ದಾವಣಗೆರೆ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ

ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ವಿಭಾಗ

ಅಧ್ಯಕ್ಷರ ಕಾರ್ಯಾಲಯ, ಮೊದಲನೇ ಮಹಡಿ, ಎಂ. ಬಿ. ಎ. ಕಟ್ಟಡ, ಶಿವಗಂಗೋತ್ರಿ, ದಾವಣಗೆರೆ -577 007
ದೂರವಾಣಿ: 80959 07689, ಇ-ಮೇಲ್: dudvgmaths@gmail.com, prakashadg@gmail.com

ಸಂಖ್ಯೆ:ದಾವಿವಿ:ಗಅ.:2025-26 ದಿನಾಂಕ:21-04-2025

ಗೆ,
ಕುಲಸಚಿವರು(ಆಡಳಿತ)
ದಾವಣಗೆರೆ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ
ಶಿವಗಂಗೋತ್ರಿ, ದಾವಣಗೆರೆ

ಮುಖಾಂತರ,
ಡೀನರು, ವಿಜ್ಞಾನ ನಿಕಾಯ,
ದಾವಣಗೆರೆ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ
ಶಿವಗಂಗೋತ್ರಿ, ದಾವಣಗೆರೆ

ಮಾನ್ಯರೆ,

ವಿಷಯ : ಸ್ನಾತಕ ಪದವಿ ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ವಿಭಾಗದ ಅಧ್ಯಯನ ಮಂಡಳಿ ಸಭೆಯಲ್ಲಿ ಪರೀಷ್ಕರಣೆ ಮಾಡಿರುವ ಬಿ.ಎಸ್ಸಿ., 3 ಮತ್ತು 4 ನೇ ಸೆಮಿಸ್ಟರ್‌ನ ಪಠ್ಯಕ್ರಮವನ್ನು ಕಳುಹಿಸುತ್ತಿರುವ ಬಗ್ಗೆ.

ಉಲ್ಲೇಖ: ಸಂಖ್ಯೆ:ದಾವಿವಿ:ಬಿ.ಓ.ಎಸ್./304/2024-25/4924 ದಿನಾಂಕ:15-03-2025

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ಈ ಮೇಲ್ಕಂಡ ವಿಷಯ ಹಾಗೂ ಉಲ್ಲೇಖಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ, ಸ್ನಾತಕ ಪದವಿಯ ರಾಜ್ಯ ಶಿಕ್ಷಣ ನೀತಿ ಅನುಸಾರ ಬಿ.ಎಸ್ಸಿ., 3 ಮತ್ತು 4ನೇ ಸೆಮಿಸ್ಟರ್‌ನ ಪಠ್ಯಕ್ರಮ ಪರೀಷ್ಕರಣೆಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ದಿನಾಂಕ:16-04-2025(ಬುಧವಾರ) ದಂದು ಅಧ್ಯಯನ ಮಂಡಳಿ ಸಭೆಯನ್ನು ನಡೆಸಲಾಯಿತು. ಸದರಿ ಸಭೆಯಲ್ಲಿ ಪರೀಷ್ಕರಣೆ ಮಾಡಿರುವ ಪಠ್ಯಕ್ರಮವನ್ನು ಈ ಪತ್ರದೊಂದಿಗೆ ಲಗತ್ತಿಸಿ ತಮಗೆ ಮುಂದಿನ ಕ್ರಮಕ್ಕಾಗಿ ಕಳುಹಿಸಿಕೊಡುತ್ತಿದ್ದೇವೆ.

ವಂದನೆಗಳೊಂದಿಗೆ,

ತಮ್ಮ ವಿಶ್ವಾಸಿ,

Chairman (BOS) 21/4/25
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NO: DU: Math/2025-26/ Date: 16-04-2025

Proceedings of the Board of Studies meeting in UG Mathematics

The meeting of Board of Studies in UG (Under Graduate) Mathematics was held in the office of the Chairman, Department of Mathematics, Davangere University, Davangere on 16-04-2025 at 11.30 AM.

