

ದಾವಣಗೆರೆ ಪ್ರತಿಪ್ಪಿವಿದ್ಯಾನಿಲಯ ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ವಿಭಾಗ

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

ಸಂಖ್ಯೆ:ದಾವಿವಿ:ಗಆ.:2024–25**/200**

ದಿನಾಂಕ:18-06-2024

ಗೆ.

ಕುಲಸಚಿವರು (ಆಡಳಿತ) ದಾವಣಗೆರೆ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ ಶಿವಗಂಗೋತ್ತಿ ದಾವಣಗೆರೆ

ಮುಖಾಂತರ,

ಡೀನರು, ವಿಜ್ಞಾನ ನಿಕಾಯ, ದಾವಣಗೆರೆ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ ಶಿವಗಂಗೋತಿ, ದಾವಣಗೆರೆ

ಮಾನ್ಯರೆ,

ವಿಷಯ: ್ವಸ್ನಾತಕ ಪದವಿ ಗಣಿತಶಾಸ್ತ್ರ ಅಧ್ಯಯನ ವಿಭಾಗದ ಅಧ್ಯಯನ ಮಂಡಳಿ ಸಭೆಯಲ್ಲಿ ಪರೀಷ್ಕರಣೆ ಮಾಡಿರುವ ಬಿ.ಎಸ್ಸಿ., I ಮತ್ತು 2 ನೇ ಸೆಮಿಸ್ಟರ್ನ್ ಪಠ್ಯಕ್ರಮವನ್ನು ಕಳುಹಿಸುತ್ತಿರುವ ಬಗ್ಗೆ. ಉಲ್ಲೇಖ: ಸಂಖೈ:ದಾವಿವಿ:ಬಿ.ಓ.ಎಸ್./304/2024-25/719 ದಿನಾಂಕ:10-06-2024

ಈ ಮೇಲ್ಕಂಡ ವಿಷಯ ಹಾಗೂ ಉಲ್ಲೇಖಕ್ಕೆ ಸಂಬಂಧಿಸಿದಂತೆ. ಸ್ನಾತಕ ಪದವಿಯ ರಾಜ್ಯ ಶಿಕ್ಷಣ ನೀತಿ ಅನುಸಾರ ಬಿ.ಎಸ್ಸಿ., 1 ಮತ್ತು 2 ನೇ ಸೆಮಿಸ್ಟರ್ ಪಪಕ್ರಕ್ರಮ ಪರೀಷ್ಕರತೆಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ದಿನಾಂಕ:14–06–2024 (ಶುಕ್ರವಾರ) ದಂದು ಅಧ್ಯಯನ ಮಂಡಳಿ ಸಭೆಯನ್ನು ನಡಿಸಲಾಯಿತು. ಸದರಿ ಸಭೆಯಲ್ಲಿ ಪರೀಷ್ಕರಣೆ ಮಾಡಿರುವ ಪಠ್ಯಕ್ರಮವನ್ನು ಈ ಪತ್ರದೊಂದಿಗೆ ಲಗತ್ತಿಸಿ ತಮಗೆ ಮುಂದಿನ ಕ್ರಮಕ್ಕಾಗಿ ಕಳುಹಿಸಿಕೊಡುತ್ತಿದ್ದೇವೆ.

ವಂದನೆಗಳೊಂದಿಗೆ

18.06-204

Dr. U.S. MAHABALESHWAR M.Sc., M.Phil., Ph.D. M.Sc., & Technology Professor & Dean, Science & Technology Professor & University, Shivagangotri, Davangere-577 007, Karnataka, India. Davangere-577 007, Karnataka, India. First floor, M.B.A. Building, Shivagangotri, Davangere – 577 007, Karnataka Contact: +9180959 07689, E-mail: dudygmaths@gmail.com, prakashadg@gmail.com

NO: DU: Math/2024-25

Date: 14/06/2024

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 Department of Mathematics, Davangere University, Davangere on 14th June, 2024 (Friday) at 11.30AM.

The following members were present:

Chairman and Members in	Signature	
Smt. Jagadeeshwari A. M.	Member (UG-BOS)	Ami
Smt. Geetha H. V.	Member (UG-BOS)	-geelha H.V.
Dr. Anand G. Puranik	Member (UG-BOS)	Baul
Dr. Yogesh K. M.	Member (UG-BOS)	yortaxu
Dr. Shivaraj N.	Special Invitee	0 ====
Dr. Prasannakumara B. C.	Member (UG-BOS)	Berla
	(Co-Opt)	

Member Absent: Dr. U. S. Mahabaleshwar, Dept. of Mathematics, DUD.

