoranjan De, Assistant Prof.
- (3) Mr. Suman Giri, Sact.
- (4) Mr. Debraj Manna, Sact.
- (5) Mr. Bikash Panda, Sact. (Jt. Co-ordinator)
- (6) Mr. Hiranmoy Manna, Sact.
- (7) Mr. Goutam Mandal, Contractual teacher (**Coordinator**)
- (8) Mr. Santu Hati, Contractual teacher.

A short meeting was arranged at 3:15 pm regarding the Two Days Workshop on NET, GATE, NBHM& TFIR syllabus in our Department. All teachers of the department joined the meeting in time. Dr. Kalipada Maity(HOD) chaired the meeting.

Decisions taken in the meeting are:

(1) It is decided that Mr. Goutam Mandal will be the coordinator of this program and Mr. Bikash Ponda will be program jt. Co-ordinator and rest teachers of the department will be the recourse persons of the program. .

(2) The course period will be scheduled from 25 August, 2022 to 26 August 2022

(3) The participation students will be UG-5th Sem, and PG-1st & 3rd sem.

(3) Course content for the said program is scheduled as

(i) Help to choose the right career Help to provide expert resources

(ii) Help to gain confidence and insight Help to change unwanted behaviour pattern

(iii) Help to reduce career related frustrations

(iv) Help to provide a role model Help to bring stability in thought process

It is decided that the course will be delivered by lecture, interaction and ppt presentation. Available seat to register the program is 100. There is no course access fee for the student. Last date of registration for this program is 23th August 2022. HoD will forward the matter for approval of this program from Academic Sub-committee. Teachers are requested to prepare a routine for smooth running of course.

The meeting comes to end with a vote of thanks.

Two Days Workshop on NET, GATE, NBHM& TFIR syllabus

Date: 25.08.2022

Mr. Goutam Kumar Mandal, Contractual Teacher in Mathematics(**Coordinator**)

Dr. Kalipada Maity, HOD, Associate Prof.(**Jt. Coordinator**)

Speaker : Dr. Kalipada Maity, Associate Professor & HOD, dept of Mathematics.

Topic : **Syllabus of GATE, CSIR NET and reference books**

a. **GATE syllabus in Mathematics**

Calculus: Functions of two or more variables, continuity, directional derivatives, partial derivatives, total derivative, maxima and minima, saddle point, method of Lagrange's multipliers; Double and Triple integrals and their applications to area, volume and surface area; Vector Calculus: gradient, divergence and curl, Line integrals and Surface integrals, Green's theorem, Stokes' theorem, and Gauss divergence theorem.

Linear Algebra: Finite dimensional vector spaces over real or complex fields; Linear transformations and their matrix representations, rank and nullity; systems of linear equations, characteristic polynomial, eigenvalues and eigenvectors, diagonalization, minimal polynomial, Cayley-Hamilton Theorem, Finite dimensional inner product spaces, Gram-Schmidt orthonormalization process, symmetric, skew-symmetric, Hermitian, skew-Hermitian, normal, orthogonal and unitary matrices; diagonalization by a unitary matrix, Jordan canonical form; bilinear and quadratic forms.

Real Analysis: Metric spaces, connectedness, compactness, completeness; Sequences and series of functions, uniform convergence, Ascoli-Arzelà theorem; Weierstrass approximation theorem; contraction mapping principle, Power series; Differentiation of functions of several variables, Inverse and Implicit function theorems; Lebesgue measure on the real line, measurable functions; Lebesgue integral, Fatou's lemma, monotone convergence theorem, dominated convergence theorem.

Complex Analysis: Functions of a complex variable: continuity, differentiability, analytic functions, harmonic functions; Complex integration: Cauchy's integral theorem and formula; Liouville's theorem, maximum modulus principle, Morera's theorem; zeros and singularities; Power series, radius of convergence, Taylor's series and Laurent's series; Residue theorem and applications for evaluating real integrals; Rouché's theorem, Argument principle, Schwarz lemma; Conformal mappings, Möbius transformations.

Ordinary Differential Equations: First order ordinary differential equations, existence and uniqueness theorems for initial value problems, linear ordinary differential equations of higher order with constant coefficients; Second order linear ordinary differential equations with variable coefficients; Cauchy-Euler equation, method of Laplace transforms for solving ordinary

differential equations, series solutions (power series, Frobenius method); Legendre and Bessel functions and their orthogonal properties; Systems of linear first order ordinary differential equations, Sturm's oscillation and separation theorems, Sturm-Liouville eigenvalue problems, Planar autonomous systems of ordinary differential equations: Stability of stationary points for linear systems with constant coefficients, Linearized stability, Lyapunov functions.

Algebra: Groups, subgroups, normal subgroups, quotient groups, homomorphisms, automorphisms; cyclic groups, permutation groups, Group action, Sylow's theorems and their applications; Rings, ideals, prime and maximal ideals, quotient rings, unique factorization domains, Principal ideal domains, Euclidean domains, polynomial rings, Eisenstein's irreducibility criterion; Fields, finite fields, field extensions, algebraic extensions, algebraically closed fields.

Functional Analysis: Normed linear spaces, Banach spaces, Hahn-Banach theorem, open mapping and closed graph theorems, principle of uniform boundedness; Inner-product spaces, Hilbert spaces, orthonormal bases, projection theorem, Riesz representation theorem, spectral theorem for compact self-adjoint operators.

Numerical Analysis: Systems of linear equations: Direct methods (Gaussian elimination, LU decomposition, Cholesky factorization), Iterative methods (Gauss-Seidel and Jacobi) and their convergence for diagonally dominant coefficient matrices; Numerical solutions of nonlinear equations: bisection method, secant method, Newton-Raphson method, fixed point iteration; Interpolation: Lagrange and Newton forms of interpolating polynomial, Error in polynomial interpolation of a function; Numerical differentiation and error, Numerical integration: Trapezoidal and Simpson rules, Newton-Cotes integration formulas, composite rules, mathematical errors involved in numerical integration formulae; Numerical solution of initial value problems for ordinary differential equations: Methods of Euler, Runge-Kutta method of order 2.

Partial Differential Equations: Method of characteristics for first order linear and quasilinear partial differential equations; Second order partial differential equations in two independent variables: classification and canonical forms, method of separation of variables for Laplace equation in Cartesian and polar coordinates, heat and wave equations in one space variable; Wave equation: Cauchy problem and d'Alembert formula, domains of dependence and influence, non-homogeneous wave equation; Heat equation: Cauchy problem; Laplace and Fourier transform methods.

Topology: Basic concepts of topology, bases, sub bases, subspace topology, order topology, product topology, quotient topology, metric topology, connectedness, compactness, countability and separation axioms, Urysohn's Lemma.

Linear Programming: Linear programming models, convex sets, extreme points; Basic feasible solution, graphical method, simplex method, two phase methods, revised simplex method ; Infeasible and unbounded linear programming models, alternate optima; Duality theory, weak duality and strong duality; Balanced and unbalanced transportation problems, Initial basic feasible solution of balanced transportation problems (least cost method, north-west corner rule,

Vogel's approximation method); Optimal solution, modified distribution method; Solving assignment problems, Hungarian method.

Reference Books:

1. Linear Algebra and its applications, Gilbert Strang.
2. Real Analysis, Royden H.L., Fitzpatrick P. M
3. Introduction to Real analysis, Donald R. Sherbert Robert G. Bartle
4. Foundations of complex analysis, S. Ponnusamy
5. Topics in Algebra, I. N. Herstein
6. An Introduction to Ordinary Differential Equations, Earl A. Coddington

a. CSIR-NET Syllabus in Mathematics

CSIR-UGC National Eligibility Test (NET) for Junior Research Fellowship and Lecturer-ship COMMON SYLLABUS FOR PART 'B' AND 'C' MATHEMATICAL SCIENCES

UNIT – 1

Analysis: Elementary set theory, finite, countable and uncountable sets, Real number system as a complete ordered field, Archimedean property, supremum, infimum. Sequences and series, convergence, limsup, liminf. Bolzano Weierstrass theorem, Heine Borel theorem. Continuity, uniform continuity, differentiability, mean value theorem. Sequences and series of functions, uniform convergence. Riemann sums and Riemann integral, Improper Integrals. Monotonic functions, types of discontinuity, functions of bounded variation, Lebesgue measure, Lebesgue integral. Functions of several variables, directional derivative, partial derivative, derivative as a linear transformation, inverse and implicit function theorems. Metric spaces, compactness, connectedness. Normed linear Spaces. Spaces of continuous functions as examples.

Linear Algebra: Vector spaces, subspaces, linear dependence, basis, dimension, algebra of linear transformations. Algebra of matrices, rank and determinant of matrices, linear equations. Eigenvalues and eigenvectors, Cayley-Hamilton theorem. Matrix representation of linear transformations. Change of basis, canonical forms, diagonal forms, triangular forms, Jordan forms. Inner product spaces, orthonormal basis. Quadratic forms, reduction and classification of quadratic forms

UNIT – 2

Complex Analysis: Algebra of complex numbers, the complex plane, polynomials, power series, transcendental functions such as exponential, trigonometric and hyperbolic functions. Analytic

functions, Cauchy-Riemann equations. Contour integral, Cauchy's theorem, Cauchy's integral formula, Liouville's theorem, Maximum modulus principle, Schwarz lemma, Open mapping theorem. Taylor series, Laurent series, calculus of residues. Conformal mappings, Mobius transformations.

Algebra: Permutations, combinations, pigeon-hole principle, inclusion-exclusion principle, derangements. Fundamental theorem of arithmetic, divisibility in \mathbb{Z} , congruences, Chinese Remainder Theorem, Euler's ϕ -function, primitive roots. Groups, subgroups, normal subgroups, quotient groups, homomorphisms, cyclic groups, permutation groups, Cayley's theorem, class equations, Sylow theorems. Rings, ideals, prime and maximal ideals, quotient rings, unique factorization domain, principal ideal domain, Euclidean domain. Polynomial rings and irreducibility criteria. Fields, finite fields, field extensions, Galois Theory. Topology: basis, dense sets, subspace and product topology, separation axioms, connectedness and compactness.

UNIT – 3

Ordinary Differential Equations (ODEs): Existence and uniqueness of solutions of initial value problems for first order ordinary differential equations, singular solutions of first order ODEs, system of first order ODEs. General theory of homogeneous and non-homogeneous linear ODEs, variation of parameters, Sturm-Liouville boundary value problem, Green's function.

Partial Differential Equations (PDEs): Lagrange and Charpit methods for solving first order PDEs, Cauchy problem for first order PDEs. Classification of second order PDEs, General solution of higher order PDEs with constant coefficients, Method of separation of variables for Laplace, Heat and Wave equations.

Numerical Analysis : Numerical solutions of algebraic equations, Method of iteration and Newton-Raphson method, Rate of convergence, Solution of systems of linear algebraic equations using Gauss elimination and Gauss-Seidel methods, Finite differences, Lagrange, Hermite and spline interpolation, Numerical differentiation and integration, Numerical solutions of ODEs using Picard, Euler, modified Euler and Runge-Kutta methods.

Calculus of Variations: Variation of a functional, Euler-Lagrange equation, Necessary and sufficient conditions for extrema. Variational methods for boundary value problems in ordinary and partial differential equations.

Linear Integral Equations: Linear integral equation of the first and second kind of Fredholm and Volterra type, Solutions with separable kernels. Characteristic numbers and eigenfunctions, resolvent kernel.

Classical Mechanics: Generalized coordinates, Lagrange's equations, Hamilton's canonical equations, Hamilton's principle and principle of least action, Two-dimensional motion of rigid bodies, Euler's dynamical equations for the motion of a rigid body about an axis, theory of small oscillations.

UNIT – 4

Descriptive statistics, exploratory data analysis Sample space, discrete probability, independent events, Bayes theorem. Random variables and distribution functions (univariate and

multivariate); expectation and moments. Independent random variables, marginal and conditional distributions. Characteristic functions. Probability inequalities (Tchebyshef, Markov, Jensen). Modes of convergence, weak and strong laws of large numbers, Central Limit theorems (i.i.d. case). Markov chains with finite and countable state space, classification of states, limiting behaviour of n -step transition probabilities, stationary distribution, Poisson and birth-and-death processes. Standard discrete and continuous univariate distributions. sampling distributions, standard errors and asymptotic distributions, distribution of order statistics and range. Methods of estimation, properties of estimators, confidence intervals. Tests of hypotheses: most powerful and uniformly most powerful tests, likelihood ratio tests. Analysis of discrete data and chi-square test of goodness of fit. Large sample tests. Simple nonparametric tests for one and two sample problems, rank correlation and test for independence. Elementary Bayesian inference. Gauss-Markov models, estimability of parameters, best linear unbiased estimators, confidence intervals, tests for linear hypotheses. Analysis of variance and covariance. Fixed, random and mixed effects models. Simple and multiple linear regression. Elementary regression diagnostics. Logistic regression. Multivariate normal distribution, Wishart distribution and their properties. Distribution of quadratic forms. Inference for parameters, partial and multiple correlation coefficients and related tests. Data reduction techniques: Principle component analysis, Discriminant analysis, Cluster analysis, Canonical correlation. Simple random sampling, stratified sampling and systematic sampling. Probability proportional to size sampling. Ratio and regression methods. Completely randomized designs, randomized block designs and Latin-square designs. Connectedness and orthogonality of block designs, BIBD. 2K factorial experiments: confounding and construction. Hazard function and failure rates, censoring and life testing, series and parallel systems. Linear programming problem, simplex methods, duality. Elementary queuing and inventory models. Steady-state solutions of Markovian queuing models: M/M/1, M/M/1 with limited waiting space, M/M/C, M/M/C with limited waiting space, M/G/1. All students are expected to answer questions from Unit I. Students in mathematics are expected to answer additional question from Unit II and III. Students with in statistics are expected to answer additional question from Unit IV.

Reference books:

1. Linear Algebra and its applications, Gilbert Strang.
2. Real Analysis, Royden H.L., Fitzpatrick P. M
3. Introduction to Real analysis, Donald R. Sherbert Robert G. Bartle
4. Foundations of complex analysis, S. Ponnusamy
5. Topics in Algebra, I. N. Herstein
6. An Introduction to Ordinary Differential Equations, Earl A. Coddington



Speaker: Dr. Manoran De, Assistant Professor, Dept of Mathematics

Date: 26.08.2022

Speaker: Dr Manoranjan De, Assistant Professor, dept of mathematics

Topic : Syllabus of NBHM & TFIR and reference books

a. NBHM Syllabus in Mathematics

Section A: Algebra: Polynomial's, Abstract algebra, Binary operations, Sets theory, Matrix Theory, Rings and Fields, Groups Algebra.

Section B: Analysis Real Analysis: Sequence and limits, Series, Metric Spaces, Functional Analysis Maxima and minima Continues function Defining a function Differential function Complex Analysis Poles and Residues Polar coordinates.

Section C: Geometric : Algebraic geometry Cartesian coordinates Polar coordinates Plane algebraic curves Cubic curves Lines Circles 3d Shapes Ellipse Elliptical curves etc.

Reference books:

1. Linear Algebra and its applications, Gilbert Strang.
2. Real Analysis, Royden H.L., Fitzpatrick P. M
3. Introduction to Real analysis, Donald R. Sherbert Robert G. Bartle
4. Foundations of complex analysis, S. Ponnusamy
5. Topics in Algebra, I. N. Herstein
6. An Introduction to Ordinary Differential Equations, Earl A. Coddington

b. TIFR Syllabus in Mathematics

Algebra: Definitions and examples of groups (finite and infinite, commutative and non-commutative), cyclic groups, subgroups, homomorphisms, quotients. Group actions and Sylow theorems. Definitions and examples of rings and fields. Integers, polynomial rings and their basic properties. Basic facts about vector spaces, matrices, determinants, ranks of linear transformations, characteristic and minimal polynomials, symmetric matrices. Inner products, positive definiteness.