The following members were present:

Chairman and Members in the Board of Studies		Signature
Smt. Jagadeeshwari A. M.	Member (UG-BOS)	.....
Smt. Geetha H. V.	Member (UG-BOS)	.....
Dr. Yogesh K. M.	Member (UG-BOS)	.....
Sri Shivaraj N.	Member (UG-BOS)	.....
Dr. Prasannakumara B. C.	Member (UG-BOS) (Co-Opt)	.....

Members Absent: 1) Dr. Mahabaleshwar U. S., Member (UG-BOS)
2) Sri Anand G. Puranik, Member (UG-BOS)

The meeting was started with the welcoming the members by Chairman and then discussed the following:

Item No. 1: To Read and Confirm the minutes of the last meeting.

Resolution No. 1: Read and confirmed the minutes of the last meeting held on 14-06-2024.

Chairman (BOS) 16/4/25
Department of Mathematics
Davangere University
Shivagangotri, Davangere - 577 00.

Item No. 2: Preparation and Approval of Third and Fourth Semester Syllabus for UG programme in Mathematics for the academic year 2025-26 and onwards.

Resolution No. 2: Board thoroughly gone through the regulations of UGC and Davangere University along with syllabus of various universities. Further, prepared the syllabus on par with UGC/CSIR NET/GATE syllabus for UG programme in Mathematics. Finally, it is resolved to approve and recommend the prepared syllabus to Davangere University for implementation from the academic year 2025-26 for Third and Fourth Semester B. Sc. Mathematics programme of Davangere University. (See, Appendix - I).

Item No. 3: Up-gradation of panel of Examiners for UG Mathematics Examinations of 2025-26 & onwards.

Resolution No. 3: Board has revisited the panel of examiners and prepared the fresh list of panel of examiners for UG Mathematics examination of 2025-26 & onwards. And, resolved to approve and recommend the same to the University (See, Appendix - II).

Item No. 4: Any other matter with the permission of the Chair.

Resolution No. 4: No matter.

Dr. Prakasha D. G.
CHAIRMAN 16/4/25
(UG-BOS in Mathematics)
Davangere University
Davangere-7.

Davangere University

Bachelor of Science (B.Sc.) Semester Scheme
Curriculum Structure for Undergraduate Programme for 2025-26
Syllabus for Mathematics

Sl. No.	Course/Paper Code	Title of the Paper	Subject Category	Teaching Hours/ week	Semester End Exam.	Internal Assessment	Total Marks	Credits	Examination Duration
1	2	3	4	5	6	7	8	9	10
Semester-III									
1	ALGEBRA-III, DIFFERENTIAL EQUATIONS-1, SEQUENCE AND SERIES		**24MT-3**	04	80	20	**100**	03	3 Hrs.
	Mathematics Lab – III		**24MP-3**	04	40	10	**50**	02	3 Hrs.
	Total			**08**	**120**	**30**	**150**	**05**	---
Semester-IV									
2	VECTOR CALCULUS, DIFFERENTIAL EQUATIONS-II, LAPLACE TRANSFORMS		**24MT-4**	04	80	20	**100**	03	3 Hrs.
	Mathematics Lab – IV		**24MP-4**	04	40	10	**50**	02	3 Hrs.
	Total			**08**	**120**	**30**	**150**	**05**	---

THEORY PAPER
SEMESTER-III

24MT-3: ALGEBRA-III, DIFFERENTIAL EQUATIONS-1, SEQUENCE AND SERIES

TOTAL HOURS – 56

Course Learning Objectives:

a) To gain a clear understanding of the definitions and properties of normal subgroups, quotient groups, and isomorphisms.
b) To equip with the ability to identify and solve various types of first-order differential equations (of first degree and higher degree), understand the meaning of solutions, and apply these concepts to real-world problems.
c) To develop a fundamental understanding of sequences, series, and related concepts like limits, convergence, and divergence.
d) To determine if an infinite sequence is bounded, monotonic, or oscillating, and if it's convergent or divergent. Determine if an infinite series is convergent or divergent using various tests.