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 03rd August, 2023.

Item No. 2: Approval of Syllabus for the First and Second Semester UG Course in Mathematics according to the State Education Policy.

Resolution No. 2: Board thoroughly gone through the regulations of State Education Policy (SEP), and discussed the syllabus in detail. Further, it is resolved to approve and recommend the syllabus to Davangere University for implementation from the academic year 2024-25 under SEP for UG First & Second Semesters (See, Appendix - I).

Item No. 3: Up-gradation of panel of Examiners for UG Mathematics Examinations of 2024-25 & 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 2024-25 & 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 (UG-BOS in Mathematics)

Davangere University
Davangere-7.





Bachelor of Science (B.Sc.) Semester Scheme Curriculum Structure for Undergraduate Programme for 2024-25

Syllabus for Mathematics

SI. No.	Course/Paper Code	Title of the Paper	Subject Category	Teaching Hours/ week	Semester End Exam.	Internal	Total Marks	Credits	Examination Duration
1	2	3	4	5	6	7	8	9	10
	24 MT L Al L L LO	Semeste					•		
1	24-MT-I Algebra-I and Calculus-I MT-T Practical – I Mathematics Lab – I MT-P		04	80	20	100	03	3 Hrs.	
	Fractical – 1 Mathematics L	1711-1		04	40	10	50	02	3 Hrs.
		Total		08	120	30	150	05	
		Semester	-II						
2	24-MT-II Algebra-II and C		MT-T	04	80	20	100	03	3 Hrs.
	Practical – II Mathematics I	ab – II	МТ-Р	04	40	10	50	02	3 Hrs.
		Total		08	120	30	150	05	
		Semester-	III		•				
	24-MT-III Algebra –III and	d Calculus-III	MT-T	04	80	20	100	03	3 Hrs.
3	Practical – III Mathematics Lab – III		МТ-Р	04	40	10	50	02	3 Hrs.
	Elective/Optional – I* Foundations of Mathematics - I		EL/OP-	02	40	10	50	02	2 Hrs.
		Total		10	160	40	200	07	
		Semester-	IV						
	24-MT-IV Differential Equat	ions - I and Calculus-IV	MT-T	04	80	20	100	03	3 Hrs.
4	Practical –IV Mathematics Lab – IV MT-P		04	40	10	50	02	3 Hrs.	
·			EL/OP-	02	40	10	50	02	2 Hrs.
		Total		10	160	40	200	07	
		Semester-	V						
	24-MT-VA Algebra – IV an	d Differential Equations - II	MT-T	04	80	20	100	03	3 Hrs.
5	24-MT-VB Numerical Analy	sis and Integrals	MT-T	04	80	20	100	03	3 Hrs.
	Practical – V Mathematics Lab – V		MT-P	04	40	10	50	02	3 Hrs.
		Total		12	200	50	250		
	Semester-VI 12 200 50 250 08								
	24-MT-VIA Linear Algebra	and Geometry of Space Curves	MT-T	04	80	20	100	0.2	2
6	24-MT-VIB Complex Analys		MT-T	04		20	100	03	3 Hrs.
	Practical – VI Mathematics I				80	20	100	03	3 Hrs.
				04	40	10	50	02	3 Hrs.
	1 10 Joen meerisiiip/Dissertatio		AEDP	02	40	10	50	02	1 hr
	Total			14	240	60	300	10	
	Grand total		62	1000	250	1250	42		

MT: Major Course; MT-T: Major Course Theory; MT-P: Major Course Practical; El/Op: Elective/Optional; AEDP: Apprenticeship Embedded Degree Programme Chairman.

*In Semester-III and Semester-IV elective papers are offered. There shall be 02 elective papers offered during Mathematics semester (Semester-III and Semester-IV) by every major subject offering Department, where a student shaders ity choose/select/opt 01 elective paper out of two to study in each semester (Semester-III and Semester-IV). Shavangere-577007

THEORY PAPER **SEMESTER-I**

24MT-1: ALGEBRA - I AND CALCULUS - I

TOTAL HOURS - 56

Course Learning Objectives:

- a) To understand the concept of matrices thoroughly with its role in solving system of equations.
- b) To understand the concept of binary operation, semigroups, Monoids and groups with examples.
- c) To understand the concept of successive differentiation
- d) To explore the different tools for partial derivatives with problems associated with it.
- e) To understand the major polar curves.

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

- Solve the system of linear equations; find the Eigen values and Eigen vectors of a square
- b) Differentiate semi-groups, Monoids and groups with suitable examples and applications.
- c) Use Leibnitz's rule to evaluate derivatives of higher order.
- d) Identify major parts of the polar coordinate system.
- e) Acquire basic principles of algebra and calculus.