Analysis: Basic facts about real and complex numbers, convergence of sequences and series of real and complex numbers, continuity, differentiability and Riemann integration of real valued functions defined on an interval (finite or infinite), elementary functions (polynomial functions, rational functions, exponential and log, trigonometric functions), sequences and series of functions and their different types of convergence.

Geometry/Topology: Elementary geometric properties of common shapes and figures in 2 and 3 dimensional Euclidean spaces (e.g. triangles, circles, discs, spheres, etc.). Plane analytic geometry (= coordinate geometry) and trigonometry. Definition and basic properties of metric spaces, examples of subset Euclidean spaces (of any dimension), connectedness, compactness. Convergence in metric spaces, continuity of functions between metric spaces.

General: Pigeon-hole principle (box principle), induction, elementary properties of divisibility, elementary combinatorics (permutations and combinations, binomial coefficients), elementary reasoning with graphs, elementary probability theory.

Reference books :

1. Linear Algebra and its applications, Gilbert Strang.
2. Real Analysis, Royden H.L., Fitzpatrick P. M
3. Introduction to Real analysis, Donald R. Sherbert Robert G. Bartle
4. Foundations of complex analysis, S. Ponnusamy
5. Topics in Algebra, I. N. Herstein
6. An Introduction to Ordinary Differential Equations, Earl A. Coddington





List of Registrar students for Two Days Workshop on NET, GATE, NBHM& TFIR syllabus

S.N.	Student Name	UG/PG
1	Amiya Mandal	PG
2	Biren Pahari	PG
3	Biswajit Mondal	PG
4	Buddhadev Jana	PG
5	Debabrata Patra	PG
6	Debajyoti Maity	PG
7	Ditangshu Barman	PG
8	Goutam Jana	PG
9	Krishendu Pradhan	PG
10	Moumita Sardar	PG
11	Poushali Tripathy	PG
12	Pradyot Dalapati	PG
13	Priti Das Adhikari	PG
14	Puspendu Sau	PG
15	Raja Kumar Shee	PG
16	Saikat Jana	PG
17	Sachayan Laha	PG
18	Shrabani Jana	PG
19	Shyamal Bera	PG
20	Snehasish Bhowmik	PG
21	Snigdha Mandal	PG
22	Shreya Jana	PG
23	Subhadip Mandal	PG
24	Subhamay Das	PG
25	Subinoy Patra	PG
26	Suchismita Pradhan	PG
27	Sudeshna Maity	PG
28	Susmita Sahoo	PG
29	Tapasi Karan	PG
30	Sahib Bera	PG
31	Soumya Kanti Mandal	PG
32	Sayan Das	PG
33	Sumana Maity	PG
34	Bidisha Sasmal	UG

Registration

S.N.	Student Name	UG/PG
1	Somsankar Mandal	UG
2	Suman Das	UG
3	Amiyendra Maiti	UG
4	Soumyadeep Bej	UG
5	Jatindranath Samanta	UG
6	Sudipta Mondal	UG
7	Ranajit Mandal	UG
8	Atanu Maity	UG
9	Bachaspati Mondal	UG
10	Shubhajit Giri	UG
11	Surajit Maity	UG
12	Ayan Pradhan	UG
13	Rajkumar Karan	UG
14	Soumitra Das	UG
15	Bidisha Sasmal	UG
16	Sonali Mandal	UG
17	Sudeshna Maity	UG
18	Annesha Khatua	UG
19	Paramita Maity	UG
20	Megha Rani Sahoo	UG
21	Gaurangi Pal	UG
22	Subhadip Mahapatra	UG
23	Amit Patra	UG

Five Days Workshop for Problem & Year Wise Questions Paper Solved:

Duration: 2th January- 6th January, 2023

Mr. Goutam Kumar Mandal, Contractual Teacher in Mathematics(**Coordinator**)

Dr. Kalipada Maity, HOD, Associate Prof.(**Jt. Coordinator**)

Day-1:

Topic : Linear Algebra, Real Analysis,

Speaker: **Bikash panda, SACT, Dept of Mathematics**

Day-2 :

Topic : Linear Programming, Complex Analysis, Calculus

Speaker :Santu Hati, Contractual Teacher, Dept. of Mathematics

Day-3:

Topic: Algebra, Functional Analysis, Numerical Analysis, Topology

Speaker: Hironmay Manna, SACT, Dept. of Mathematics

Day-4:

Topic: ODEs, PDEs, Linear Integral Equation, Classical Mechanics

Speaker: Dr. Kalipada Maity, Associate Professor & HOD Dept. of Mathematics

Day-5:

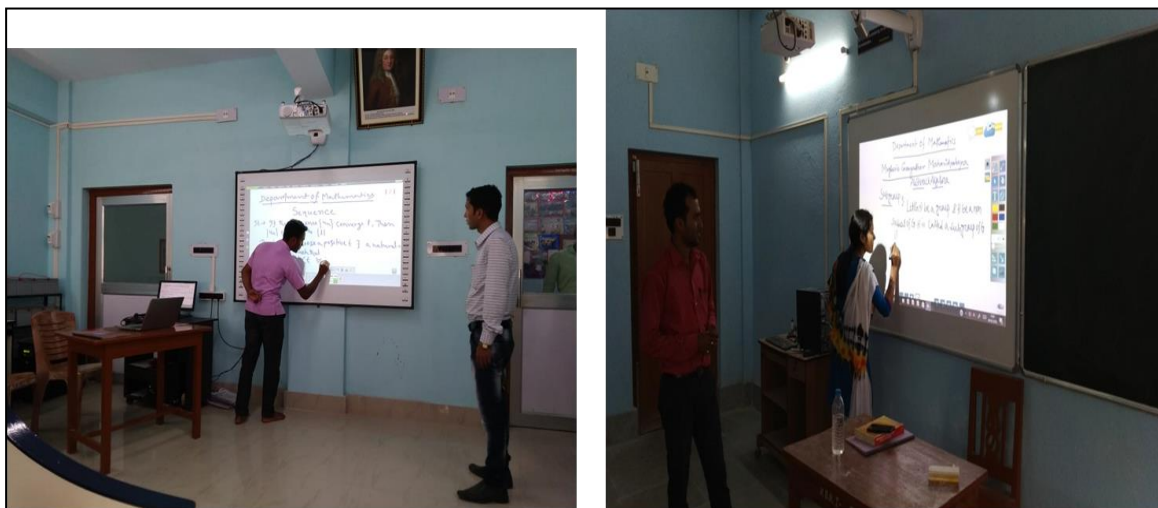
Topic: Vector Algebra, Calculus of variation, Probability & statistics

Speaker: Dr. Manoranjon De, Assistant Professor, Dept. of Mathematics

Date: 02.01.2023

In the welcome address Dr. Kalipada Maity, Coordinator, Associate Professor, HOD, NAAC Coordinator, of Mathematics Department had briefly discussed about the relevance of organizing ‘**Year wise questions paper solve**’ in the transition period to move towards the digital milieu along with the uncertainties owing to the covid situation.

Mr. Bikash Panda, SACT, Department of Mathematics discussed about the job opportunities of the present course and allied scopes of the same. He advised participants to utilize their time in routine as well as rigorous practices of job-related study with peers and making a group of the common minded peers for evaluating their performance to keep themselves upgraded.





Date: 03.01.2023

In the welcome address Dr. Kalipada Maity, Coordinator, Associate Professor, HOD, NAAC Coordinator, of Mathematics Department had briefly discussed about the relevance of organizing **‘Year wise questions paper solve’** in the transition period to move towards the digital milieu along with the uncertainties owing to the covid situation.

Mr. Santu Hati, Teacher, Department of Mathematics discussed about the job opportunities of the present course and allied scopes of the same. He advised participants to utilize their time in routine as well as rigorous practices of job-related study with peers and making a group of the common minded peers for evaluating their performance to keep themselves upgraded.



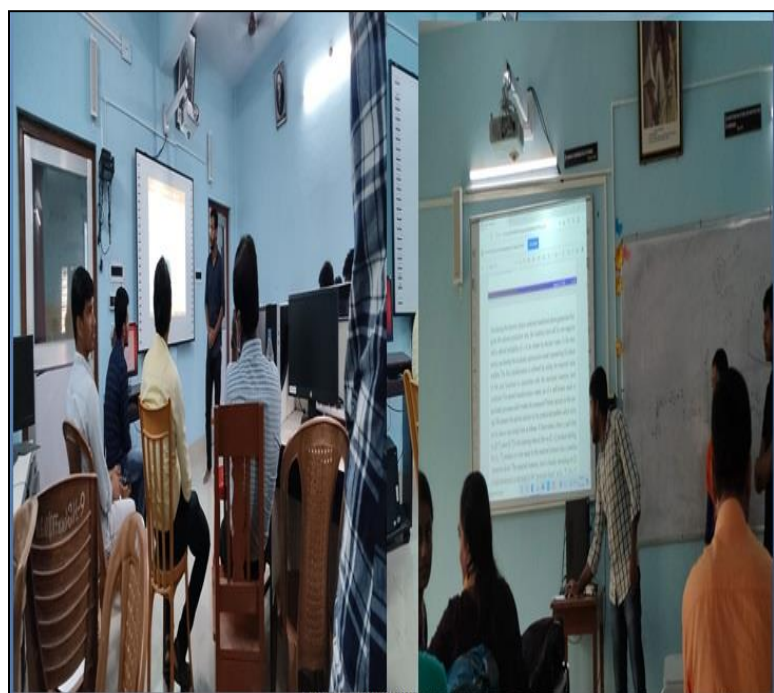
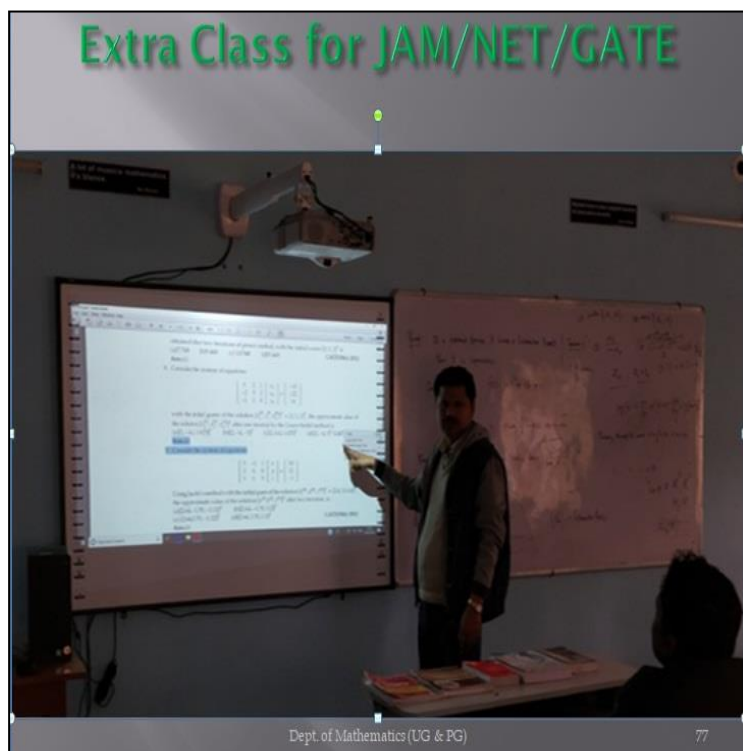
In the welcome address Dr. Kalipada Maity, Coordinator, Associate Professor, HOD, NAAC Coordinator, of Mathematics Department had briefly discussed about the relevance of organizing **‘Year wise questions paper solve’** in the transition period to move towards the digital milieu along with the uncertainties owing to the covid situation.

Mr. Hiranmoy Mannna, SACT, Department of Mathematics discussed about the job opportunities of the present course and allied scopes of the same. He advised participants to utilize their time in routine as well as rigorous practices of job-related study with peers and making a group of the common minded peers for evaluating their performance to keep themselves upgraded.



Date: 05.01.2023

Dr. Kalipada Maity, joint Coordinator, Associate Professor, HOD, NAAC Coordinator, Mathematics Department give a ppt presentation in Partial Differential Equation field. All in all, the day's program was a grand success.



Dr. Manoranjan De, Assistant Professor, Mathematics Department give a ppt presentation in Vector calculus, probality and statistics field. All in all, the day's program was a grand success.

Registration

S.N.	Student Name	UG/PG
1	MeghaSantra	UG
2	BithiMaikap	UG
3	Subhajit Jana	UG
4	Sourav Das	UG
5	Indrani Das	UG
6	Anwesha Samanta	UG
7	Nandita Jana	UG
8	SaswatiGiri	UG
9	PabitraMondal	UG
10	ParthaPratimMaity	UG
11	Manoj Maity	UG
12	Ranjit Pradhan	UG
13	Samik Das	UG
14	SantuBera	UG
15	Subhadip Jana	UG
16	BithiMaikap	UG
17	Subhajit Jana	UG
18	Sourav Das	UG
19	Indrani Das	UG
20	SantuBera	UG
21	Subhadip Jana	UG
22	SouravTripathy	UG
23	SuryadipBarik	UG



MUGBERIA GANGADHAR MAHAVIDYALAYA

P.O.—BHUPATINAGAR, Dist.—PURBA MEDINIPUR, PIN.—721425, WEST BENGAL, INDIA

NAAC Re-Accredited B+Level Govt. aided College

CPE (Under UGC XII Plan) & NCTE Approved Institutions

DBT Star College Scheme Award Recipient

E-mail : mugberia_college@rediffmail.com // www.mugberiangangadharmahavidyalaya.ac.in

Date: 17/10/2021

NOTICE

This is to hereby notify all the students that the Dept. of Mathematics, Mugberia Gangadhar Mahavidyalaya is going to organize a **Five Days Workshop on Joint Admission Test for Master (JAM)** which will be held on & from 08th -12th November, 2021 under DBT STAR COLLEGE Strengthening Scheme (Govt. of India) using Google meet platform. All the students and researchers are requested to be present in the said workshop.

Swapan 17.10.21

Dr. Swapan Kumar Misra

Principal

Mugberia Gangadhar Mahavidyalaya

Principal

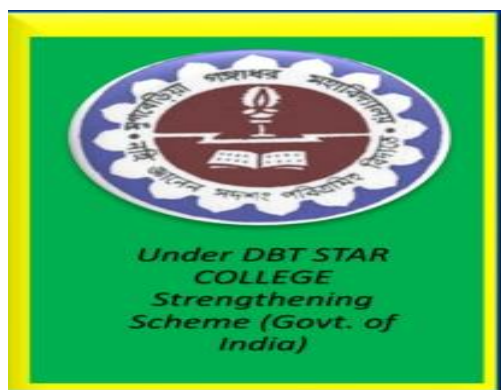
Mugberia Gangadhar Mahavidyalaya



Report Of

Course period: 08th -12th November, 2021

Five Days Workshop for Joint Admission Test for Masters (JAM)



Organized
by

Department of Mathematics(UG & PG)

(Under DBT STAR College strengthening Scheme (Govt. of India))

Mugberia Gangadhar Mahavidyalaya

Bhupatinagar, Purba Medinipur- 721425

ACCREDITED BY NAAC WITH GRADE **B⁺**

Affiliated to

Vidyasagar University

Department of Mathematics

Mugberia Gangadhar Mahavidyalaya

Dated: 18/10/2021

Minutes of the Departmental meeting held on 18.10.2021

Members present:

- (1) Dr. Kalipada Maity, HOD, Associate Prof. (Coordinator)
- (2) Dr. Manoranjan De, Assistant Prof.
- (3) Mr. Suman Giri, Sact.
- (4) Mr. Debraj Manna, Sact.
- (5) Mr. Bikash Panda, Sact.
- (6) Mr. Hiranmoy Manna, Sact.
- (7) Mr. SantuHati, Contractual teacher. (Joint Coordinator)
- (8) Mr. Goutam Mandal, Contractual teacher

A short meeting was arranged at 3:15 pm regarding the workshop for joint admission test for masters (JAM) in our Department. All teachers of the department joined the meeting in time. Dr. KalipadaMaity(HOD) chaired the meeting.

