

गणित विभाग
गुरु घासीदास विश्वविद्यालय

(केंद्रीय विश्वविद्यालय)

कोनी, बिलासपुर-495009, छत्तीसगढ़, भारत
(नैक से संबद्धता A++ ग्रेड)



Department of Mathematics

Guru Ghasidas Vishwavidyalaya

(A Central University)

Koni, Bilaspur-495009, Chhattisgarh, Bharat
(NAAC Accredited A++ Grade)

No.: २४३ /Maths/2025/Bilaspur

Date: 22/07/2025

To,

The Members of BOS
Department of Mathematics
GGV, Bilaspur (CG)


Subject: Regarding BOS Meeting on 25/07/25 (Friday)

Respected BOS Members,

After due consultation with our external member of BOS, a meeting is being convened on 25/07/25 (Friday) in the Department of Mathematics Meeting Hall (Room No. 13) at 12:30 P.M. onwards to discuss and include in the present curriculum of the UG/PG/Ph.D. program. Also any correction / suggestion or inclusion of new specialization may also be discussed. Your presence in this regard is highly appreciable.

Agenda of the Meeting:

1. Implementation of UG NEP 5th Semester syllabus.
2. Correction / Modification of 2nd Semester VOC "Engineering Mathematics" in the place of minor paper "Algebra and Matrix Theory" UG NEP Syllabus, 4th VOC "Industrial Mathematics" in place of minor "Vector Calculus" UG NEP Syllabus, 3rd Semester VOC "Numerical Techniques" in the place of Minor paper "Differential Calculus".
3. Inclusion of three new Ph.D. Course Work Papers "Integral Transforms", "Operator Theory" and "Nonlinear Analysis".
4. Correction / Modification of Paper M.Sc. II Semester "Numerical Analysis".
5. Any other matter with the permission of Chair.

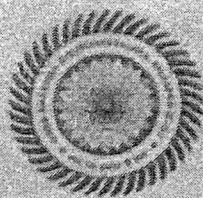

Prof. A. K. Thakur
(Chairman - BOS)

Copy to:

- 1) PS to VC for information to HVC.
- 2) PA to Registrar for information to Registrar.
- 3) Prof. Navnit Jha, Faculty of Mathematical Sciences, South Asian University, Rajpur Road, Maidan Garhi, New Delhi, External Subject, BOS
- 4) Dr. Ashutosh Kumar Pandey, IT (AI and Machine Learning) Datametrics Tru AI Pattern Bangalore – 560054, Industry Expert, BOS
- 5) Dean, School of Studies of Mathematical and Computational Science.
- 6) AR (Academic), for necessary action.
- 7) Hon'ble Members of BOS
- 8) Finance Officer GGV, for necessary action.
- 9) Notice Board
- 10) Office Copy

Phone: 07752-260144; E-mail: mathsggv@rediffmail.com

URL: <http://www.new.ggu.ac.in/departments-details/20/0/>



Minutes of the Meeting of Board of Studies

A meeting of Board of Studies has been conducted today on 25/07/2025 at 12:30 PM in the department of Mathematics in hybrid mode. The following members are present in the meeting:

1. Prof. A.K. Thakur - Chairman
2. Prof. Navnit Jha - External Subject Expert
3. Dr. Ashutosh Kumar Pandey - Industry Expert
4. Prof. A.S. Ranadive - Member, BoS
5. Prof. P.P. Murthy - Member, BoS
6. Dr. K. Sarkar - Member, BoS
7. Mr. C.P. Dhuri - Member, BoS
8. Dr. J.P. Jaiswal - Special Invitee
9. Dr. M. K. Gupta - Special Invitee
10. Dr. B.B. Chaturvedi - Special Invitee
11. Dr. K.N.V.V. Vara Prasad - Special Invitee
12. Dr. Uma Devi Patel - Special Invitee
13. Dr. Santosh Verma - Special Invitee
14. Dr. Brijendra Paswan - Special Invitee
15. Mr. Hapka Surendra - Special Invitee

In the meeting, the following points have been concluded:

1. Syllabus of B.Sc. V Sem is approved. (Annexure - I)
2. Correction / Modification of 2nd Semester VOC "Engineering Mathematics" in the place of minor paper "Algebra and Matrix Theory" UG NEP Syllabus, 4th VOC "Industrial Mathematics" in place of minor "Vector Calculus" UG NEP Syllabus, 3rd Semester VOC "Numerical Techniques" in the place of Minor paper "Differential Calculus" is approved. (Annexure - II)
3. Proposal for inclusion of three new Ph.D. Course Work Papers "Integral Transforms", "Operator Theory" and "Nonlinear Analysis" is approved. (Annexure - III)
4. Correction / Modification of Paper M.Sc. II Semester "Numerical Analysis" is approved. (Annexure - IV)
5. The MOOC/SWAYAM Course "Numerical Methods" for B.Sc. V sem is approved. (Annexure - V)

The chairman, BoS extended his thanks to all the members.