(14 Hrs) **UNIT I: MATRICES**

Elementary transformations; Row reduced Echelon form; Rank of a matrix; Inverse and Normal form of a matrix by elementary Operations; Solution of system of linear equations; Criteria for existence of trivial and non-trivial solutions of homogeneous and non-homogeneous system of linear equations; Eigen values and Eigen vectors of square matrices; Cayley- Hamilton theorem (without proof) and related problems.

UNIT II: BASIC ALGEBRA

(14 Hrs)

Binary operation on sets - properties, theorems and examples; Semigroup and Monoid - properties, theorems and examples; Definition of a Group - properties, theorems and examples; Order of a group; Modulo groups; Subgroups definition, criteria for subgroups, intersection and union of subgroups, Subgroups of cyclic groups.

UNIT III: SUCCESSIVE DIFFERENTIATION AND PARTIAL DERIVATIVES (14 Hrs)

Derivative of a function; Derivatives of higher order – nth derivatives of the functions : e^{ax} , $(ax + b)^n$, log(ax + b), sin(ax + b), cos(ax + b), $e^{ax}sin(bx + c)$, $e^{ax}cos(bx + c)$ with problems; Leibnitz theorem and its applications; Partial derivatives definition and examples; homogeneous functions; Euler's theorem and its extension; total derivatives and total differential; Jacobians-Problems.

Registrar Davangere University Shivagangotri, Davangere.

Dr. U.S. MAHABALESHWAR M.Sc., M.Phil., Ph.D. Professor & Dean, Science & Technology Shivagangotri, Davangere-577007 Davangere University, Shivagangotri, Davangere-577 007, Karnataka, India.

Department of Mathematics Davangere University

UNIT IV: POLAR CO-ORDINATES

(14 Hrs)

Polar coordinates; angle between the radius vector and tangent; Angle of Intersection of two curves; pedal equations; Derivative of an arc in Cartesian, parametric and polar forms; curvature of plane curveradius of curvature formula in Cartesian, parametric and polar and pedal forms; center of curvature-problems.

Suggested References/Text books:

- 1. I N Herstain, Topics in Algebra, Wiley Eastern Ltd., New Delhi.
- 2. Bernard & Child, Higher algebra, Arihant, ISBN: 9350943199/ 9789350943199.
- 3. Sharma and Vasishta, Modern Algebra, Krishna Prakashan Mandir, Meerut, U.P.
- 4. Shanti Narayan, P. K. Mittal, Differential Calculus, S. Chand & Company, New Delhi.
- 5. Vijay K Khanna and S K Bhambri, A Course in Abstract Algebra, Vikas Publications.
- 6. G K Ranganath, Text Book of B.Sc. Mathematics, S Chand & Company.
- 7. N.P. Bali. 9. Golden algebra. First Edition Edition 1 January 2018.

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PRACTICAL PAPER SEMESTER-I

24MP-1: MATHEMATICS LAB-I

(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 1 (Theory) may be solved with the help of programming.

Suggested Softwares: Maxima/Scilab/Phython.

<u>List of Programs (Suggested):</u>

- 1. Introduction to Scilab and Maxima with basic commands.
- 2. Algebra of Matrices. (Addition, subtraction, Multiplication, Transpose of a Matrix).
- 3. Computation of Rank of matrix and Row reduced Echelon form and Normal form of a matrix.
- 4. Solving the system of homogeneous and non-homogeneous linear algebraic equations.
- 5. Finding the Eigen Values and Eigen Vectors of a matrix.
- 6. Computation of Inverse of a Matrix using Cayley-Hamilton theorem.
- 7. Verification of binary operations.
- 8. Verification of Commutative and Associative Laws.
- 9. Find the identity element and inverse of an element.
- 10. Finding the nth derivative using Leibnitz rule.
- 11. Finding the derivatives and Partial derivatives of a function.
- 12. Verification of Euler's theorem and its extension.
- 13. To find Jacobians.
- 14. Finding the angle between the radius vector and tangent.

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15. Finding the angle of intersection of two curves and orthogonal curves otri, Davangere 577007

THEORY PAPER SEMESTER-II

24MT-2: ALGEBRA -II AND CALCULUS - II

TOTAL HOURS - 56

Course Learning Objectives:

- a) To understand the concept of groups, subgroups, Cyclic groups with examples.
- b) To understand the concept of mean value theorems.
- c) To understand the concept of tracing of curves.
- d) To understand the concept of integral calculus.