Decisions taken in the meeting are:

- (1) It is decided that Mr. Santu Hati will be the joint coordinator of this program and Dr.KalipadaMaity (HOD) will be program coordinator and rest teachers of the department will be the recourse persons of the program. .
- (2) The course period will be scheduled from 08 November 2021 to 12 November, 2021
- (3) The participation students will be UG-5th Sem,and UG-3rd sem.

(3) Course Syllabus

Real Analysis:

Sequences and Series of Real Numbers: convergence of sequences, bounded and monotone sequences, Cauchy sequences, Bolzano-Weierstrass theorem, absolute convergence, tests of convergence for series – comparison test, ratio test, root test; Power series (of one real variable), radius and interval of convergence, term-wise differentiation and integration of power series.

Functions of One Real Variable: limit, continuity, intermediate value property, differentiation, Rolle's Theorem, mean value theorem, L'Hospital rule, Taylor's theorem, Taylor's series, maxima and minima, Riemann integration (definite integrals and their properties), fundamental theorem of calculus.

Multivariable Calculus and Differential Equations:

Functions of Two or Three Real Variables: limit, continuity, partial derivatives, total derivative, maxima and minima.

Integral Calculus: double and triple integrals, change of order of integration, calculating surface areas and volumes using double integrals, calculating volumes using triple integrals.

Differential Equations: Bernoulli's equation, exact differential equations, integrating factors, orthogonal trajectories, homogeneous differential equations, method of separation of variables, linear differential equations of second order with constant coefficients, method of variation of parameters, Cauchy-Euler equation.

Linear Algebra and Algebra:

Matrices: systems of linear equations, rank, nullity, rank-nullity theorem, inverse, determinant, eigenvalues, eigenvectors.

Finite Dimensional Vector Spaces: linear independence of vectors, basis, dimension, linear transformations, matrix representation, range space, null space, rank-nullity theorem.

Groups: cyclic groups, abelian groups, non-abelian groups, permutation groups, normal subgroups, quotient groups, Lagrange's theorem for finite groups, group homomorphisms.

It is decided that the course will be delivered by lecture, interaction and presentation by ppt. Available seat to register the program is 50. There is no course access fee for the student. Last date of registration for this program is 7th November 2021. HOD will forward the matter for approval of this program from Academic Sub-committee. Teachers are requested to prepare a routine for smooth running of course.

The meeting comes to end with a vote of thanks.

Five Days Workshop for J

Admission Test for Masters

Organized by

Department of Mathematics (UG & PG)
Mugberia Gangadhar Mahavidyalaya
Date: 8th November to 12th November 2021
Pythagoras Hall, Room No: 237



Under DBT STAR
COLLEGE
Strengthening

Day-1

1. Dr. Swapan Kumar Misra, Principal Mugberia Gangadhar Mahavidyalaya (2.15 P.M– 2.30 P.M)
2. Dr. Kalipada Maity, Associate Professor, HOD (UG & PG), Department of Mathematics, Mugberia Gangadhar Mahavidyalaya.(2.30 P.M-3.00 P.M)
3. Mr. Bikash Panda SACT Department of Mathematics (3.00-4.00P.M)

Monday
08/11/2021

Day-2

4. Dr. Bidhan Chandra Samanta, DBT Coordinator & Associate Prof. & HOD, Department of Chemistry (2.15 P.M- 2.30 P.M).
5. Dr Manoranjan De, Assistant Professor, Department of Mathematics (2.30 P.M- 3.30 P.M)
6. Mr. Suman Giri, SACT, Department of Mathematics. (3.30 P.M- 4.30 P.M)

Tuesday
09/11/2021

Day-3

4. Dr Prasenjit Ghosh, IQAC Coordinator & Associate Prof. & HOD, Department of History (2.15 P.M- 2.30 P.M)
5. Dr Kalipada Maity, Associate Professor, HOD (UG & PG), Department of Mathematics, Mugberia Gangadhar Mahavidyalaya (2.30 P.M – 3.30 P.M)
6. Mr.Debraj Manna, SACT, Department of Mathematics. (3.30 P.M- 4.30 P.M)

Wednesday
10/11/2021

Day-4

4. Dr Kalipada Maity, Associate Professor, HOD (UG & PG), Department of Mathematics, (2.15 P.M – 2.30 P.M)
5. Mr. Goutam kumar Mondal, Contractual Teacher , Department of Mathematics (2.30 P.M – 3.30 P.M)
6. Mr. Hironmoy Manna SACT, Department of Mathematics (3.30 P.M- 4.30 P.M)

Thursday
11/11/2021

Day 5: Examination (2.15 p.m- 4.15 p.m) Santu Hati Contractual Teacher

Friday
12/11/2021

Department of Mathematics
Mugberia Gangadhar Mahavidyalaya

Date: 29.08.2022

Registration

Sl.No.	Students Name	UG
1	Annesha Khatua	III Sem
2	Atanu Maity	III Sem
3	Ayan Pradhan	III Sem
4	Amiyendra Maiti	III Sem
5	Amit Patra	III Sem
6	Bachaspati Mondal	III Sem
7	Bidisha Sasmal	III Sem
8	Gourangi pal	III Sem
9	Jatindranath Samanta	III Sem
10	Megha Rani Sahoo	III Sem
11	Paramita Maity	III Sem
12	Rajkumar Karan	III Sem
13	Ranajit Mandal	III Sem
14	Subhajit Giri	III Sem
15	Sonali Mandal	III Sem
16	Soumitra Das	III Sem
17	Soumyadeep Bej	III Sem
18	Subhadip Mahapatra	III Sem
19	Surajit Maity	III Sem
20	Sudeshna Maity	III Sem
21	Sudipta Mondal	III Sem
22	Suman Das	III Sem

Registration

Sl.No.	Students Name	UG
23	Megha Santra	V Sem
24	Subhajit Jana	V Sem
25	Saswati Giri	V Sem
26	Anwesha Samanta	V Sem
27	Bithi Maikap	V Sem
28	Sourav Das	V Sem
29	Pabitra Mondal	V Sem
30	Nandita Jana	V Sem
31	Ranjit Pradhan	V Sem
32	Indrani Das	V Sem
33	Sabyasachi Maji	V Sem

34	Puspendu Maity	V Sem
35	Partha Pratim Maity	V Sem
36	Sourav Tripathi	V Sem
37	Subhadip Jana	V Sem
38	Dipak Paria	V Sem
39	Santu Bera	V Sem
40	Srijan Das	V Sem
41	Suryadip Barik	V Sem
42	Pradip Maity	V Sem
43	Monoj Maity	V Sem
44	Samik Das	V Sem
45	Debraj Mandal	V Sem

Department of Mathematics Mugberia Gangadhar Mahavidyalaya

The entire world is going through the grim situation owing to the COVID-19 pandemic and its new variant 'Delta' as well as 'Omicron'. In the present situation people are passing days with lots of uncertainties like threat to be infected, economic recession owing to the long period of lock down, irregularities and disruption of children's education, domestic intolerance due to no or irregular earning and old parent's physical instability as well as employment uncertainties of the educated youth. Not only these, the modern highly complicated way of life has led people in front of perpetual competition and new challenges.

In the light of this, a committee was formed under the mentorship of the Principal, Mugberia Gangadhar Mahavidyalaya, Dr. Swapan Kumar Mishra and Dr. Kalipada Maity, Asso. Prof. and hod of Department of Mathematics as Convener to conduct the program in a systematic manner. The five days "**Joint admission test for masters (JAM)**" was completed successfully under the proper guidance of Hon'ble Principal Sir Dr Swapan Kumar Mishra and Hon'ble Dr. Kalipada Maity sir (Associate Professor, HOD, NAAC Coordinator), through face-to-face program as held from, 08th -12th November, 2021 with 45 participants.

In the welcome address Dr. Kalipada Maity, Coordinator, Associate Professor, HOD, NAAC Coordinator, of Mathematics Department had briefly discussed about the relevance of organizing '**Joint admission test for masters (JAM)**' in the transition period to move towards the digital milieu along with the uncertainties owing to the covid situation. Learners should do self-analysis to find out their strengths as well as weaknesses. After complete graduation degree students have opportunity to take admission in IIT/ NIT for M.Sc in Mathematics by passing JAM examination.

Dr. Bidhan Chandra Samanta, Associate Professor, DBT Coordinator, HOD of Chemistry Department, the first speaker of the technical session of the program had discussed about the

scopes and opportunities of higher studies. He ended his speech with lots of blessings and good wishes for the participants in their future life.

In the welcome address Dr. Manoranjan De, Assistant Professor, Dept of Mathematics discussed in details about different opportunities after completion of the present course along with multiple options to switch over from the present domain of discipline to some other. Most of the participants of camp were the Mathematics Learners, hence, Dr. Manoranjan De explained briefly about the necessity of earning ‘Continuing Rehabilitation Education (CRE)’ points for teacher trainees in different field of Mathematics for the persons with disabilities.

Dr. Prasenjit Ghosh, Associate Professor, IQAC Coordinator, Department of History discussed about the job opportunities of the present course and allied scopes of the same. He also advised participants to utilize their time in routine as well as rigorous practices of JAM study with peers and making a group of the common minded peers for evaluating their performance to keep themselves upgraded. And he said keep the target always high then you will get success one day.

Dr. Kalipada Maity, Coordinator, Associate Professor, HOD, NAAC Coordinator, Mathematics Department give a ppt presentation in Differential Equation field. All in all, the day’s program was a grand success.

Dr., Manoranjan De, Assistant Professor, Dept of Mathematics give a ppt presentation in Function of real variables field. All in all, the day’s program was a grand success

Mr Suman Kumar Giri, Sact, Mathematics Department give a ppt presentation in Linear algebra area. All in all, the day’s program was a grand success.

Mr Debraj Manna, Sact, Mathematics Department give a ppt presentation in Abstract algebra area. All in all, the day’s program was a grand success.

Mr Bikash Panda, Sact, Mathematics Department give a ppt presentation in Real Analysis area. All in all, the day’s program was a grand success.

Mr Hironmoyee Manna, Sact, Mathematics Department give a ppt presentation in Integral Calculus area. All in all, the day’s program was a grand success.

Mr Goutam Kumar Mondal, Contractual Teacher, Mathematics Department give a ppt presentation in Real Analysis area. All in all, the day’s program was a grand success.

Last day of the speech of the last speaker, there was an interactive session with the participants conducted by Mr. Santu Hati, Joint Coordinator, Contractual Teacher, Lots of relevant questions were raised by the participants like further opportunities after completion M.Sc and the linked courses for further study etc. All pertinent queries of the participants were resolved by the resource persons with their insights and erudite reply. Last day Mr. Santu Hati take a examination on the JAM related syllabus. At the end of the program the vote of thanks was proposed by Dr. Kalipada Maity, Coordinator, Associate Professor, HOD, NAAC Coordinator, Department of Mathematics.





MUGBERIA GANGADHAR MAHAVIDYALAYA

P.O.—BHUPATINAGAR, Dist.—PURBA MEDINIPUR, PIN.—721425, WEST BENGAL, INDIA

NAAC Re-Accredited B+Level Govt. aided College

CPE (Under UGC XII Plan) & NCTE Approved Institutions

DBT Star College Scheme Award Recipient

E-mail : mugberia_college@rediffmail.com // www.mugberiangangadharmahavidyalaya.ac.in

Date: 18.12.2020

NOTICE

This is to hereby notify all the students that the Dept. of Mathematics, Mugberia Gangadhar Mahavidyalaya is going to organize a “The Five Days Workshop on NET, GATE, NBHM & TFIR syllabus” which will be held on & from 4th January to 8th January, 2021 . All the students and researchers are requested to be present in the said workshop.

18.12.2020

Dr. Swapan Kumar Misra

Principal
Mugberia Gangadhar Mahavidyalaya

Principal
Mugberia Gangadhar Mahavidyalaya





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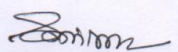
DBT Star College Scheme Award Recipient

E-mail : mugberia_college@rediffmail.com // www.mugberiangangadharmahavidyalaya.ac.in

Dated: 12/08/2021

NOTICE

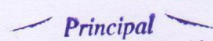
This is to hereby notify all the students that the Dept. of Mathematics, Mugberia Gangadhar Mahavidyalaya is going to organize a “The Two Days Workshop on NET, GATE, NBHM & TFIR syllabus” which will be held on & from 25th August, 2021 to 26th August 2021. All the students and researchers are requested to be present in the said workshop.

 12.08.2021

Dr. Swapan Kumar Misra

Principal

Mugberia Gangadhar Mahavidyalaya


Principal
Mugberia Gangadhar Mahavidyalaya



**Report on two Workshops on NET, GATE, NBHM & TFIR syllabus” held on
& from 4th January to 8th January, 2021 & held on & from 25th August, 2021 to
26th August 2021**



Organized
by

Department of Mathematics (UG & PG)
Mugberia Gangadhar Mahavidyalaya

Bhupatinagar, Purba Medinipur- 721425

ACCREDITED BY NAAC WITH GRADE **B⁺**

Affiliated to

Vidyasagar University

Department of Mathematics
Mugberia Gangadhar Mahavidyalaya

NOTICE

Dated: 18/08/2021

Minutes of the Departmental meeting held on 18.08.2021

Members present:

- (1) Dr. Kalipada Maity, HOD, Associate Prof.
- (2) Dr. Manoranjan De, Assistant Prof.
- (3) Mr. Suman Giri, Sact.
- (4) Mr. Debraj Manna, Sact.
- (5) Mr. Bikash Panda, Sact. (Jt. Co-ordinator)
- (6) Mr. Hiranmoy Manna, Sact.

(7) Mr. Goutam Mandal, Contractual teacher (**Coordinator**)

(8) Mr. SantuHati, Contractual teacher.

A short meeting was arranged at 3:15 pm regarding the Two Days Workshop on NET, GATE, NBHM& TFIR syllabus in our Department. All teachers of the department joined the meeting in time. Dr. KalipadaMaity(HOD) chaired the meeting.

Decisions taken in the meeting are:

(1) It is decided that Mr. Goutam Mandal will be the coordinator of this program and Mr. Bikash Ponda will be program jt. Co-ordinator and rest teachers of the department will be the recourse persons of the program. .

(2) The course period will be scheduled from 25 August, 2021 to 26 August 2021

(3) The participation students will be UG-5th Sem, and PG-1st & 3rd sem.

(3) Course content for the said program is scheduled as

(i) Help to choose the right career Help to provide expert resources

(ii) Help to gain confidence and insight Help to change unwanted behaviour pattern

(iii) Help to reduce career related frustrations

(iv) Help to provide a role model Help to bring stability in thought process

It is decided that the course will be delivered by lecture, interaction and ppt presentation. Available seat to register the program is 100. There is no course access fee for the student. Last date of registration for this program is 23th August 2021. HoD will forward the matter for approval of this program from Academic Sub-committee. Teachers are requested to prepare a routine for smooth running of course.

The meeting comes to end with a vote of thanks.

Two Days Workshop on NET, GATE, NBHM& TFIR syllabus

Date: 25.08.2021

Mr. Goutam Kumar Mandal, Contractual Teacher in Mathematics(Coordinator)

Dr. Kalipada Maity, HOD, Associate Prof.(Jt. Coordinator)

Speaker : Dr. Kalipada Maity, Associate Professor & HOD, dept of Mathematics.

Topic : **Syllabus of GATE, CSIR NET and reference books**

a. GATE syllabus in Mathematics

Calculus: Functions of two or more variables, continuity, directional derivatives, partial derivatives, total derivative, maxima and minima, saddle point, method of Lagrange's multipliers; Double and Triple integrals and their applications to area, volume and surface area; Vector Calculus: gradient, divergence and curl, Line integrals and Surface integrals, Green's theorem, Stokes' theorem, and Gauss divergence theorem.

