MATHEMATICS SCHEME AND SYLLABUS OF NEP-2021-22

# JSS COLLEGE FOR WOMEN (AUTONOMOUS)

SARASWATHIPURAM, MYSURU-09



# **DEPARTMENT OF MATHEMATICS**

# PROPOSED, SCHEME AND SYLLABUS For the BACHELOR OF SCIENCE (B.Sc.), Mathematics Papers of I and II Semesters And Open Elective Subject for Non-Mathematics Courses

(Incorporating Practical with FOSS Tools)

Academic year 2021-22

#### PREAMBLE

The subject wise expert committee to draft model curriculum contents in Mathematics constituted by the Department of Higher Education, Government of Karnataka, Bangalore vide GO No. ED 260 UNE 2019 (PART-1) DATED 13.08.2021 is pleased to submit its partial report on the syllabus for the First Year (First & Second Semesters) B.Sc. (Basic/Honors) Mathematics and detailed Course Structure for B.Sc.(Honors) Mathematics and M.Sc. (One Year) Mathematics.

The committee discussed various models suggested by the Karnataka State Higher Education Council in its joint meetings with the Chairpersons of Board of Studies of all state universities in Karnataka and resolved to adopt Model IIA (Model Program Structure for the Bachelor of Science (Basic/Hons.) for the subjects with practical's with Mathematics as Major/Minor.

To achieve the core objectives of the National Education Policy 2020 it is unanimously resolved to introduce computer based practical's for the Discipline Core (DSC) courses by using Free and Open Source Software's (FOSS) tools for implementation of theory based on DSC courses as it is also suggested by the LOCF committee that the papers may be taught using various Computer Algebra System (CAS) software's such as Mathematica, MATLAB, Maxima, Python and R to strengthen the conceptual understanding and widen up the horizon of students' self-experience. In view of these observations the subject expert committee suggested the software's Phython /R / Maxima/ Scilab/ Maple/MatLab/Mathematica for hands on experience of implementation of mathematical concepts in computer based lab.

The expert committee suggests the implementation this curriculum structure in all the Departments of Mathematics in Universities/Colleges in Karnataka. The subject expert committee designed the Course Learning Outcome (CO) to help the learners to understand the main objectives of studying the courses by keeping in mind of the Programme outcomes (PO) of the graduate degree with honors in Mathematics or a graduate degree with Mathematics as a major subject.

As the Mathematics subject is a vast with several branches of specializations, it is difficult for every student to learn each branch of Mathematics, even though each paper has its own importance. Hence the subject expert committee suggests number of elective papers (for both Discipline electives and Open Electives) along with Discipline Core Courses. The BoS in Mathematics of universities may include additional electives based on the expertise of their staff and needs of the students. A student can select elective paper as per her/his needs and interest.

The subject expert committee in Mathematics suggests that the concerned Department/Autonomous Colleges/Universities to encourage their faculty members to include necessary topics in addition to courses suggested by the expert committee.

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#### MISSION AND VISION OF THE NEW SYLLABUS IN MATHEMATICS

#### **Mission**

- > Improve retention of mathematical concepts in the student.
- > To develop a spirit of inquiry in the student.
- To improve the perspective of students on mathematics as per modern requirement.
- To initiate students to enjoy mathematics, pose and solve meaningful problems, to use abstraction to perceive relationships and structure and to understand the basic structure of mathematics.
- To enable the teacher to demonstrate, explain and reinforce abstract mathematical ideas by using concrete objects, models, charts, graphs, pictures, posters with the help of FOSS tools on a computer.
- To make the learning process student-friendly by having a shift in focus in mathematical teaching, especially in the mathematical learning environment.
- Exploit techno-savvy nature in the student to overcome math-phobia.
- Propagate FOSS (Free and open source software) tools amongst students andteachers as per vision document of National Mission for Education.
- To set up a mathematics laboratory in every college in order to help students in the exploration of mathematical concepts through activities and experimentation.
- > To orient students towards relating Mathematics to applications.

#### <u>Vision</u>

- To remedy Math phobia through authentic learning based on hands-on experience with computers.
- To foster experimental, problem-oriented and discovery learning of mathematics.
- To show that ICT can be a panacea for quality and efficient education whenproperly integrated and accepted.
- To prove that the activity-centered mathematics laboratory places the student in a problem solving situation and then through self-exploration and discovery habituates the student into providing a solution to the problem based on his or her experience, needs, and interests.
- To provide greater scope for individual participation in the process of learning and becoming autonomous learners.
- To provide scope for greater involvement of both the mind and the hand which facilitates cognition?
- To ultimately see that the learning of mathematics becomes more alive, vibrant, relevant and meaningful; a program that paves the way to seek and understand the world around them. A possible by-product of such an exercise is that math- phobia can be gradually reduced amongst students.
- > To help the student build interest and confidence in learning the subject.