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

- a) Understand cyclic groups and its generators; Applications and importance of Lagrange's theorem. Also, able to find the all cosets of a finite group.
- b) Understand the importance of Rolle's theorem, Lagrange's theorem and Cauchy's mean value theorem.
- c) Plot of standard Cartesian, Polar and Parametric curves.
- d) Find the surface area and volume of solids of revolution.
- e) Acquire more knowledge on algebra and calculus.

UNIT I: GROUP THEORY

(14 Hrs)

Order of an element - properties, theorems and examples; Cyclic groups - properties, theorems and examples; Cosset decomposition - properties, theorems and examples; Lagrange's theorem and its consequences.

UNIT II: DIFFERENTIABILITY AND MEAN VALUE THEOREMS

(14 Hrs)

Rolle's theorem - statement and problems; Lagrange's mean value theorem; Cauchy's mean value theorem with proof and examples. Taylor's theorem, Maclaurin's series, indeterminate forms with examples.

UNIT III: TRACING OF CURVES

(14 Hrs)

Concavity, Convexity and points of inflexions; Asymptotes; Nature of singular and multiple points – Cusp, Node and Conjugate points; General rules for tracing of curves – tracing of standard Cartesian, parametric and polar curves.

UNIT IV: INTEGRAL CALCULUS

(14 Hrs)

Reduction formula for $sin^n x$, $cos^n x$, $tan^n x$, $cot^n x$, $sec^n x$, $cosec^n x$, $sin^m x cos^n x$ and its applications, Area of plane curves, Surface area and volume of solids of revolutions for standard cures in Cartesian, parametric and polar curves.

Suggested References/Text books:

- 1. I N Herstain, Topics in Algebra, Wiley Eastern Ltd., New Delhi.
- 2. Bernard & Child, Higher algebra, Arihant, ISBN: 9350943199/ 9789350943199.
- 3. Sharma and Vasishta, Modern Algebra, Krishna Prakashan Mandir, Meerut, U.P.
- 4. Shanti Narayan, Differential Calculus and integral calculus, S. Chand & Company, New Delhi.
- 5. Vijay K Khanna and S K Bhambri, A Course in Abstract Algebra, Vikas Publications.
- 6. G K Ranganath, Text Book of B.Sc. Mathematics, S Chand & Company.
- 7.M.K Sen and B C Chakraborty introduction to discrete mathematics, Allied publisher mathematics, Allied publisher mathematics.
- 8. M.D. Raisinghania, Ordinary and Partial Differential Equations. 20th Edition Davangere University
- 9. S Balachandra Rao Differential Calculus; Publisher, New Age International gotti. Davangere 577007

PRACTICAL PAPER

SEMESTER-II

24MP-2: MATHEMATICS LAB-II

(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 2 (Theory) may be solved with the help of programming.

Suggested Softwares: Maxima/Scilab/Phython.

List of Programs (Suggested):

- 1. Find the generators of a cyclic group.
- 2. Find all possible Cosets of a finite group.
- 3. Verification of Lagrange's theorem for finite groups.
- 4. Verification of Cauchy's mean value theorem.
- 5. Verification of Lagrange's mean value theorem.
- 6. Problems on Taylor's and Maclaurin's series.
- 7. Evaluation of limits using L-Hospital rule.
- 8. Plotting of asymptotes for the given equation of a curve.
- 9. Finding the nature of singular points.
- 10. Plotting of standard Cartesian, Polar and Parametric curves.
- 11. Problems on properties of integration.
- 12. Problems on Reduction Formula.
- 13. Problems to find area of curves.
- 14. Problems to find surface area of solids of revolution.
- 15. Problems to find volumes of solids of revolution.

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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 –:: _		
Time: 3 Hours		Max. Marks: 80
Instructions to candidates: 1) All sections are compulsory 2) Draw neat and labelled diagrams wherever in		
SECTIO	N-A	
1. Answer all the following questions:		(2×10=20)
a)		(= 13 10)
b)		
c)		
d)		
e)		
f)		
g)		
h)		
i)		
j)		
SECTIO	N-B	
Answer any SIX of the following:		(5×6=30)
		(3^0-30)
2. 3.		
4.		
5.		
6.		
7.		
7. 3.		
).		
SECT	TON -C	
Answer Any Three of the following:		(10×3=30)
0.	From Unit-I	210
11.	From Unit-II	BoS-Charman, Department of Mathematics
2.	From Unit-III	Davangere University Shivagangotri, Davangere-577007

From Unit-IV

13.

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		
(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/	05	
	Assignment etc., with proper record		
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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