Linear Algebra: Finite dimensional vector spaces over real or complex fields; Linear transformations and their matrix representations, rank and nullity; systems of linear equations, characteristic polynomial, eigenvalues and eigenvectors, diagonalization, minimal polynomial, Cayley-Hamilton Theorem, Finite dimensional inner product spaces, Gram-Schmidt orthonormalization process, symmetric, skew-symmetric, Hermitian, skew-Hermitian, normal, orthogonal and unitary matrices; diagonalization by a unitary matrix, Jordan canonical form; bilinear and quadratic forms.

Real Analysis: Metric spaces, connectedness, compactness, completeness; Sequences and series of functions, uniform convergence, Ascoli-Arzelà theorem; Weierstrass approximation theorem; contraction mapping principle, Power series; Differentiation of functions of several variables, Inverse and Implicit function theorems; Lebesgue measure on the real line, measurable functions; Lebesgue integral, Fatou's lemma, monotone convergence theorem, dominated convergence theorem.

Complex Analysis: Functions of a complex variable: continuity, differentiability, analytic functions, harmonic functions; Complex integration: Cauchy's integral theorem and formula; Liouville's theorem, maximum modulus principle, Morera's theorem; zeros and singularities; Power series, radius of convergence, Taylor's series and Laurent's series; Residue theorem and applications for evaluating real integrals; Rouché's theorem, Argument principle, Schwarz lemma; Conformal mappings, Möbius transformations.

Ordinary Differential Equations: First order ordinary differential equations, existence and uniqueness theorems for initial value problems, linear ordinary differential equations of higher order with constant coefficients; Second order linear ordinary differential equations with variable coefficients; Cauchy-Euler equation, method of Laplace transforms for solving ordinary differential equations, series solutions (power series, Frobenius method); Legendre and Bessel

functions and their orthogonal properties; Systems of linear first order ordinary differential equations, Sturm's oscillation and separation theorems, Sturm-Liouville eigenvalue problems, Planar autonomous systems of ordinary differential equations: Stability of stationary points for linear systems with constant coefficients, Linearized stability, Lyapunov functions.

Algebra: Groups, subgroups, normal subgroups, quotient groups, homomorphisms, automorphisms; cyclic groups, permutation groups, Group action, Sylow's theorems and their applications; Rings, ideals, prime and maximal ideals, quotient rings, unique factorization domains, Principal ideal domains, Euclidean domains, polynomial rings, Eisenstein's irreducibility criterion; Fields, finite fields, field extensions, algebraic extensions, algebraically closed fields.

Functional Analysis: Normed linear spaces, Banach spaces, Hahn-Banach theorem, open mapping and closed graph theorems, principle of uniform boundedness; Inner-product spaces, Hilbert spaces, orthonormal bases, projection theorem, Riesz representation theorem, spectral theorem for compact self-adjoint operators.

Numerical Analysis: Systems of linear equations: Direct methods (Gaussian elimination, LU decomposition, Cholesky factorization), Iterative methods (Gauss-Seidel and Jacobi) and their convergence for diagonally dominant coefficient matrices; Numerical solutions of nonlinear equations: bisection method, secant method, Newton-Raphson method, fixed point iteration; Interpolation: Lagrange and Newton forms of interpolating polynomial, Error in polynomial interpolation of a function; Numerical differentiation and error, Numerical integration: Trapezoidal and Simpson rules, Newton-Cotes integration formulas, composite rules, mathematical errors involved in numerical integration formulae; Numerical solution of initial value problems for ordinary differential equations: Methods of Euler, Runge-Kutta method of order 2.

Partial Differential Equations: Method of characteristics for first order linear and quasilinear partial differential equations; Second order partial differential equations in two independent variables: classification and canonical forms, method of separation of variables for Laplace equation in Cartesian and polar coordinates, heat and wave equations in one space variable; Wave equation: Cauchy problem and d'Alembert formula, domains of dependence and influence, nonhomogeneous wave equation; Heat equation: Cauchy problem; Laplace and Fourier transform methods.

Topology: Basic concepts of topology, bases, subbases, subspace topology, order topology, product topology, quotient topology, metric topology, connectedness, compactness, countability and separation axioms, Urysohn's Lemma.

Linear Programming: Linear programming models, convex sets, extreme points; Basic feasible solution, graphical method, simplex method, two phase methods, revised simplex method ; Infeasible and unbounded linear programming models, alternate optima; Duality theory, weak duality and strong duality; Balanced and unbalanced transportation problems, Initial basic feasible solution of balanced transportation problems (least cost method, north-west corner rule,

Vogel's approximation method); Optimal solution, modified distribution method; Solving assignment problems, Hungarian method.

Reference Books:

7. Linear Algebra and its applications, Gilbert Strang.
8. Real Analysis, Royden H.L., Fitzpatrick P. M
9. Introduction to Real analysis, Donald R. Sherbert Robert G. Bartle
10. Foundations of complex analysis, S. Ponnusamy
11. Topics in Algebra, I. N. Herstein
12. An Introduction to Ordinary Differential Equations, Earl A. Coddington

b. CSIR-NET Syllabus in Mathematics

CSIR-UGC National Eligibility Test (NET) for Junior Research Fellowship and Lecturer-ship COMMON SYLLABUS FOR PART 'B' AND 'C' MATHEMATICAL SCIENCES

UNIT – 1

Analysis: Elementary set theory, finite, countable and uncountable sets, Real number system as a complete ordered field, Archimedean property, supremum, infimum. Sequences and series, convergence, limsup, liminf. Bolzano Weierstrass theorem, Heine Borel theorem. Continuity, uniform continuity, differentiability, mean value theorem. Sequences and series of functions, uniform convergence. Riemann sums and Riemann integral, Improper Integrals. Monotonic functions, types of discontinuity, functions of bounded variation, Lebesgue measure, Lebesgue integral. Functions of several variables, directional derivative, partial derivative, derivative as a linear transformation, inverse and implicit function theorems. Metric spaces, compactness, connectedness. Normed linear Spaces. Spaces of continuous functions as examples.

Linear Algebra: Vector spaces, subspaces, linear dependence, basis, dimension, algebra of linear transformations. Algebra of matrices, rank and determinant of matrices, linear equations. Eigenvalues and eigenvectors, Cayley-Hamilton theorem. Matrix representation of linear transformations. Change of basis, canonical forms, diagonal forms, triangular forms, Jordan forms. Inner product spaces, orthonormal basis. Quadratic forms, reduction and classification of quadratic forms

UNIT – 2

Complex Analysis: Algebra of complex numbers, the complex plane, polynomials, power series, transcendental functions such as exponential, trigonometric and hyperbolic functions. Analytic

functions, Cauchy-Riemann equations. Contour integral, Cauchy's theorem, Cauchy's integral formula, Liouville's theorem, Maximum modulus principle, Schwarz lemma, Open mapping theorem. Taylor series, Laurent series, calculus of residues. Conformal mappings, Mobius transformations.

Algebra: Permutations, combinations, pigeon-hole principle, inclusion-exclusion principle, derangements. Fundamental theorem of arithmetic, divisibility in \mathbb{Z} , congruences, Chinese Remainder Theorem, Euler's ϕ -function, primitive roots. Groups, subgroups, normal subgroups, quotient groups, homomorphisms, cyclic groups, permutation groups, Cayley's theorem, class equations, Sylow theorems. Rings, ideals, prime and maximal ideals, quotient rings, unique factorization domain, principal ideal domain, Euclidean domain. Polynomial rings and irreducibility criteria. Fields, finite fields, field extensions, Galois Theory. Topology: basis, dense sets, subspace and product topology, separation axioms, connectedness and compactness.

UNIT – 3

Ordinary Differential Equations (ODEs): Existence and uniqueness of solutions of initial value problems for first order ordinary differential equations, singular solutions of first order ODEs, system of first order ODEs. General theory of homogeneous and non-homogeneous linear ODEs, variation of parameters, Sturm-Liouville boundary value problem, Green's function.

Partial Differential Equations (PDEs): Lagrange and Charpit methods for solving first order PDEs, Cauchy problem for first order PDEs. Classification of second order PDEs, General solution of higher order PDEs with constant coefficients, Method of separation of variables for Laplace, Heat and Wave equations.

Numerical Analysis : Numerical solutions of algebraic equations, Method of iteration and Newton-Raphson method, Rate of convergence, Solution of systems of linear algebraic equations using Gauss elimination and Gauss-Seidel methods, Finite differences, Lagrange, Hermite and spline interpolation, Numerical differentiation and integration, Numerical solutions of ODEs using Picard, Euler, modified Euler and Runge-Kutta methods.

Calculus of Variations: Variation of a functional, Euler-Lagrange equation, Necessary and sufficient conditions for extrema. Variational methods for boundary value problems in ordinary and partial differential equations.

Linear Integral Equations: Linear integral equation of the first and second kind of Fredholm and Volterra type, Solutions with separable kernels. Characteristic numbers and eigenfunctions, resolvent kernel.

Classical Mechanics: Generalized coordinates, Lagrange's equations, Hamilton's canonical equations, Hamilton's principle and principle of least action, Two-dimensional motion of rigid bodies, Euler's dynamical equations for the motion of a rigid body about an axis, theory of small oscillations.

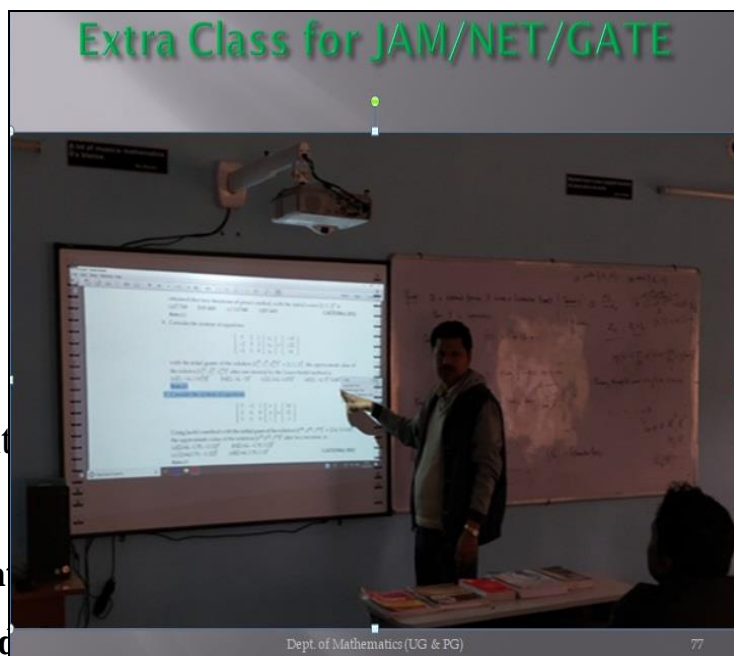
UNIT – 4

Descriptive statistics, exploratory data analysis Sample space, discrete probability, independent events, Bayes theorem. Random variables and distribution functions (univariate and

multivariate); expectation and moments. Independent random variables, marginal and conditional distributions. Characteristic functions. Probability inequalities (Tchebyshef, Markov, Jensen). Modes of convergence, weak and strong laws of large numbers, Central Limit theorems (i.i.d. case). Markov chains with finite and countable state space, classification of states, limiting behaviour of n -step transition probabilities, stationary distribution, Poisson and birth-and-death processes. Standard discrete and continuous univariate distributions. sampling distributions, standard errors and asymptotic distributions, distribution of order statistics and range. Methods of estimation, properties of estimators, confidence intervals. Tests of hypotheses: most powerful and uniformly most powerful tests, likelihood ratio tests. Analysis of discrete data and chi-square test of goodness of fit. Large sample tests. Simple nonparametric tests for one and two sample problems, rank correlation and test for independence. Elementary Bayesian inference. Gauss-Markov models, estimability of parameters, best linear unbiased estimators, confidence intervals, tests for linear hypotheses. Analysis of variance and covariance. Fixed, random and mixed effects models. Simple and multiple linear regression. Elementary regression diagnostics. Logistic regression. Multivariate normal distribution, Wishart distribution and their properties. Distribution of quadratic forms. Inference for parameters, partial and multiple correlation coefficients and related tests. Data reduction techniques: Principle component analysis, Discriminant analysis, Cluster analysis, Canonical correlation. Simple random sampling, stratified sampling and systematic sampling. Probability proportional to size sampling. Ratio and regression methods. Completely randomized designs, randomized block designs and Latin-square designs. Connectedness and orthogonality of block designs, BIBD. 2K factorial experiments: confounding and construction. Hazard function and failure rates, censoring and life testing, series and parallel systems. Linear programming problem, simplex methods, duality. Elementary queuing and inventory models. Steady-state solutions of Markovian queuing models: M/M/1, M/M/1 with limited waiting space, M/M/C, M/M/C with limited waiting space, M/G/1. All students are expected to answer questions from Unit I. Students in mathematics are expected to answer additional question from Unit II and III. Students with in statistics are expected to answer additional question from Unit IV.

Reference books:

7. Linear Algebra and its applications, Gilbert Strang.
8. Real Analysis, Royden H.L., Fitzpatrick P. M
9. Introduction to Real analysis, Donald R. Sherbert Robert G. Bartle
10. Foundations of complex analysis, S. Ponnusamy
11. Topics in Algebra, I. N. Herstein
12. An Introduction to Ordinary Differential Equations, Earl A. Coddington



c. NBHM Syllabus in Mathematics

Section A: Algebra: Polynomial's, Abstract algebra, Binary operations, Sets theory, Matrix Theory, Rings and Fields, Groups Algebra.

Section B: Analysis Real Analysis: Sequence and limits, Series, Matric Spaces, Functional Analysis Maxima and minima Continues functionDefining a function Differential function Complex Analysis Poles and Residues Polar coordinates.

Section C: Geometric : Algebraic geometry Cartesian coordinates Polar coordinates Plane algebraic curves Cubic curves Lines Circles 3d Shapes Ellipse Elliptical curves etc.

Reference books:

7. Linear Algebra and its applications, Gilbert Strang.
8. Real Analysis, Royden H.L., Fitzpatrick P. M
9. Introduction to Real analysis, Donald R. Sherbert Robert G. Bartle
10. Foundations of complex analysis, S. Ponnusamy
11. Topics in Algebra, I. N. Herstein
12. An Introduction to Ordinary Differential Equations, Earl A. Coddington

d. TIFR Syllabus in Mathematics

Algebra: Definitions and examples of groups (finite and infinite, commutative and non-commutative), cyclic groups, subgroups, homomorphisms, quotients. Group actions and Sylow theorems. Definitions and examples of rings and fields. Integers, polynomial rings and their basic properties. Basic facts about vector spaces, matrices, determinants, ranks

of linear transformations, characteristic and minimal polynomials, symmetric matrices. Inner products, positive definiteness.