Course Outcome: On successful completion of the course, the student will able to:

a) Explain the significance of the notions of cosets, normal subgroups, and quotient group.
b) Differentiate, classify, and find solutions for separable, exact, linear, homogeneous, and Bernoulli equations. Additionally, they should be able to recognize and apply integrating factors,
c) Recognize different types of sequences and series, determine their convergenc or divergence, and compute sums of convergent series.
d) Evaluate the convergence or divergence of infinite series based on various tests.

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Registrar
Davangere University
Shivagangotri, Davangere.

BoS-Chairman,
Department of Mathematics
Davangere University
Shivagangotri, Davangere-577007

SYLLABUS (24MT-3)

UNIT I: NORMAL SUBGROUPS **(14 Hrs)**

Definition and examples; Standard theorems on normal subgroups; Quotient groups; Homomorphism and Isomorphism of groups; Fundamental theorem of homomorphism, Permutation groups.

UNIT II: DIFFERENTIAL EQUATIONS **(14 Hrs)**

Definition; Order and degree of a differential equation, Equations of first order and first degree: variable separable, reducible to variable separable, homogeneous and reducible to homogeneous, Linear and Bernoulli's form, Exact equations (excluding reducible to exact form).

Equations of first order and higher degree: Solvable for p, Solvable for x, solvable for y and Clairaut's equation.

UNIT III: SEQUENCE OF REAL NUMBERS **(14 Hrs)**

Definition of a sequence, Limit of a sequence, Algebra of limit of a sequence. Convergent, Divergent and oscillatory sequences: Related problems. Bounded sequence; Every convergent Sequence is bounded – converse is not true. Monotonic sequences with their properties and related problems.

UNIT IV: INFINITE SERIES **(14 Hrs)**

Definition of convergent, divergent and oscillatory series, Standard properties and results. Tests of convergence: comparison tests; D'Alemberts Ratio test; Raabe's test; Cauchy's root test, Absolute Convergence and Leibnitz's test for alternating series.

Suggested References/Text books:

1) G.K.Ranganath, A Textbook of B.Sc. Mathematics, S. Chand Publishing.
2) M D Raisinghania, Advanced Differential Equations, S. Chand Publishing.
3) F Ayres, Schaum's Outline of Theory and Problems of Differential Equations, Schaum Publishing Co, 611 Broadway, New York 12
4) S Narayanan and T K Manicavachogam Pillay, Differential Equations and its Applications, Viswanathan, S., Printers & Publishers Pvt Ltd (30 May 2009).
5) Shanthi Narayana and P.K. Mittal , A Course of Mathematical Analysis, S. Chand and Company Pvt. Ltd., New Delhi.
6) G F Simmons, Differential equation with Applications and historical notes, McGraw Hill Education, 2nd edition (1 July 2017).
7) A.R. Vasistha and R.K. Gupta, Laplace Transforms, Krishna Prakashan Media Pvt. Ltd. Meerut.
8) G. B. Gururajachar, Text Book of Mathematics, Academic Excellent Series Pub.
9) B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers.

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PRACTICAL PAPER

SEMESTER-III

24MP-3: MATHEMATICS LAB-III

(4 hours/ week per batch of not more than 15 students)

Course Learning Objectives:

a) Foundation for introducing to programming.
b) Enables the student to explore mathematical concepts and verify mathematical facts through the use of software
c) Enhances the skills in programming.
d) Acquire knowledge of practical applications of algebra, differential quations, sequence and series through FOSS.

Course Outcome: On successful completion of the course, the student will abl to:

a) Learn Free and Open Source Software (FOSS) tools for computer programming.
b) show proficiency in using the software C-Programming.
c) understand the use of various techniques of the software for effectively doing mathematics.
d) obtain necessary skills in programming.
e) understand the applications of mathematics
f) explore and grasp concepts for the future across a wealth of disciplines.