### Support system for Students and Teachers in understanding and learning FOSS TOOLS:

As a national level initiative towards learning FOSS tools, IIT Bombay for MHRD, Government of India is giving free training to teachers interested in learning open source software's like scilab, maxima, python, octave, geogebra and others.

# (Website:http://spoken-tutorial.org;email:contact@spoken-tutorial.org; info@spokentutorial.org)

#### **Meeting Notice**

#### JSS College for women(Autonomous),Saraswathipuram,Mysuru-09

#### **DEPARTMENT OF MATHEMATICS**

Date: 12-10-2021

To,

Dear Sir/Madam,

Sub: Meeting of the Board of Studies in Mathematics

I thank you sincerely for having been kind enough to accept our invitation to be a member of Board of Studies in Mathematics. With your guidance, we would achieve most of our academic goals. Keeping this in view, I reiterate my request to you to be a member of the BOS and be the guiding spirit in our academic activities during the academic year 2021-22.

I take pleasure informing you that the Board of Studies Meeting in Mathematics is scheduled to be held **on 16<sup>th</sup> October 2021 at 11-00 A.M.** in the Department of Mathematics, The JSS College for Women [Autonomous], Saraswathipuram, Mysuru to discuss following agenda.

I request you to make it convenient to attend the meeting. We look forward to your august presence in the meeting.

Agenda:

- 1. Discussion in detail on I & II Semester B.Sc Syllabus
- 2. Approval of Panel of External Examiners and Board of Examiners.
- 3. Any other subject matter.

Thanking you,

Yours sincerely,

Prathiba Urs .L Chairperson Board of Studies in Mathematics JSS College for women(Autonomous) Saraswathipuram ,Mysuru-09

### JSS College for Women (Autonomous), Saraswathipuram, Mysuru-09 DEPARTMENT OF MATHEMATICS

Proceedings of the meeting of Board of Studies in Mathematics (UG) held at Department of Mathematics on 16/10/2021 at 11am.

#### Chairperson: Smt. Prathiba Urs .L

Members present:

SL. No	Name of the Members	Member	Signature
1	Smt. Prathiba Urs. L Assistant Professor of Mathematics JSS College for Women (Autonomous), Mysuru.	Chairperson	
2	Dr. Vasuki . K. R Professor, DoS in Mathematics Manasagangothri University of Mysore. Mysuru	University Nominee	
3	Dr. Jayanthi. C Associate Professor Department of Mathematics Teresian College, Mysuru.	Subject Expert	
4	Dr. Renuka devi Assistant Professor Department of Mathematics Govt. First Grade College Kuvempunagar, Mysuru.	Subject Expert	
5	Dr. M. C. Mahesh Kumar Assistant Professor Department of Mathematics Govt. First Grade College K. R. Puram, Bengaluru.	External Member of Other University	
6	Dr. Shivakumar Swamy .C. S Assistant Professor Department of Mathematics Government College for Women (Autonomous), Mandya	External Member.	
7	Smt. Nethravathi .S Assistant Professor Department of Mathematics JSS College for Women (Autonomous), Mysuru.	Senior Faculty	
8	Ms. Rajeshwari .G Assistant Professor Department of Mathematics Maharani's Science College (Autonomous), Mysuru.	Alumni	

#### **Resolution passed in the meeting:**

- 1. The chairman, BOS of Mathematics department welcomed and introduced the members of Board of Studies and thanked each one of them for sparing their valuable time to attend the meeting.
- 2. The BOS Committee members discussed the model of National Education Policy (NEP) syllabus of I and II Semester for B.Sc course in Mathematics suggested by Karnataka State Higher Education Council and approved the same with minor changes.
- 3. The instructions and the Scheme of Examination are approved.
- 4. The question paper pattern is approved.
- 5. The panel of Examiners list is approved.
- 6. Resolved that the NEP 2020 is applicable only to those students admitted during 2021 onwards.
- 7. The Syllabus, the Scheme of Examination and Question paper pattern for open electives in Mathematics for students of both Science and other than Science Streams are approved.
- 8. The Syllabus, the Scheme of Examination and Question paper pattern of <u>certificate course</u> is approved.
- 9. Finally, the Chairperson of Mathematics department thanked the members of B.O.S.