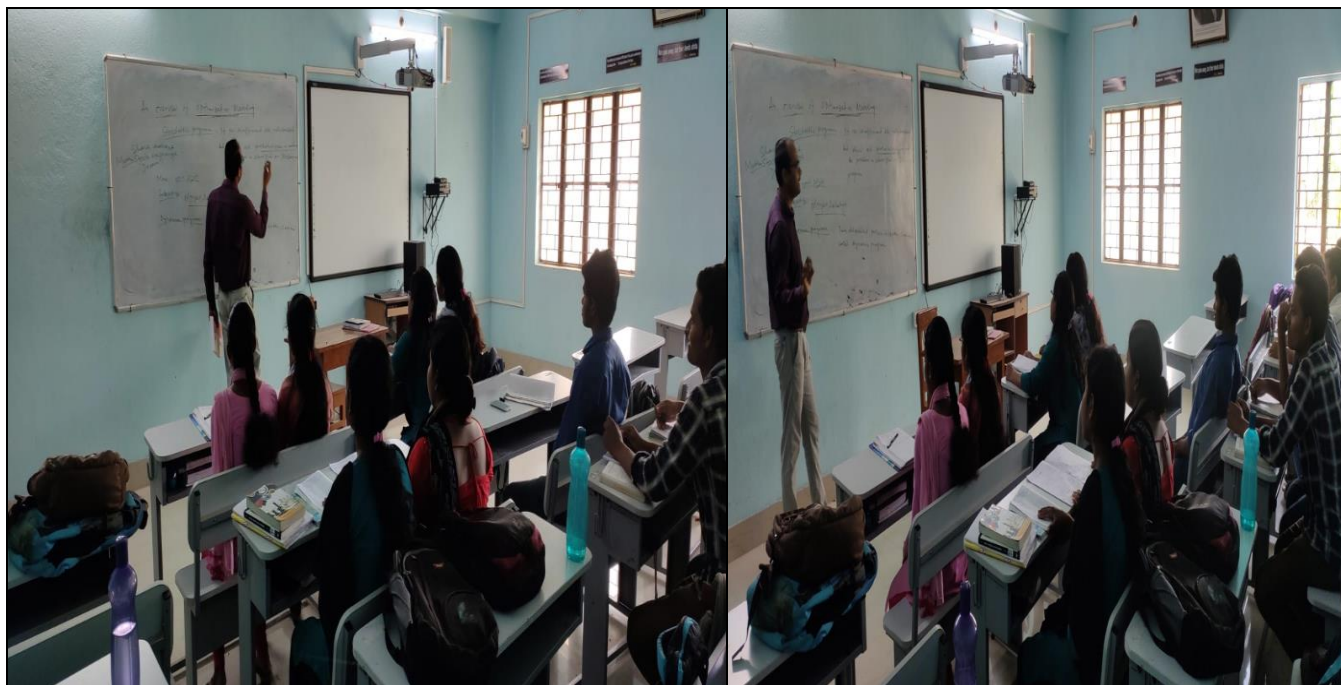
Analysis: Basic facts about real and complex numbers, convergence of sequences and series of real and complex numbers, continuity, differentiability and Riemann integration of real valued functions defined on an interval (finite or infinite), elementary functions (polynomial functions, rational functions, exponential and log, trigonometric functions), sequences and series of functions and their different types of convergence.

Geometry/Topology: Elementary geometric properties of common shapes and figures in 2 and 3 dimensional Euclidean spaces (e.g. triangles, circles, discs, spheres, etc.). Plane analytic geometry (= coordinate geometry) and trigonometry. Definition and basic properties of metric spaces, examples of subset Euclidean spaces (of any dimension), connectedness, compactness. Convergence in metric spaces, continuity of functions between metric spaces.

General: Pigeon-hole principle (box principle), induction, elementary properties of divisibility, elementary combinatorics (permutations and combinations, binomial coefficients), elementary reasoning with graphs, elementary probability theory.

Reference books :

7. Linear Algebra and its applications, Gilbert Strang.
8. Real Analysis, Royden H.L., Fitzpatrick P. M
9. Introduction to Real analysis, Donald R. Sherbert Robert G. Bartle
10. Foundations of complex analysis, S. Ponnusamy
11. Topics in Algebra, I. N. Herstein
12. An Introduction to Ordinary Differential Equations, Earl A. Coddington



Registration

S.N.	Student Name	UG/PG
1	Amiya Mandal	PG
2	Biren Pahari	PG
3	Biswajit Mondal	PG
4	Buddhadev Jana	PG
5	Debabrata Patra	PG
6	Debajyoti Maity	PG
7	Ditangshu Barman	PG
8	Goutam Jana	PG
9	Krishendu Pradhan	PG
10	Moumita Sardar	PG
11	Poushali Tripathy	PG
12	Pradyot Dalapati	PG
13	Priti Das Adhikari	PG
14	Puspendu Sau	PG
15	Raja Kumar Shee	PG
16	Saikat Jana	PG
17	Sachayan Laha	PG
18	Shrabani Jana	PG
19	Shyamal Bera	PG
20	Snehasish Bhowmik	PG
21	Snigdha Mandal	PG
22	Shreya Jana	PG
23	Subhadip Mandal	PG
24	Subhamay Das	PG
25	Subinoy Patra	PG
26	Suchismita Pradhan	PG
27	Sudeshna Maity	PG
28	Susmita Sahoo	PG
29	Tapasi Karan	PG
30	Sahib Bera	PG
31	Soumya Kanti Mandal	PG
32	Sayan Das	PG
33	Sumana Maity	PG
34	Bidisha Sasmal	UG

Registration

S.N.	Student Name	UG/PG
1	Somsankar Mandal	UG
2	Suman Das	UG
3	Amiyendra Maiti	UG
4	Soumyadeep Bej	UG
5	Jatindranath Samanta	UG
6	Sudipta Mondal	UG
7	Ranajit Mandal	UG
8	Atanu Maity	UG
9	Bachaspati Mondal	UG
10	Shubhajit Giri	UG
11	Surajit Maity	UG
12	Ayan Pradhan	UG
13	Rajkumar Karan	UG
14	Soumitra Das	UG
15	Bidisha Sasmal	UG
16	Sonali Mandal	UG
17	Sudeshna Maity	UG
18	Annesha Khatua	UG
19	Paramita Maity	UG
20	Megha Rani Sahoo	UG
21	Gaurangi Pal	UG
22	Subhadip Mahapatra	UG
23	Amit Patra	UG

Five Days Workshop for Problem & Year Wise Questions Paper Solved:

Duration: 4th January- 8th January, 2022

Mr. Goutam Kumar Mandal, Contractual Teacher in Mathematics(**Coordinator**)

Dr. Kalipada Maity, HOD, Associate Prof.(**Jt. Coordinator**)

Day-1:

Topic : Linear Algebra, Real Analysis,

Speaker: Bikash panda, SACT, Dept of Mathematics

Day-2 :

Topic : Linear Programming, Complex Analysis, Calculus

Speaker :Santu Hati, Contractual Teacher, Dept. of Mathematics

Day-3:

Topic: Algebra, Functional Analysis, Numerical Analysis, Topology

Speaker: Hironmay Manna, SACT, Dept. of Mathematics

Day-4:

Topic: ODEs, PDEs, Linear Integral Equation, Classical Mechanics

Speaker: Dr. Kalipada Maity, Associate Professor & HOD Dept. of Mathematics

Day-5:

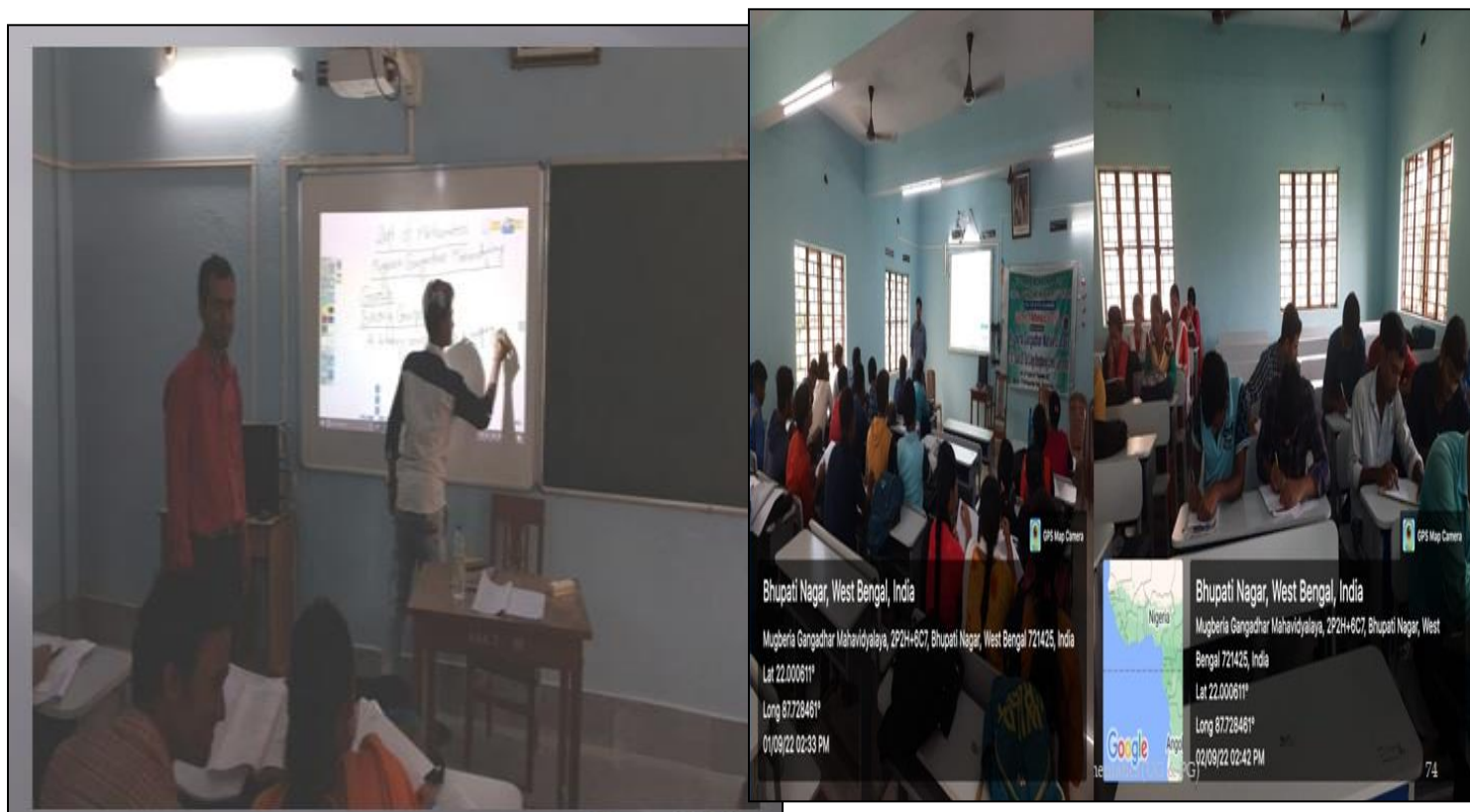
Topic: Vector Algebra, Calculus of variation, Probability & statistics

Speaker: Dr. Manoranjon De, Assistant Professor, Dept. of Mathematics

Date: 04.01.2022

In the welcome address Dr. Kalipada Maity, Coordinator, Associate Professor, HOD, NAAC Coordinator, of Mathematics Department had briefly discussed about the relevance of organizing '**Year wise questions paper solve**' in the transition period to move towards the digital milieu along with the uncertainties owing to the covid situation.

Mr. Bikash Panda, SACT, Department of Mathematics discussed about the job opportunities of the present course and allied scopes of the same. He advised participants to utilize their time in routine as well as rigorous practices of job-related study with peers and making a group of the common minded peers for evaluating their performance to keep themselves upgraded.



Date: 05.01.2022

In the welcome address Dr. Kalipada Maity, Coordinator, Associate Professor, HOD, NAAC Coordinator, of Mathematics Department had briefly discussed about the relevance of organizing '**Year wise questions paper solve**' in the transition period to move towards the digital milieu along with the uncertainties owing to the covid situation.

Mr. Santu Hati, Teacher, Department of Mathematics discussed about the job opportunities of the present course and allied scopes of the same. He advised participants to utilize their time in routine as well as rigorous practices of job-related study with peers and making a group of the common minded peers for evaluating their performance to keep themselves upgraded.

Date: 06.01.2022

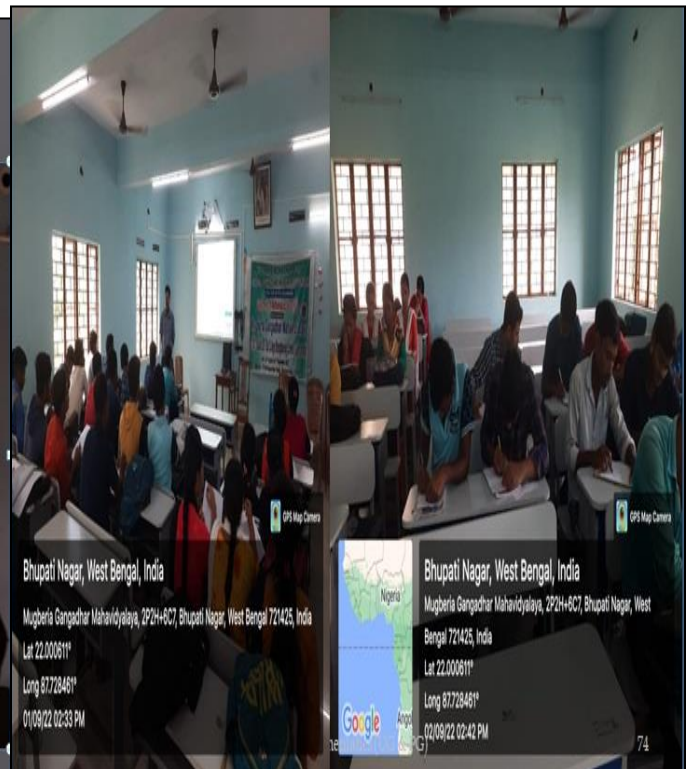
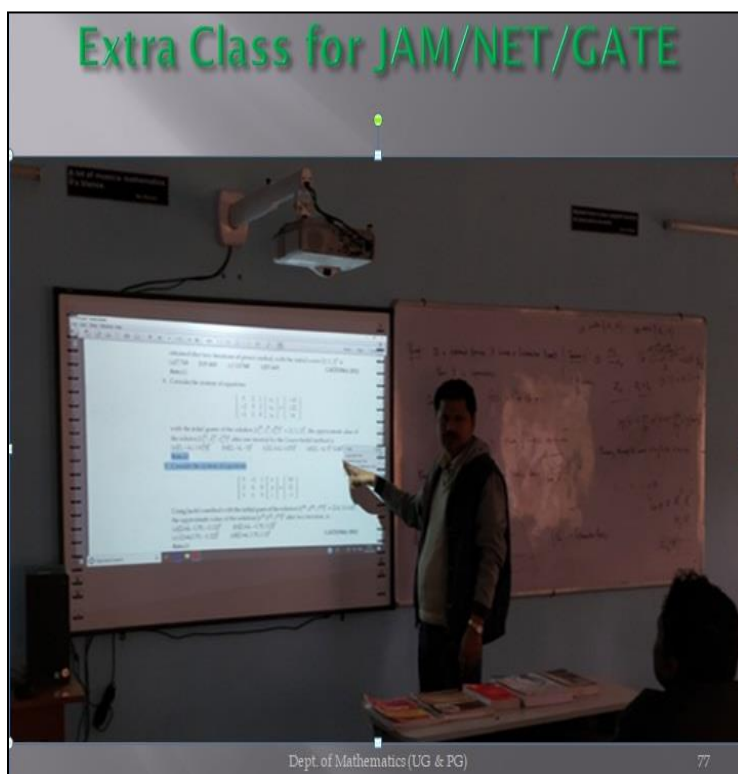
In the welcome address Dr. Kalipada Maity, Coordinator, Associate Professor, HOD, NAAC Coordinator, of Mathematics Department had briefly discussed about the relevance of organizing '**Year wise questions paper solve**' in the transition period to move towards the digital milieu along with the uncertainties owing to the covid situation.

Mr. Hiranmoy Mannna, SACT, Department of Mathematics discussed about the job opportunities of the present course and allied scopes of the same. He advised participants to utilize their time in routine as well as rigorous practices of job-related study with peers and making a group of the common minded peers for evaluating their performance to keep themselves upgraded.





Dr. Kalipada Maity, joint Coordinator, Associate Professor, HOD, NAAC Coordinator, Mathematics Department give a ppt presentation in Partial Differential Equation field. All in all, the day's program was a grand success.



Dr. Manoranjan De, Assistant Professor, Mathematics Department give a ppt presentation in Vector calculus, probality and statistics field. All in all, the day's program was a grand success.