Syllabus: Problems from 24MT-3 (Theory) may be solved with the help of programming.

Suggested Softwares: Maxima/Scilab/Phython.

List of Programs (Suggested):

1. Verification of normality of a given subgroup.
2. Illustrating homomorphism and isomorphism of groups.
3. Solution for linear differential equations
4. Particular Solution of linear differential equations and plotting their solutions.
5. Verification of Exactness and solution
6. Solution for Non-linear differential equation.
7. General and singular solution of Clairaut's equation.
8. Nature of a sequence.
9. Boundedness of a sequence.
10. Monotonicity of a sequence.
11. Nature of the series.
12. Convergence of the series by D'Alemberts Ratio test and Raabe's test

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THEORY PAPER

SEMESTER-IV

24MT-4: VECTOR CALCULUS, DIFFERENTIAL EQUATIONS-II, LAPLACE TRANSFORMS

TOTAL HOURS – 56

Course Learning Objectives:

a) To provide students with a strong foundation in vector calculus and its applications in various scientific and engineering fields.

b) to solve second and higher-order linear differential equations with constant coefficients.

c) To gaining a grasp of the definition, properties, and conditions for existence of Laplace transforms.

d) Understanding the concept of inverse transforms and techniques like the Convolution theorem.

Course Outcome: On successful completion of the course, the student will able to:

a) apply concepts like gradients, divergences, and curls to solve problems,

b) learn various techniques, including finding the complementary function, determining particular solutions, and applying these solutions to real-world problems.

c) Students will be able to calculate Laplace transforms of standard functions and determine conditions for their existence.

d) To find the inverse Laplace transforms of functions, applying techniques.

SYLLABUS

UNIT I: VECTOR DIFFERENTIAL CALCULUS (14 Hrs)

Definition of Scalar and Vector Fields, Gradient of a scalar field; Geometrical meaning. Directional derivative: Maximum directional derivative, Angle between two surfaces, Divergence and Curl of a vector field, Solenoidal and Irrotational fields, Laplacian of a scalar field, Harmonic functions, Vector identities, Related Problems.

UNIT II: SECOND AND HIGHER ORDER LINEAR DIFFERENTIAL EQUATIONS WITH CONSTANT CO-EFFICIENTS (14 Hrs)

Complementary functions, Particular integral of Standard types, Cauchy-Euler differential equations, Legendre differential equations, Simultaneous linear differential equations with constant co-efficients (for two variables).

UNIT III: LAPLACE TRANSFORMS (14 Hrs)

Definition and basic properties, Laplace transforms of e^{at}, cos*at*, sin*at*, t^n, cosh*at* , sinh*at*, e^{at} F(t), t^n F(t), F(t)/t – problems, Laplace transform of derivatives of functions, Laplace transforms of integrals of functions, Laplace transforms of periodic functions and unit step function.

UNIT IV: INVERSE LAPLACE TRANSFORMS (14 Hrs)

Basic properties and related problems. Convolution theorem, Initial value problems, Solution of first and second order differential equations with constant coefficients by Laplace transform method.

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Suggested References/Text books:

1) G.K.Ranganath, A Textbook of B.Sc. Mathematics, S. Chand Publishing.
2) M D Raisinghania, Advanced Differential Equations, S. Chand Publishing.
3) F Ayres, Schaum's Outline of Theory and Problems of Differential Equations, Schaum Publishing Co, 611 Broadway, New York 12
4) S Narayanan and T K Manicavachogam Pillay, Differential Equations and its Applications, Viswanathan, S., Printers & Publishers Pvt Ltd (30 May 2009).
5) Shanthi Narayana and P.K. Mittal , A Course of Mathematical Analysis, S. Chand and Company Pvt. Ltd., New Delhi.
6) G F Simmons, Differential equation with Applications and historical notes, McGraw Hill Education, 2nd edition (1 July 2017).
7) A.R. Vasistha and R.K. Gupta, Laplace Transforms, Krishna Prakashan Media Pvt. Ltd. Meerut.
8) G. B. Gururajachar, Text Book of Mathematics, Academic Excellent Series Pub.
9) B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers.