Date:

Signature of the Chairperson (Prathiba Urs .L) Board of Studies in Mathematics JSS College for women(Autonomous) Saraswathipuram ,Mysuru-09

### III A. Model Program Structures for the Under-Graduate Programs in Universities and Colleges in Karnataka

Bachelor of Science (Basic/Hons.) in subjects with practical with both subjects as majors in the 3<sup>rd</sup> year

Sem.	Discipline	Discipline	Ability Enhancement Skill Enhancement Courses			Tot		
	Core	Elective(DSE) /	Compulsory Courses		(SEC)			
	(DSC)	Open Elective	(AECC), Languages		Skill	Value based (Credits)		Cre
	(Credits)	(OE) (Credits)	(Credits)(L+7	<b>(+P)</b>	based	(L+T+P)		dits
	(L+T+P)	(L+T+P)			(Credits) (L+T+P)			
Ι	Discipline	OE-1 (3)	L1-1(3), L2-		SEC-1:	Physical Education	Health &	25
	A1(4+2)		1(3)		Digital	for fitness(1)( $0+0+2$ )	Wellness	
	Discipline		(4 hrs. each)		Fluency		(1)(0+0+2)	
	B1(4+2)				(2)(1+0+2)			
					)			
II	Discipline	OE-2 (3)	L1-2(3), L2-	Environme		Physical Education	NCC/NSS/R&	25
	A2(4+2)		2(3)	ntal		- Yoga(1) (0+0+2)	R(S&G)	
	Discipline		(4 hrs. each)	Studies			/Cultural (1)	
	B2(4+2)			(2)			(0+0+2)	
		Γ	Exit option	with Certif	icate (50 cre	edits)	1	
III	Discipline	OE-3 (3)	L1-3(3), L2-		SEC-2:	Physical Education-	NCC/NSS/R	25
	A3(4+2)		3(3)		Artificial	Sports (1) (0+0+2)	&R(S&G)	
	Discipline		(4 hrs. each)		Inte-		/Cultural	
	B3(4+2)				lligence		(1)(0+0+2)	
					(2)(1+0+2)			
					)			
IV	Discipline	OE-4 (3)	L1-4(3), L2-	Constituti		Physical Education -	NCC/NSS/R	25
	A4(4+2)		4(3)	on		Games (1) (0+0+2)	&R(S&G)	
	Discipline		(4 hrs. each)	of India			/Cultural	
	B4(4+2)			(2)			(1)(0+0+2)	
Exi	t option with I	Diploma (100 cre	dits) or continu	ue the third	year with bo	th the subjects as major	s	
V	Discipline A	5(3+2),			SEC-3:			22
	Discipline A	6(3+2)			SEC such			
	Discipline Ba	5(3+2),			asCyber			
	Discipline B	6(3+2)			Security			
					(2)			
					(1+0+2)			
VI	Discipline A	7(3+2),			SEC-4:			24
	Discipline A	8(3+2)			Professiona	l		
	Discipline B	7(3+2)			Communic	a		
	Discipline B	8(3+2)			tion (2)			
	Internship (2)							
Ex	Exit option with Bachelor of Arts, B.A./ Bachelor of Science, B. Sc. Basic Degree (146 credits) or Choose one of the							
Discipl	ines as Major							22
VII		DS-A/B						22
	A/B-9(3+2)	Elective-1(3)						
	Discipline	DS-A/B						
	А/В-	Elective- $2(3)$						

	10(3+2)	Res.Methodolo					
	Discipline	gy(3)					
	A/B-11(3)						
VIII	Discipline	DS-A/B					20
	A/B-	Elective 3(3)					
	12(3+2)	Research					
	Discipline	Project (6)*					
	A/B-13(3)						
	Discipline						
	A/B-14(3)						
Award of Bachelor of Arts Honours, B.A. (Hons.)/ Bachelor of Science Honours, B.Sc. (Hons) degree in a discipline							
etc. (18	38 credits)						

# Assessment

# Weightage for the Assessments (in percentage)

Type of Course	Formative Assessment	Summative Assessment
	/ <b>I.A.</b>	( <b>S.A.</b> )
Theory		
	C1+C2=40%	60 %
	C1=10+10=20 marks	
	C2=10+10=20 marks	60 marks
	Total =40 marks	
Practical	C1+C2=50%	50 %
	C1=10 marks	
	C2=10+5(record) marks	
		25 marks
	Total =25 marks	
Projects		
Experiential Learning		
(Internship etc.)		