S.N.	Student Name	UG/PG
1	MeghaSantra	UG
2	BithiMaikap	UG
3	Subhajit Jana	UG
4	Sourav Das	UG
5	Indrani Das	UG
6	Anwasha Samanta	UG
7	Nandita Jana	UG
8	SaswatiGiri	UG
9	PabitraMondal	UG
10	ParthaPratimMaity	UG
11	Manoj Maity	UG
12	Ranjit Pradhan	UG
13	Samik Das	UG
14	SantuBera	UG
15	Subhadip Jana	UG
16	BithiMaikap	UG
17	Subhajit Jana	UG
18	Sourav Das	UG
19	Indrani Das	UG

20	SantuBera	UG
21	Subhadip Jana	UG
22	SouravTripathy	UG
23	SuryadipBarik	UG

List of GATE qualifying students in the session 2021-22

1. SUKHENDU DAS ADHIKARY (PG-2019)
2. Rabindranath Bhoj (PG-2019)
3. Manish Acharyya (PG-2021)
- 4.

List of GATE qualifying students in the session 2020-21

1. Subhasish Das (PG-2020)
2. Rabindranath Bhoj (PG-2019)
3. Sandip Das (PG-2020)
4. Ramkrishna Bar (PG-2020)
5. Bubun Das (UG)
6. Sukhendu Das Adhikary (PG-2019)
7. SUNAYANI MONDAL (PG-2020)

List of CSIR-NET qualifying students in the session 2021-22

1. SUNAYANI MONDAL (PG-2020)
2. SUKHENDU DAS ADHIKARY(PG-2019)
3. Bubun Das (UG)
4. Rabindranath Bhoj (PG-2019)



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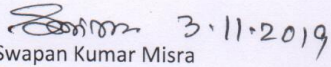
DBT Star College Scheme Award Recipient

E-mail : mugberia_college@rediffmail.com // www.mugberiagangadharmahavidyalaya.ac.in

Date: 03/11/2019

NOTICE

This is to hereby notify all the students that the Dept. of Mathematics, Mugberia Gangadhar Mahavidyalaya is going to organize a **Five Days Workshop on Joint Admission Test for Master (JAM)** which will be held on & from 10th November to 15th November, 2019. All the students and researchers are requested to be present in the said workshop.


Dr. Swapan Kumar Misra

Principal

Mugberia Gangadhar Mahavidyalaya


Principal
Mugberia Gangadhar Mahavidyalaya



Report **Of** Five Days Workshop for Joint Admission Test for Masters (JAM)

Course period: 11th -15th November, 2019



Organized
by
Department of Mathematics(UG & PG)
(Under DBT STAR College strengthening Scheme (Govt. of India))

Mugberia Gangadhar Mahavidyalaya

Bhupatinagar, Purba Medinipur- 721425
ACCREDITED BY NAAC WITH GRADE **B⁺**

Affiliated to
Vidyasagar University

Department of Mathematics
Mugberia Gangadhar Mahavidyalaya
NOTICE

Dated: 18/10/2019

Minutes of the Departmental meeting held on 18.10.2019

Members present:

- (1) Dr. KalipadaMaity, HOD, Associate Prof. (**Coordinator**)
- (2) Dr. Manoranjan De, Assistant Prof.
- (3) Mr. Suman Giri, Sact.
- (4) Mr. Debraj Manna, Sact.
- (5) Mr. Bikash Panda, Sact.
- (6) Mr. Hiranmoy Manna, Sact.
- (7) Mr. SantuHati, Contractual teacher. (**Joint Coordinator**)
- (8) Mr. Goutam Mandal, Contractual teacher

A short meeting was arranged at 3:15 pm regarding the workshop for joint admission test for masters (JAM) in our Department. All teachers of the department joined the meeting in time. Dr. KalipadaMaity(HOD) chaired the meeting.

Decisions taken in the meeting are:

- (1) It is decided that Mr. Santu Hati will be the joint coordinator of this program and Dr.KalipadaMaity (HOD) will be program coordinator and rest teachers of the department will be the recourse persons of the program. .
- (2) The course period will be scheduled from 11 November, 2019 to 15 November, 2019
- (3) The participation students will be UG-5th Sem,and UG-3rd sem.

(3) Course Syllabus

Real Analysis:

Sequences and Series of Real Numbers: convergence of sequences, bounded and monotone sequences, Cauchy sequences, Bolzano-Weierstrass theorem, absolute convergence, tests of convergence for series – comparison test, ratio test, root test; Power series (of one real variable), radius and interval of convergence, term-wise differentiation and integration of power series.

Functions of One Real Variable: limit, continuity, intermediate value property, differentiation, Rolle's Theorem, mean value theorem, L'Hospital rule, Taylor's theorem, Taylor's series, maxima and minima, Riemann integration (definite integrals and their properties), fundamental theorem of calculus.

Multivariable Calculus and Differential Equations:

Functions of Two or Three Real Variables: limit, continuity, partial derivatives, total derivative, maxima and minima.

Integral Calculus: double and triple integrals, change of order of integration, calculating surface areas and volumes using double integrals, calculating volumes using triple integrals.

Differential Equations: Bernoulli's equation, exact differential equations, integrating factors, orthogonal trajectories, homogeneous differential equations, method of separation of variables, linear

differential equations of second order with constant coefficients, method of variation of parameters, Cauchy-Euler equation.

Linear Algebra and Algebra:

Matrices: systems of linear equations, rank, nullity, rank-nullity theorem, inverse, determinant, eigenvalues, eigenvectors.

Finite Dimensional Vector Spaces: linear independence of vectors, basis, dimension, linear transformations, matrix representation, range space, null space, rank-nullity theorem.

Groups: cyclic groups, abelian groups, non-abelian groups, permutation groups, normal subgroups, quotient groups, Lagrange's theorem for finite groups, group homomorphisms.

It is decided that the course will be delivered by lecture, interaction and presentation by ppt. Available seat to register the program is 50. There is no course access fee for the student. Last date of registration for this program is 7th September 2022. HOD will forward the matter for approval of this program from Academic Sub-committee. Teachers are requested to prepare a routine for smooth running of course.

The meeting comes to end with a vote of thanks.



**Five Days Workshop for Joint
Admission Test for Masters (JAM)**

Organized by

Department of Mathematics (UG & PG)
Mugberia Gangadhar Mahavidyalaya
Date: 11th November to 15th November 2019
Pythagoras Hall, Room No: 237



**Under DBT STAR
COLLEGE
Strengthening
Scheme (Govt. of
India)**

Day-1

1. Dr. Swapan Kumar Misra, Principal Mugberia Gangadhar Mahavidyalaya (2.15 P.M– 2.30 P.M)
2. Dr. Kalipada Maity, Associate Professor, HOD (UG & PG), Department of Mathematics, Mugberia Gangadhar Mahavidyalaya. (2.30 P.M-3.00 P.M)
3. Mr. Bikash Panda SACT Department of Mathematics (3.00-4.00P.M)

**Monday
11/11/2019**

Day-2

7. Dr. Bidhan Chandra Samanta, DBT Coordinator & Associate Prof. & HOD, Department of Chemistry (2.15 P.M- 2.30 P.M).
8. Dr Manoranjan De, Assistant Professor, Department of Mathematics (2.30 P.M- 3.30 P.M)
9. Mr. Suman Giri, SACT, Department of Mathematics. (3.30 P.M- 4.30 P.M)

**Tuesday
12/11/2019**

Day-3

7. Dr Prasenjit Ghosh, IQAC Coordinator & Associate Prof. & HOD, Department of History (2.15 P.M- 2.30 P.M)
8. Dr Kalipada Maity, Associate Professor, HOD (UG & PG), Department of Mathematics, Mugberia Gangadhar Mahavidyalaya (2.30 P.M – 3.30 P.M)

**Wednesday
13/11/2019**

Day-4

7. Dr Kalipada Maity, Associate Professor, HOD (UG & PG), Department of Mathematics, (2.15 P.M – 2.30 P.M)
8. Mr. Goutam kumar Mondal, Contractual Teacher , Department of Mathematics (2.30 P.M – 3.30 P.M)
9. Mr. Hironmoy Manna SACT, Department of Mathematics (3.30 P.M- 4.30 P.M)

**Thursday
14/11/2019**

Day-5: Examination (2.15 p.m- 4.15 p.m) Santu Hati Contractual Teacher

**Friday
15/11/2019**

Sl.No.	Students Name	UG
1	Goutam Jana	III Sem
2	Puspendu Sau	III Sem
3	Rathin Samanta	III Sem
4	Subinoy Patra	III Sem
5	Mrinmay mahapatra	III Sem
6	Saheb Bera	III Sem
7	Srikrishna Maity	III Sem
8	Surajit Kar	III Sem
9	Subhadip Sahoo	III Sem
10	Kallol Jana	III Sem
11	Subha Bhunia	III Sem
12	Prasenjit Mandal	III Sem
13	Shyamal Bera	III Sem
14	Tanmoy Bera	III Sem
15	Buddhadev Jana	III Sem
16	Rathindranath Sahu	III Sem
17	Arnab Maity	III Sem
18	Sumana Mandal	III Sem
19	Shrabani Jana	III Sem
20	Sreya Jana	III Sem
21	Priti Das Adhikari	III Sem
22	Poushali Tripathy	III Sem
23	Tapasi Karan	III Sem
24	Suchismita Pradhan	III Sem
25	Susmita Sahoo	III Sem
26	Arijit Maity	V Sem
27	Surya Kanta Kandar	V Sem
28	Biswaranjan Manna	V Sem
29	Basudev Maity	V Sem
30	Subha Ghorai	V Sem
31	Sabyasachi Mandal	V Sem
32	Sourav Bera	V Sem
33	Subhendu Bhunia	V Sem
34	Udita Sahoo	V Sem
35	Piu Maity	V Sem
36	Anuradha Sau	V Sem
37	Moumita Maity	V Sem
38	Bhagyashree Jana	V Sem
39	Sayan Roy	V Sem
40	Priti Chanda	V Sem
41	Sangita Das	V Sem

42	Anasua Maity	V Sem
43	Soumendu Nanda	V Sem
44	Anupama Ojha	V Sem
45	Susmita Pal	V Sem
46	Pritam Nayak	V Sem
47	Uttam Sen	V Sem
48	Srikrishna Das	V Sem

Department of Mathematics Mugberia Gangadhar Mahavidyalaya

Date-11th -15th November, 2019

In the light of this, a committee was formed under the mentorship of the Principal, Mugberia Gangadhar Mahavidyalaya, Dr. Swapan Kumar Mishra and Dr. Kalipada Maity, Asso. Prof. and hod of Department of Mathematics as Convener to conduct the program in a systematic manner. The five days “**Joint admission test for masters (JAM)**” was completed successfully under the proper guidance of Hon’ble Principal Sir Dr Swapan Kumar Mishra and Hon’ble Dr. Kalipada Maity sir (Associate Professor, HOD, NAAC Coordinator), through face-to-face program as held from, 11th -15th November, 2019 with 45 participants.

In the welcome address Dr. Kalipada Maity, Coordinator, Associate Professor, HOD, NAAC Coordinator, of Mathematics Department had briefly discussed about the relevance of organizing ‘**Joint admission test for masters (JAM)**’. Learners should do self-analysis to find out their strengths as well as weaknesses. After complete graduation degree students have opportunity to take admission in IIT/ NIT for M.Sc in Mathematics by passing JAM examination.

Dr. Bidhan Chandra Samanta, Associate Professor, DBT Coordinator, HOD of Chemistry Department, the first speaker of the technical session of the program had discussed about the scopes and opportunities of higher studies. He ended his speech with lots of blessings and good wishes for the participants in their future life.

In the welcome address Dr. Manoranjan De, Assistant Professor, Dept of Mathematics discussed in details about different opportunities after completion of the present course along with multiple options to switch over from the present domain of discipline to some other. Most of the participants of camp were the Mathematics Learners, hence, Dr. Manoranjan De explained briefly about the necessity of earning ‘Continuing Rehabilitation Education (CRE)’ points for teacher trainees in different field of Mathematics for the persons with disabilities.

Dr. Prasenjit Ghosh, Associate Professor, IQAC Coordinator, Department of History discussed about the job opportunities of the present course and allied scopes of the same. He also advised

participants to utilize their time in routine as well as rigorous practices of JAM study with peers and making a group of the common minded peers for evaluating their performance to keep themselves upgraded. And he said keep the target always high then you will get success one day.

Dr. KalipadaMaity, Coordinator, Associate Professor, HOD, NAAC Coordinator, Mathematics Department give a ppt presentation in Differential Equation field. All in all, the day's program was a grand success.

Dr., Manoranjan De, Assistant Professor, Dept of Mathematics give a ppt presentation in Function of real variables field. All in all, the day's program was a grand success

Mr Suman Kumar Giri, Sact, Mathematics Department give a ppt presentation in Linear algebra area. All in all, the day's program was a grand success.

Mr Debraj Manna, Sact, Mathematics Department give a ppt presentation in Abstract algebra area. All in all, the day's program was a grand success.

Mr Bikash Panda, Sact, Mathematics Department give a ppt presentation in Real Analysis area. All in all, the day's program was a grand success.

Mr Hironmoyee Manna, Sact, Mathematics Department give a ppt presentation in Integral Calculus area. All in all, the day's program was a grand success.

Mr Goutam Kumar Mondal, Contractual Teacher, Mathematics Department give a ppt presentation in Real Analysis area. All in all, the day's program was a grand success.

Last day of the speech of the last speaker, there was an interactive session with the participants conducted by Mr. Santu Hati, Joint Coordinator, Contractual Teacher, Lots of relevant questions were raised by the participants like further opportunities after completion M.Sc and the linked courses for further study etc. All pertinent queries of the participants were resolved by the resource persons with their insights and erudite reply. Last day Mr. Santu Hati take a examination on the JAM related syllabus. At the end of the program the vote of thanks was proposed by Dr. KalipadaMaity, Coordinator, Associate Professor, HOD, NAAC Coordinator, Department of Mathematics.





MUGBERIA GANGADHAR MAHAVIDYALAYA

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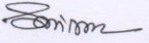
DBT Star College Scheme Award Recipient

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Date: 18.08.2019

NOTICE

This is to hereby notify all the students that the Dept. of Mathematics, Mugberia Gangadhar Mahavidyalaya is going to organize a “The Five Days Workshop on NET, GATE, NBHM & TFIR syllabus” which will be held on & from 25th August to 26th August 2019. All the students and researchers are requested to be present in the said workshop.

 18.08.2019
Dr. Swapan Kumar Misra

Principal
Mugberia Gangadhar Mahavidyalaya

Principal
Mugberia Gangadhar Mahavidyalaya





MUGBERIA GANGADHAR MAHAVIDYALAYA

P.O.—BHUPATINAGAR, Dist.—PURBA MEDINIPUR, PIN.—721425, WEST BENGAL, INDIA

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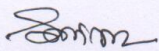
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E-mail : mugberia_college@rediffmail.com // www.mugberiagangadharmahavidyalaya.ac.in


Date: 18.12.2019

NOTICE

This is to hereby notify all the students that the Dept. of Mathematics, Mugberia Gangadhar Mahavidyalaya is going to organize a “The Five Days Workshop on NET, GATE, NBHM & TFIR syllabus” which will be held on & from 2th January-6th January, 2020 . All the students and researchers are requested to be present in the said workshop.

 18.12.2019
Dr. Swapan Kumar Misra

Principal
Mugberia Gangadhar Mahavidyalaya

 Principal
Mugberia Gangadhar Mahavidyalaya



Report Workshop on NET, GATE, NBHM & TFIR syllabus with Problem & Year Wise Questions Paper Solved

Organized
by

Department of Mathematics (UG & PG) Mugberia Gangadhar Mahavidyalaya

Bhupatinagar, Purba Medinipur- 721425

ACCREDITED BY NAAC WITH GRADE B⁺

Affiliated to

Vidyasagar University

Department of Mathematics
Mugberia Gangadhar Mahavidyalaya

Dated: 18/08/2019

Minutes of the Departmental meeting held on 18.08.2019

Members present:

- (1) Dr. Kalipada Maity, HOD, Associate Prof.
- (2) Dr. Manoranjan De, Assistant Prof.
- (3) Mr. Suman Giri, Sact.
- (4) Mr. Debraj Manna, Sact.
- (5) Mr. Bikash Panda, Sact. (Jt. Co-ordinator)
- (6) Mr. Hiranmoy Manna, Sact.
- (7) Mr. Goutam Mandal, Contractual teacher (**Coordinator**)
- (8) Mr. Santu Hati, Contractual teacher.