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PRACTICAL PAPER

SEMESTER-IV

24MP-4: MATHEMATICS LAB-IV

(4 hours/ week per batch of not more than 15 students)

Course Learning Objectives:

a) Foundation for introducing to programming.

b) Enables the student to explore mathematical concepts and verify mathematical facts through the use of software.

c) Enhances the skills in programming.

d) Acquire knowledge of practical applications of algebra and calculus through FOSS.

Course Outcome: On successful completion of the course, the student will able to:

a) Learn Free and Open Source Software (FOSS) tools for computer programming.

b) Show proficiency in using the software C-Programming.

c) Understand the use of various techniques of the software for effectively doing mathematics.

d) Obtain necessary skills in programming.

e) Understand the applications of mathematics

f) Explore and grasp concepts for the future across a wealth of disciplines.

Syllabus: Problems from 24MT-4 (Theory) may be solved with the help of programming.

Suggested Softwares: Maxima/Scilab/Phython.

List of Programs (Suggested):

1. Gradient and Laplacian of a scalar function.
2. Divergence and Curl of a vector function.
3. Solenoidal and irrotational vector fields.
4. Verification of orthogonal planes.
5. Complementary function of second order linear differential equation with constant coefficients.
6. Particular Integral of second order linear differential equation with constant coefficients.
7. Solutions of second order linear differential equation with constant coefficients and plot the solution.
8. Solution of Cauchy-Euler differential equation.
9. Laplace transforms of the given functions.
10. Inverse Laplace transform of given functions.
11. Convolution Theorem.
12. Solutions of differential equation using Laplace transform method.

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THEORY EXAMINATION QUESTION PAPER PATTERN
(Semesters I –VI)

B.Sc. Semester-I Degree Examination; 2024-25
(Semester Scheme; New Syllabus: 2024-25)

SUBJECT: Mathematics

Paper –_____: _____
Paper Code: _____

Time: 3 Hours **Max. Marks: 80**

Instructions to candidates:

1) All sections are compulsory
2) Draw neat and labeled diagrams wherever necessary.

SECTION-A

1. Answer **all** the following questions: **(2×10=20)**

a)
b)
c)
d)
e)
f)
g)
h)
i)
j)

SECTION-B

Answer any **SIX** of the following: **(5×6=30)**

2.
3.
4.
5.
6.
7.
8.
9.

SECTION -C

Answer **Any Three** of the following: **(10×3=30)**

10. From Unit-I
11. From Unit-II
12. From Unit-III
13. From Unit-IV

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Question Paper Pattern for Practical Paper Examination

(Semesters I –VI)

Duration: 3Hrs

• Experimentation (Major & Minor/Spotters)	-	30 Marks
• Viva Voice	-	10 Marks
	Total	**40 Marks**

Internal Assessment for Theory Paper

I-VI semesters

Sl. No.	Internal Assessment	Maximum Marks
(1)	(2)	(3)
01	Two Session Tests with proper record for assessment (5+5 = 10)	10
02	Assessment of Skill Development activities/Seminars/Group Discussion/ Assignment etc., with proper record	05
03	• Attendance with proper record	05
	TOTAL MARKS	20

- **Attendance Marks-breakup**

<75%	-	00 Marks
75-80%	-	01 Mark
80-85%	-	02 Marks
85-90%	-	03 Marks
90-95%	-	04 Marks
>95%	-	05 Marks