Prof. A.K. Thakur

29-07-2025
Prof. Navnit Jha

30-07-2025
Dr. Ashutosh Kumar Pandey

Prof. A.S. Ranadive

Prof. P.P. Murthy

Dr. K. Sarkar

Mr. C.P. Dhuri

Dr. J.P. Jaiswal

Dr. M.K. Gupta

Dr. B.B. Chaturvedi

Dr. K.N.V.V. Vara Prasad

Dr. Uma Devi Patel

Dr. Santosh Verma

Dr. Brijendra Paswan

Mr. Hapka Surendra

Prof. D. Gopal

NUMERICAL ANALYSIS

Subject Code: AMPBTT2

Credit: 05 (L:04, T:01, P:01)

Course Objective:

1. To know about the types & sources of errors and its effect on any numerical computations and be familiar with finite precision computations and methods for solving an algebraic or transcendental equation using an appropriate numerical method.
2. To know about the methods for solving system of linear equations using an appropriate numerical method which include direct and iterative methods.
3. To approximate the given data with an interpolating polynomial for capturing function value, slope and curvature.
4. To learn about the numerical methods for approximating differentiation & integrations.
5. To learn methods for solving IVP using appropriate numerical methods.

Course Contents:

Iterative methods (IMs) for nonlinear equations: Muller method, Chebyshev method, general multi-step IM, modified Newton-Raphson method, IM for nonlinear systems, IM for complex root, convergence of IMs.

Interpolations & Approximations: Weirstrass-approximation Theorem, Lagrange's Interpolation, Newton-divided Interpolation, Hermite Interpolation, cubic-Spline Interpolation, Rational approximation.

Solution of Linear Systems:

Direct Methods-Gauss-Elimination method, partial & complete pivoting, Gauss-Jordan method, LU-decomposition method, Cholesky method,

Iterative Methods- Jacobi iteration method, Gauss-Seidel method, SOR method, convergence analysis of iterative method.

Numerical Differentiation: Method based on undetermined coefficient, optimum choice of step-length, partial differentiation.

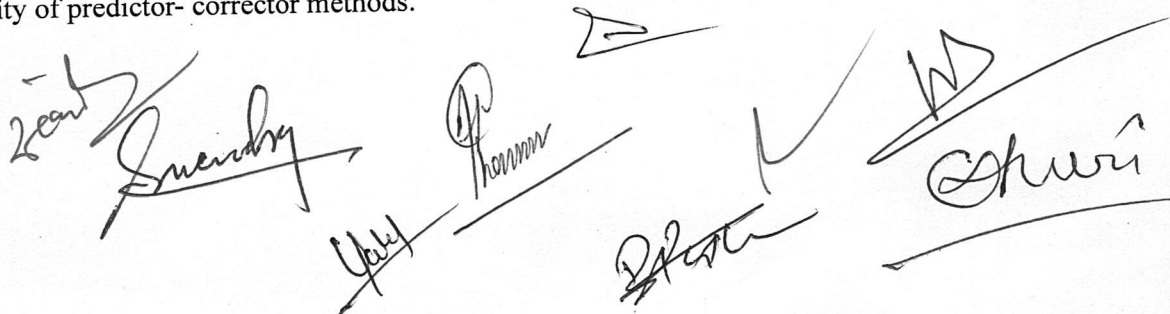
Numerical Integration: Method based on undetermined coefficient, Gauss-Quadrature method, Gauss-Legendre integration method, Gauss-Chebyshev integration method,

Single-Step Iterative Methods for IVP: Existence & uniqueness, test equations, difference equations, Routh-Hurwitz criterion, truncation error, convergence, stability, order of method, Taylor series method, Euler-Cauchy method, Explicit Runge-Kutta method, IM for system of equations, minimization of local truncation error, implicit Runge-Kutta method, second order equations, stability of earlier methods.

Multi-Step Iterative Methods for IVP:

Explicit method- Adam's-Bashforth's methods, Nystrom methods,

Implicit method-Adam's-Moulton methods, Milne-Simpson Methods, general multi-step methods, convergence of multi-step methods, predictor-corrector methods, stability of multi-step methods, stability of predictor-corrector methods.



Text/Reference Book:

1. Jain M K, Iyengar S R K and Jain R K, Numerical Methods for Scientific and Engineering Computation, 4th Edn, New Age International Pvt Ltd (2005).
2. S. S. Sastry, Introductory Methods of Numerical Analysis, 5th Edn. Prentice Hall of India (2013).
3. J. H. Mathews and K.D. Fink: Numerical Methods using MatLabs, 4th edition, PHI Learning Private Limited, New Delhi (2021).
4. B. Bradie: A Friendly Introduction to Numerical Analysis, Pearson Prentice Hall, India (2006).

Course Outcomes:

Students will try to learn:

1. To know about the types & sources of errors and its effect on any numerical computations and be familiar with finite precision computations and methods for solving an algebraic or transcendental equation using an appropriate numerical method.
2. To know about the methods for solving system of linear equations using suitable numerical method which include direct and iterative methods.
3. To approximate the given data with an interpolating polynomial for capturing function value, slope and curvature.
4. To learn about the numerical methods for approximating differentiation & integrations.
5. To learn methods for solving some ODE & PDE using appropriate numerical methods.



The bottom section of the page contains several handwritten signatures and marks. On the left, there is a signature that appears to be 'Pr. Thumma' with a large checkmark below it. In the center, there is a signature that looks like 'Yay' with a checkmark above it, and another signature below it. On the right, there is a signature that looks like 'Sneha' with a checkmark above it, and another signature below it. There are also some other scribbles and marks scattered around.