A short meeting was arranged at 3:15 pm regarding the Two Days Workshop on NET, GATE, NBHM & TFIR syllabus in our Department. All teachers of the department joined the meeting in time. Dr. Kalipada Maity (HOD) chaired the meeting.

Decisions taken in the meeting are:

- (1) It is decided that Mr. Goutam Mandal will be the coordinator of this program and Mr. Bikash Panda will be program jt. Co-ordinator and rest teachers of the department will be the recourse persons of the program. .
- (2) The course period will be scheduled from 25 August, 2019 to 26 August 2019
- (3) The participation students will be UG-5th Sem, and PG-1st & 3rd sem.

- (3) Course content for the said program is scheduled as
- (i) Help to choose the right career Help to provide expert resources
 - (ii) Help to gain confidence and insight Help to change unwanted behaviour pattern
 - (iii) Help to reduce career related frustrations
 - (iv) Help to provide a role model Help to bring stability in thought process

It is decided that the course will be delivered by lecture, interaction and ppt presentation. Available seat to register the program is 100. There is no course access fee for the student. Last date of registration for this program is 23th August 2019. HoD will forward the matter for approval of this program from Academic Sub-committee. Teachers are requested to prepare a routine for smooth running of course.

The meeting comes to end with a vote of thanks.

Two Days Workshop on NET, GATE, NBHM& TFIR syllabus

Date: 25.08.2019

Mr. Goutam Kumar Mandal, Contractual Teacher in Mathematics(**Coordinator**)

Dr. Kalipada Maity, HOD, Associate Prof.(**Jt. Coordinator**)

Speaker : Dr. Kalipada Maity, Associate Professor & HOD, dept of Mathematics.

Topic : **Syllabus of GATE, CSIR NET and reference books**

a. **GATE syllabus in Mathematics**

Calculus: Functions of two or more variables, continuity, directional derivatives, partial derivatives, total derivative, maxima and minima, saddle point, method of Lagrange's multipliers; Double and Triple integrals and their applications to area, volume and surface area; Vector Calculus: gradient, divergence and curl, Line integrals and Surface integrals, Green's theorem, Stokes' theorem, and Gauss divergence theorem.

Linear Algebra: Finite dimensional vector spaces over real or complex fields; Linear transformations and their matrix representations, rank and nullity; systems of linear equations, characteristic polynomial, eigenvalues and eigenvectors, diagonalization, minimal polynomial, Cayley-Hamilton Theorem, Finite dimensional inner product spaces, Gram-Schmidt orthonormalization process, symmetric, skew-symmetric, Hermitian, skew-Hermitian, normal, orthogonal and unitary matrices; diagonalization by a unitary matrix, Jordan canonical form; bilinear and quadratic forms.

Real Analysis: Metric spaces, connectedness, compactness, completeness; Sequences and series of functions, uniform convergence, Ascoli-Arzelà theorem; Weierstrass approximation theorem; contraction mapping principle, Power series; Differentiation of functions of several variables, Inverse and Implicit function theorems; Lebesgue measure on the real line, measurable functions; Lebesgue integral, Fatou's lemma, monotone convergence theorem, dominated convergence theorem.

Complex Analysis: Functions of a complex variable: continuity, differentiability, analytic functions, harmonic functions; Complex integration: Cauchy's integral theorem and formula; Liouville's theorem, maximum modulus principle, Morera's theorem; zeros and singularities; Power series, radius of convergence, Taylor's series and Laurent's series; Residue theorem and applications for evaluating real integrals; Rouché's theorem, Argument principle, Schwarz lemma; Conformal mappings, Möbius transformations.

Ordinary Differential Equations: First order ordinary differential equations, existence and uniqueness theorems for initial value problems, linear ordinary differential equations of higher order with constant coefficients; Second order linear ordinary differential equations with variable coefficients; Cauchy-Euler equation, method of Laplace transforms for solving ordinary differential equations, series solutions (power series, Frobenius method); Legendre and Bessel

functions and their orthogonal properties; Systems of linear first order ordinary differential equations, Sturm's oscillation and separation theorems, Sturm-Liouville eigenvalue problems, Planar autonomous systems of ordinary differential equations: Stability of stationary points for linear systems with constant coefficients, Linearized stability, Lyapunov functions.

Algebra: Groups, subgroups, normal subgroups, quotient groups, homomorphisms, automorphisms; cyclic groups, permutation groups, Group action, Sylow's theorems and their applications; Rings, ideals, prime and maximal ideals, quotient rings, unique factorization domains, Principal ideal domains, Euclidean domains, polynomial rings, Eisenstein's irreducibility criterion; Fields, finite fields, field extensions, algebraic extensions, algebraically closed fields.

Functional Analysis: Normed linear spaces, Banach spaces, Hahn-Banach theorem, open mapping and closed graph theorems, principle of uniform boundedness; Inner-product spaces, Hilbert spaces, orthonormal bases, projection theorem, Riesz representation theorem, spectral theorem for compact self-adjoint operators.

Numerical Analysis: Systems of linear equations: Direct methods (Gaussian elimination, LU decomposition, Cholesky factorization), Iterative methods (Gauss-Seidel and Jacobi) and their convergence for diagonally dominant coefficient matrices; Numerical solutions of nonlinear equations: bisection method, secant method, Newton-Raphson method, fixed point iteration; Interpolation: Lagrange and Newton forms of interpolating polynomial, Error in polynomial interpolation of a function; Numerical differentiation and error, Numerical integration: Trapezoidal and Simpson rules, Newton-Cotes integration formulas, composite rules, mathematical errors involved in numerical integration formulae; Numerical solution of initial value problems for ordinary differential equations: Methods of Euler, Runge-Kutta method of order 2.

Partial Differential Equations: Method of characteristics for first order linear and quasilinear partial differential equations; Second order partial differential equations in two independent variables: classification and canonical forms, method of separation of variables for Laplace equation in Cartesian and polar coordinates, heat and wave equations in one space variable; Wave equation: Cauchy problem and d'Alembert formula, domains of dependence and influence, nonhomogeneous wave equation; Heat equation: Cauchy problem; Laplace and Fourier transform methods.

Topology: Basic concepts of topology, bases, subbases, subspace topology, order topology, product topology, quotient topology, metric topology, connectedness, compactness, countability and separation axioms, Urysohn's Lemma.

Linear Programming: Linear programming models, convex sets, extreme points; Basic feasible solution, graphical method, simplex method, two phase methods, revised simplex method ; Infeasible and unbounded linear programming models, alternate optima; Duality theory, weak duality and strong duality; Balanced and unbalanced transportation problems, Initial basic feasible solution of balanced transportation problems (least cost method, north-west corner rule,

Vogel's approximation method); Optimal solution, modified distribution method; Solving assignment problems, Hungarian method.

Reference Books:

13. Linear Algebra and its applications, Gilbert Strang.
14. Real Analysis, Royden H.L., Fitzpatrick P. M
15. Introduction to Real analysis, Donald R. Sherbert Robert G. Bartle
16. Foundations of complex analysis, S. Ponnusamy
17. Topics in Algebra, I. N. Herstein
18. An Introduction to Ordinary Differential Equations, Earl A. Coddington

b. CSIR-NET Syllabus in Mathematics

CSIR-UGC National Eligibility Test (NET) for Junior Research Fellowship and Lecturer-ship COMMON SYLLABUS FOR PART 'B' AND 'C' MATHEMATICAL SCIENCES

UNIT – 1

Analysis: Elementary set theory, finite, countable and uncountable sets, Real number system as a complete ordered field, Archimedean property, supremum, infimum. Sequences and series, convergence, limsup, liminf. Bolzano Weierstrass theorem, Heine Borel theorem. Continuity, uniform continuity, differentiability, mean value theorem. Sequences and series of functions, uniform convergence. Riemann sums and Riemann integral, Improper Integrals. Monotonic functions, types of discontinuity, functions of bounded variation, Lebesgue measure, Lebesgue integral. Functions of several variables, directional derivative, partial derivative, derivative as a linear transformation, inverse and implicit function theorems. Metric spaces, compactness, connectedness. Normed linear Spaces. Spaces of continuous functions as examples.

Linear Algebra: Vector spaces, subspaces, linear dependence, basis, dimension, algebra of linear transformations. Algebra of matrices, rank and determinant of matrices, linear equations. Eigenvalues and eigenvectors, Cayley-Hamilton theorem. Matrix representation of linear transformations. Change of basis, canonical forms, diagonal forms, triangular forms, Jordan forms. Inner product spaces, orthonormal basis. Quadratic forms, reduction and classification of quadratic forms

UNIT – 2

Complex Analysis: Algebra of complex numbers, the complex plane, polynomials, power series, transcendental functions such as exponential, trigonometric and hyperbolic functions. Analytic

functions, Cauchy-Riemann equations. Contour integral, Cauchy's theorem, Cauchy's integral formula, Liouville's theorem, Maximum modulus principle, Schwarz lemma, Open mapping theorem. Taylor series, Laurent series, calculus of residues. Conformal mappings, Mobius transformations.

Algebra: Permutations, combinations, pigeon-hole principle, inclusion-exclusion principle, derangements. Fundamental theorem of arithmetic, divisibility in \mathbb{Z} , congruences, Chinese Remainder Theorem, Euler's ϕ -function, primitive roots. Groups, subgroups, normal subgroups, quotient groups, homomorphisms, cyclic groups, permutation groups, Cayley's theorem, class equations, Sylow theorems. Rings, ideals, prime and maximal ideals, quotient rings, unique factorization domain, principal ideal domain, Euclidean domain. Polynomial rings and irreducibility criteria. Fields, finite fields, field extensions, Galois Theory. Topology: basis, dense sets, subspace and product topology, separation axioms, connectedness and compactness.

UNIT – 3

Ordinary Differential Equations (ODEs): Existence and uniqueness of solutions of initial value problems for first order ordinary differential equations, singular solutions of first order ODEs, system of first order ODEs. General theory of homogeneous and non-homogeneous linear ODEs, variation of parameters, Sturm-Liouville boundary value problem, Green's function.

Partial Differential Equations (PDEs): Lagrange and Charpit methods for solving first order PDEs, Cauchy problem for first order PDEs. Classification of second order PDEs, General solution of higher order PDEs with constant coefficients, Method of separation of variables for Laplace, Heat and Wave equations.

Numerical Analysis : Numerical solutions of algebraic equations, Method of iteration and Newton-Raphson method, Rate of convergence, Solution of systems of linear algebraic equations using Gauss elimination and Gauss-Seidel methods, Finite differences, Lagrange, Hermite and spline interpolation, Numerical differentiation and integration, Numerical solutions of ODEs using Picard, Euler, modified Euler and Runge-Kutta methods.

Calculus of Variations: Variation of a functional, Euler-Lagrange equation, Necessary and sufficient conditions for extrema. Variational methods for boundary value problems in ordinary and partial differential equations.

Linear Integral Equations: Linear integral equation of the first and second kind of Fredholm and Volterra type, Solutions with separable kernels. Characteristic numbers and eigenfunctions, resolvent kernel.

Classical Mechanics: Generalized coordinates, Lagrange's equations, Hamilton's canonical equations, Hamilton's principle and principle of least action, Two-dimensional motion of rigid bodies, Euler's dynamical equations for the motion of a rigid body about an axis, theory of small oscillations.

UNIT – 4

Descriptive statistics, exploratory data analysis Sample space, discrete probability, independent events, Bayes theorem. Random variables and distribution functions (univariate and

multivariate); expectation and moments. Independent random variables, marginal and conditional distributions. Characteristic functions. Probability inequalities (Tchebyshef, Markov, Jensen). Modes of convergence, weak and strong laws of large numbers, Central Limit theorems (i.i.d. case). Markov chains with finite and countable state space, classification of states, limiting behaviour of n -step transition probabilities, stationary distribution, Poisson and birth-and-death processes. Standard discrete and continuous univariate distributions. sampling distributions, standard errors and asymptotic distributions, distribution of order statistics and range. Methods of estimation, properties of estimators, confidence intervals. Tests of hypotheses: most powerful and uniformly most powerful tests, likelihood ratio tests. Analysis of discrete data and chi-square test of goodness of fit. Large sample tests. Simple nonparametric tests for one and two sample problems, rank correlation and test for independence. Elementary Bayesian inference. Gauss-Markov models, estimability of parameters, best linear unbiased estimators, confidence intervals, tests for linear hypotheses. Analysis of variance and covariance. Fixed, random and mixed effects models. Simple and multiple linear regression. Elementary regression diagnostics. Logistic regression. Multivariate normal distribution, Wishart distribution and their properties. Distribution of quadratic forms. Inference for parameters, partial and multiple correlation coefficients and related tests. Data reduction techniques: Principle component analysis, Discriminant analysis, Cluster analysis, Canonical correlation. Simple random sampling, stratified sampling and systematic sampling. Probability proportional to size sampling. Ratio and regression methods. Completely randomized designs, randomized block designs and Latin-square designs. Connectedness and orthogonality of block designs, BIBD. 2K factorial experiments: confounding and construction. Hazard function and failure rates, censoring and life testing, series and parallel systems. Linear programming problem, simplex methods, duality. Elementary queuing and inventory models. Steady-state solutions of Markovian queuing models: $M/M/1$, $M/M/1$ with limited waiting space, $M/M/C$, $M/M/C$ with limited waiting space, $M/G/1$. All students are expected to answer questions from Unit I. Students in mathematics are expected to answer additional question from Unit II and III. Students with in statistics are expected to answer additional question from Unit IV.

Reference books:

13. Linear Algebra and its applications, Gilbert Strang.
14. Real Analysis, Royden H.L., Fitzpatrick P. M
15. Introduction to Real analysis, Donald R. Sherbert Robert G. Bartle
16. Foundations of complex analysis, S. Ponnusamy



Speaker: Dr. Manoran De, Assistant Professor, dept of Mathematics

Date: 26.08.2019

Speaker: Dr Manoranjan De, Assistant Professor, dept of mathematics

Topic : Syllabus of NBHM & TFIR and reference books

e. NBHM Syllabus in Mathematics

Section A: Algebra: Polynomial's, Abstract algebra, Binary operations, Sets theory, Matrix Theory, Rings and Fields, Groups Algebra.

Section B: Analysis Real Analysis: Sequence and limits, Series, Metric Spaces, Functional Analysis Maxima and minima Continuous function Defining a function Differential function Complex Analysis Poles and Residues Polar coordinates.

Section C: Geometric : Algebraic geometry Cartesian coordinates Polar coordinates Plane algebraic curves Cubic curves Lines Circles 3d Shapes Ellipse Elliptical curves etc.

Reference books:

13. Linear Algebra and its applications, Gilbert Strang.
14. Real Analysis, Royden H.L., Fitzpatrick P. M
15. Introduction to Real analysis, Donald R. Sherbert Robert G. Bartle
16. Foundations of complex analysis, S. Ponnusamy
17. Topics in Algebra, I. N. Herstein
18. An Introduction to Ordinary Differential Equations, Earl A. Coddington

f. TIFR Syllabus in Mathematics

Algebra: Definitions and examples of groups (finite and infinite, commutative and non-commutative), cyclic groups, subgroups, homomorphisms, quotients. Group actions and Sylow theorems. Definitions and examples of rings and fields. Integers, polynomial rings and their basic properties. Basic facts about vector spaces, matrices, determinants, ranks of linear transformations, characteristic and minimal polynomials, symmetric matrices. Inner products, positive definiteness.