Internal Assessment for Practical Paper I-VI semesters

• Attendance	-	05 Marks
• Record/Journal	-	05 Marks
	Total	**10 Marks**

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Bachelor of Science (B.Sc.) Semester Scheme
Curriculum Structure for Undergraduate Programme for 2025-26
Syllabus for Mathematics (Open Elective)

Sl. No.	Course/Paper Code	Title of the Paper	Subject Category	Teaching Hours/ week	Semester End Exam.	Internal Assessment	Total Marks	Credits	Examination Duration
1	2	3	4	5	6	7	8	9	10
Semester-III									
1	BASIC MATHEMATICS - I		24OMT-1	02	40	10	50	02	2 Hrs.
Semester-IV									
2	BASIC MATHEMATICS - II		24OMT-2	02	40	10	50	02	2 Hrs.

SEMESTER-III

24OMT- 1: BASIC MATHEMATICS – I (Open Elective)

TOTAL HOURS – 32

UNIT –I: MATHEMATICAL LOGIC **(16 hours)**

Statements, Types of Statements, Connectives, Truth table, Conditional Statement, Compound Statements, Bi-conditional Statements, Equivalence Formulae, logical equivalence and switching circuits, quantifiers.

UNIT – II: SETS, RELEATION AND FUNCTIONS **(16 hours)**

Basic Set theory: Empty set, Finite and infinite set, Equal sets, Sub sets, Power sets, Universal set, Union and Intersection sets, Difference of sets, Complement of a set and properties.

Ordered pairs, Cartesian product of sets, definition of relation, domain and co-domain, range of a relation. Definition of a function, domain and co-domain, range of a function, real valued functions. Types of functions: constant, identity, polynomial, rational, modulus, signum, exponential, greatest integer function and their graphs. Sum difference, product and quotient of functions.

Reference:

1. A TEXT BOOK OF MATHEMATICS BY G K RANGANATH
2. TEXT BOOK OF MATHEMATICS BY O P ARORA
3. TEXT BOOK OF MATHEMATICS BY SS BOSSCO
4. A TEXT BOOK OF MATHEMATICS BY V SEETHA RAMAIAH
5. TEXT BOOK OF MATHEMATICS BY G B GURURAJACHAR

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SEMESTER-IV

24OMT- 2: BASIC MATHEMATICS – II (Open Elective)

TOTAL HOURS – 32

UNIT-I: STATISTICS **(16 hours)**

Measures of Dispersion: Range, Mean deviation, Variance, and standard deviation of ungrouped/grouped data. Analysis of frequency distributions with equal means but different variances.

UNIT-II: MATRICES AND DETERMINANTS **(16 hours)**

Types of Matrices and problems, addition, subtraction and multiplication of matrices and examples. Definition of Determinant of square matrix and its properties with examples. Eigen equation and Eigen values. Cayley-Hamilton theorem (statements only), verification of cayley Hamilton theorem for square matrices of order two only. Finding inverse of a matrix by Cayley Hamilton theorem.

Reference:

1. A TEXT BOOK OF MATHEMATICS BY G K RANGANATH
2. TEXT BOOK OF MATHEMATICS BY O P ARORA
3. TEXT BOOK OF MATHEMATICS BY SS BOSSCO
4. A TEXT BOOK OF MATHEMATICS BY V SEETHA RAMAIAH
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QUESTION PAPER PATTERN FOR OPEN ELECTIVE
(Semesters III & VI)

B.Sc. Degree Examination; 2024-25
(Semester Scheme; New Syllabus: 2024-25)

SUBJECT: Basic Mathematics-I (Open Elective)

Paper –_____: _____
Paper Code: _____

Time: 2 Hours **Max. Marks: 40**

Instructions to candidates:

1) All sections are compulsory
2) Draw neat and labeled diagrams wherever necessary

SECTION-A

I. Answer the following questions **(5×2=10)**

a)

b)

c)

d)

e)

SECTION -B

II. Answer any six of the following **(6×5=30)**

1)

2)

3)

4)

5)

6)

7)

8)

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