Analysis: Basic facts about real and complex numbers, convergence of sequences and series of real and complex numbers, continuity, differentiability and Riemann integration

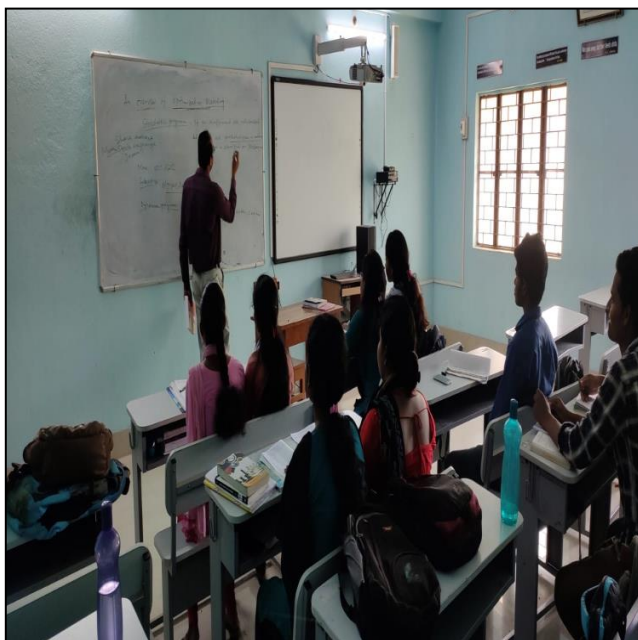
of real valued functions defined on an interval (finite or infinite), elementary functions (polynomial functions, rational functions, exponential and log, trigonometric functions), sequences and series of functions and their different types of convergence.

Geometry/Topology: Elementary geometric properties of common shapes and figures in 2 and 3 dimensional Euclidean spaces (e.g. triangles, circles, discs, spheres, etc.). Plane analytic geometry (= coordinate geometry) and trigonometry. Definition and basic properties of metric spaces, examples of subset Euclidean spaces (of any dimension), connectedness, compactness. Convergence in metric spaces, continuity of functions between metric spaces.

General: Pigeon-hole principle (box principle), induction, elementary properties of divisibility, elementary combinatorics (permutations and combinations, binomial coefficients), elementary reasoning with graphs, elementary probability theory.

Reference books :

13. Linear Algebra and its applications, Gilbert Strang.
14. Real Analysis, Royden H.L., Fitzpatrick P. M
15. Introduction to Real analysis, Donald R. Sherbert Robert G. Bartle
16. Foundations of complex analysis, S. Ponnusamy
17. Topics in Algebra, I. N. Herstein
18. An Introduction to Ordinary Differential Equations, Earl A. Coddington



Registration

S.N.	Student Name	UG/PG
1	ANSAR ALI KHAN	PG
2	ASHARANI MANNA	PG
3	BIDHAN CHANDRA JANA	PG
4	CHANDAN GIRI	PG
5	CHAYAN PRADHAN	PG
6	DEBMALYA MISHRA	PG
7	DURGA MANDAL	PG
8	GAYATRI JANA	PG
9	GOPAL DAS	PG
10	GOURANGA BERA	PG
11	MADHURI BERA	PG
12	MADHUSUDAN MIDYA	PG
13	MANISH ACHARYYA	PG
14	MOUMITA SAHOO	PG
15	NILANJAN PRAMANIK	PG
16	PALLABITA MAITY	PG
17	RAMNARAYAN PATRA	PG
18	RANITA GIRI	PG
19	SANGITA PAUL	PG
20	SANJU SINGHA	PG
21	SATYAKI ADAK	PG
22	SEULI DEY	PG
23	SIMA BHUNIA	PG
24	SK SAJAHAN	PG
25	SOUMIK HAIT	PG
26	SUDIPTA KHATUA	PG
27	SUMAN MANNA	PG
28	SUPRITI SI	PG

Registration

S.N.	Student Name	UG/PG
1	ANWESHA SAMANTA	UG
2	BITHI MAIKAP	UG
3	DEBRAJ MONDAL	UG
4	DIPAK PARIA	UG
5	INDRANI DAS	UG
6	MANOJ MAITY	UG
7	MEGHA SANTRA	UG
8	NANDITA JANA	UG
9	PABITRA MONDAL	UG
10	PARTHA PRATIM MAITY	UG
11	PRADIP MAITY	UG
12	PUSPENDU MAITY	UG
13	RANJIT PRADHAN	UG
14	SABYASACHI MAJI	UG
15	SAMIK DAS	UG
16	SANTU BERA	UG
17	SASWATI GIRI	UG
18	SOURAV DAS	UG
19	SOURAV TRIPATHY	UG
20	SRIJAN DAS	UG
21	SUBHADIOP JANA	UG
22	SUBHAJIT JANA	UG
23	SURJADIP BARIK	UG

Five Days Workshop for Problem & Year Wise Questions Paper Solved:

Duration: 2th January- 6th January, 2020

Mr. Goutam Kumar Mandal, Contractual Teacher in Mathematics(**Coordinator**)

Dr. Kalipada Maity, HOD, Associate Prof.(**Jt. Coordinator**)

Day-1:

Topic : Linear Algebra, Real Analysis,

Speaker: Bikash panda, SACT, Dept of Mathematics

Day-2 :

Topic : Linear Programming, Complex Analysis, Calculus

Speaker :Santu Hati, Contractual Teacher, Dept. of Mathematics

Day-3:

Topic: Algebra, Functional Analysis, Numerical Analysis, Topology

Speaker: Hironmay Manna, SACT, Dept. of Mathematics

Day-4:

Topic: ODEs, PDEs, Linear Integral Equation, Classical Mechanics

Speaker: Dr. Kalipada Maity, Associate Professor & HOD Dept. of Mathematics

Day-5:

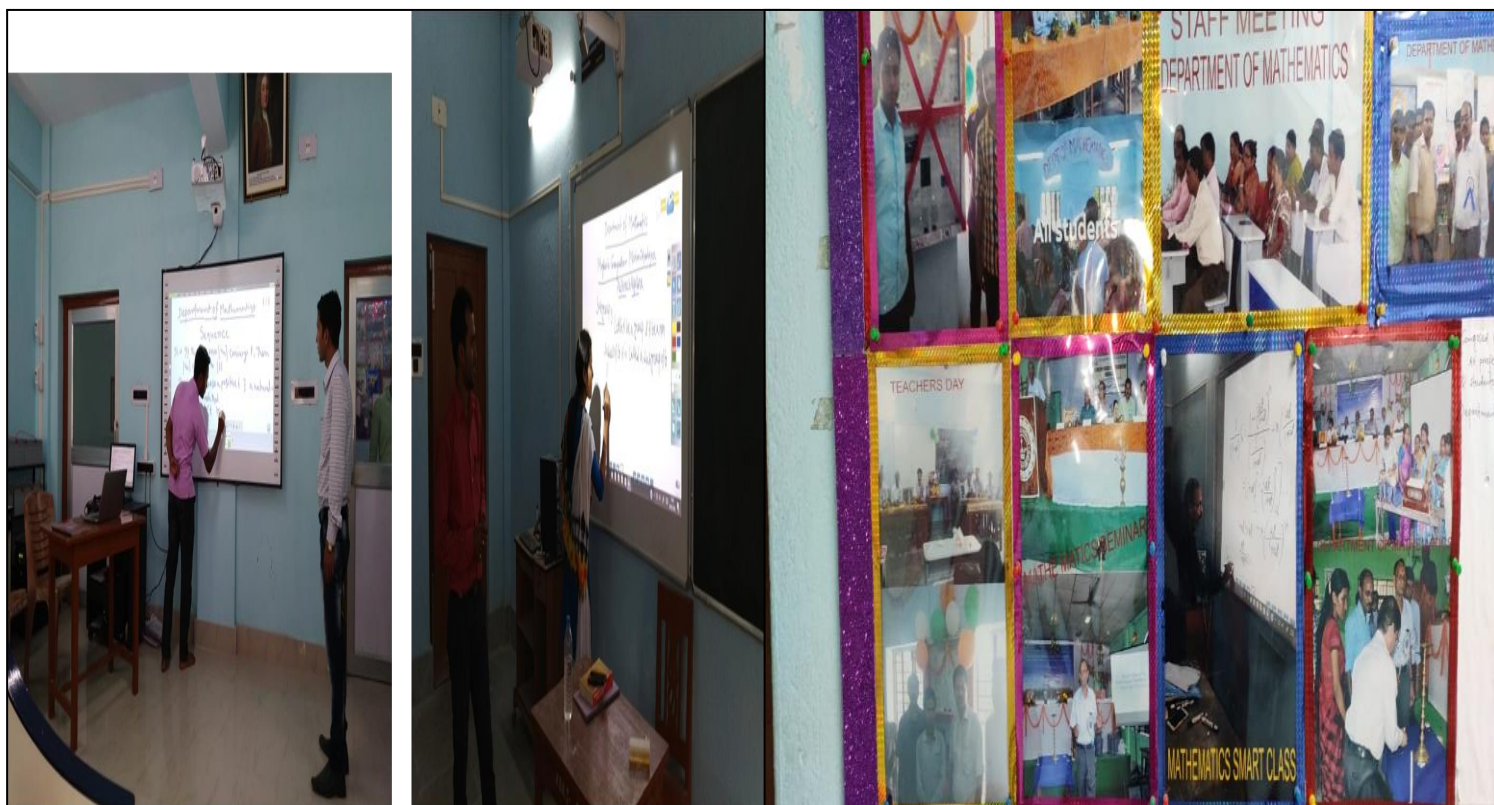
Topic: Vector Algebra, Calculus of variation, Probability & statistics

Speaker: Dr. Manoranjon De, Assistant Professor, Dept. of Mathematics

Date: 02.01.2020

In the welcome address Dr. Kalipada Maity, Coordinator, Associate Professor, HOD, NAAC Coordinator, of Mathematics Department had briefly discussed about the relevance of organizing '**Year wise questions paper solve**' in the transition period to move towards the digital milieu along with the uncertainties owing to the covid situation.

Mr. Bikash Panda, SACT, Department of Mathematics discussed about the job opportunities of the present course and allied scopes of the same. He advised participants to utilize their time in routine as well as rigorous practices of job-related study with peers and making a group of the common minded peers for evaluating their performance to keep themselves upgraded.



Date: 03.01.2020

In the welcome address Dr. Kalipada Maity, Coordinator, Associate Professor, HOD, NAAC Coordinator, of Mathematics Department had briefly discussed about the relevance of organizing '**Year wise questions paper solve**' in the transition period to move towards the digital milieu along with the uncertainties owing to the covid situation.

Mr. Santu Hati, Teacher, Department of Mathematics discussed about the job opportunities of the present course and allied scopes of the same. He advised participants to utilize their time in routine as well as rigorous practices of job-related study with peers and making a group of the common minded peers for evaluating their performance to keep themselves upgraded.



Date: 04.01.2020

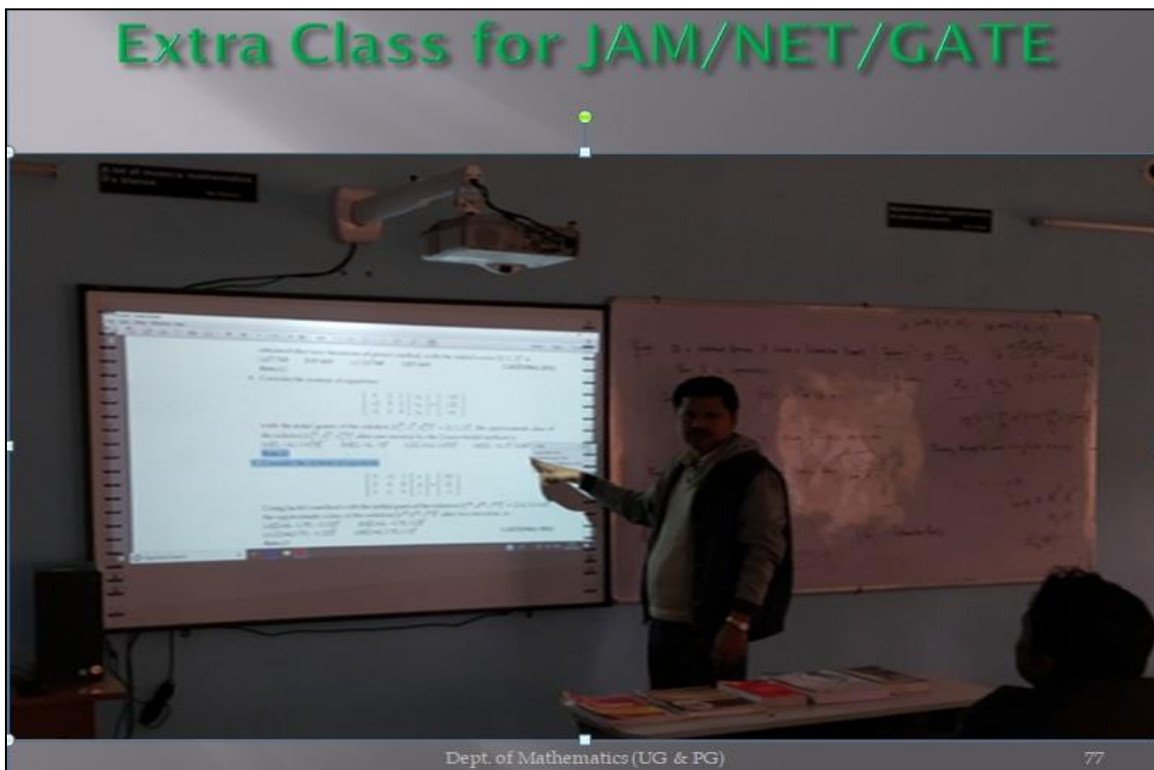
In the welcome address Dr. Kalipada Maity, Coordinator, Associate Professor, HOD, NAAC Coordinator, of Mathematics Department had briefly discussed about the relevance of organizing '**Year wise questions paper solve**' in the transition period to move towards the digital milieu along with the uncertainties owing to the covid situation.

Mr. Hiranmoy Mannna, SACT, Department of Mathematics discussed about the job opportunities of the present course and allied scopes of the same. He advised participants to utilize their time in routine as well as rigorous practices of job-related study with peers and making a group of the common minded peers for evaluating their performance to keep themselves upgraded.



Date: 05.01.2020

Dr. Kalipada Maity, joint Coordinator, Associate Professor, HOD, NAAC Coordinator, Mathematics Department give a ppt presentation in Partial Differential Equation field. All in all, the day's program was a grand success.



Date: 06.01.2020

Dr. Manoranjan De, Assistant Professor, Mathematics Department give a ppt presentation in Vector calculus, probability and statistics field. All in all, the day's program was a grand success.



Registration

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19	SOURAV TRIPATHY	UG
20	SRIJAN DAS	UG
21	SUBHADIOP JANA	UG
22	SUBHAJIT JANA	UG
23	SURJADIP BARIK	UG

List of GATE qualifying students in the session 2021-22

5. SUKHENDU DAS ADHIKARY (PG-2019)
6. Rabindranath Bhoj (PG-2019)
7. Manish Acharyya (PG-2021)
- 8.

List of GATE qualifying students in the session 2020-21

8. Subhasish Das (PG-2020)
9. Rabindranath Bhoj (PG-2019)
10. Sandip Das (PG-2020)
11. Ramkrishna Bar (PG-2020)
12. Bubun Das (UG)
13. Sukhendu Das Adhikary (PG-2019)
14. SUNAYANI MONDAL (PG-2020)

List of CSIR-NET qualifying students in the session 2021-22

5. SUNAYANI MONDAL (PG-2020)
6. SUKHENDU DAS ADHIKARY (PG-2019)
7. Bubun Das (UG)
8. Rabindranath Bhoj (PG-2019)

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Bubun Das (UG)
Rabindranath Bhoj (PG-2019)

Kaity 30/05/2023

Dr. Kalipada Maity
HOD
Dept of Mathematics



Swapan 30.05.2023

Dr. Swapan Kumar Misra
Principal
Mugberia Gangadhar Mahavidyalaya

Principal
Mugberia Gangadhar Mahavidyalaya