## **B.Sc. MATHEMATICS (HONOURS)**

## **Programme Outcomes (PO)**

By the end of the program the students will be able to:

PO 1	<b>Disciplinary Knowledge</b> : Bachelor degree in Mathematics is the culmination of in-depth knowledge of Algebra, Calculus, Geometry, differential equations and several other branches of pure and applied
	mathematics. This also leads to study the related areas such as computer science and other allied subjects
PO 2	Communication Skills: Ability to communicate various mathematical
	concepts effectively using examples and their geometrical visualization.
	The skills and knowledge gained in this program will lead to the
	proficiency in analytical reasoning which can be used for modeling and
DO 2	solving of real life problems.
103	programme acquire ability of critical thinking and logical reasoning and
	capability of recognizing and distinguishing the various aspects of real life
	problems.
PO 4	Problem Solving : The Mathematical knowledge gained by the students
	through this programme develop an ability to analyze the problems,
	identify and define appropriate computing requirements for its solutions This programme enhances students overall development and also
	equip them with mathematical modelling ability, problem solving skills.
PO 5	<b>Research related skills:</b> The completing this programme develop the
	capability of inquiring about appropriate questions relating to the
DO (	Mathematical concepts in different areas of Mathematics.
PO 6	<b>Information/digital Literacy</b> : The completion of this programme will analysis the learner to use an propriete softwares to solve system of electronic
	equation and differential equations
PO 7	<b>Self</b> – <b>directed learning</b> : The student completing this program will
	develop an ability of working independently and to make an in-depth study
	of various notions of Mathematics.
PO 8	Moral and ethical awareness/reasoning: The student completing this
	program will develop an ability to identify unethical behavior such as
	objectives unbiased and truthful actions in all aspects of life in general and
	Mathematical studies in particular.
PO 9	Lifelong learning: This programme provides self directed learning and
	lifelong learning skills. This programme helps the learner to think
	independently and develop algorithms and computational skills for solving
PO 10	Ability to peruse advanced studies and research in pure and applied
	Mathematical sciences.

# Contents of the Course B.Sc. with Mathematics as Major Subject & B.Sc. (Honours) Mathematics

er	Course No.	ļ	S	Paper Title		Ma	arks		Grand
est		ory tica	bili				I.A.		
Sem		Theo Prac	Cre		S.A.	C1	C2	Total	Total
Ι	MATDSCT1.1	Theory	4	Algebra - I and Calculus – I	60	20	20	40	100 50
	MATDSCP1.1	Practical	2	Theory based Practical's on Algebra - I and Calculus – I	25	10	10+5 (record)	25	100+50
	MATOET1.1 MATOET1.2 MATOET1.3	Theory Theory Theory	3	Optional Mathematics – I Business Mathematics – I Mathematical Aptitude – I	60	20	20	40	100
Π	MATDSCT2.1	Theory	4	Algebra - II and Calculus – II6020204		40			
	MATDSCP2.1	Practical	2	Theory based Practical's on Algebra - II and Calculus – II	25	10	10+5 (record)	25	100+50
	MATOET2.1 MATOET2.2 MATOET2.3	Theory Theory Theory	3	Optional Mathematics – II Business Mathematics-II Mathematical Aptitude – II	60	20	20	40	100
			E	xit Option with Certificate	1		1	1	

#### **Model IIIA**

1. Scheme of Admission: As per the University rules.

2. Eligibility: As prescribed by the University.

3. Scheme of Examination: Continuous assessment.

# Credit Distribution for B.A./B.Sc. (Honours) with Mathematics asMajor in the 1st Year(For Model IIIA)

		Major/ Minor			Credit	ts		
Subject	Semester	in the 3 <sup>rd</sup> Year	Disciplin eSpecific Core (DSC)	Open Electiv e(OE)	Discipline Specific Elective (DSE)	AECC & Languag es	Skill Enhanceme ntCourses (SEC)	Total Credi ts
Mathematics	I – IV	Major	4 Courses (4+2)x 4=24	4 Courses 3 x 4 = 12		(4+4=8) Courses 8x(3+1)=32	2 Courses 2x(1+1)= 4	72
Other Subject		Minor	24					24
					•			96

#### CURRICULUM STRUCTURE FOR UNDERGRADUATE DEGREE PROGRAM

Name of the Degree Program : B.Sc. (Honors)

Discipline/Subject

: Mathematics

Starting Year of Implementation : 2021-22

#### **PROGRAM ARTICULATION MATRIX**

Semester	Course No.	Programme Outcomes thatthe Course Addresses	Pre-Requisite Course(s)	Pedagogy*	Assessment**
Ι	MATDSCT1.1	PO 1, PO 2, PO 3	-	МООС	CLASS TESTS
Π	MATDSCT2.1	PO 1, PO 2, PO 3, PO 8	MATDSCT1.1	PROBLEM SOLVING	
III	MATDSCT3.1	PO 1, PO 4, PO7, PO 8		SEMINAR	SEMINAR
IV	MATDSCT4.1	PO 1, PO 4, PO7, PO 8	MATDSCT3.1	PROJECT BASED	QUIZ
V	MATDSCT5.1	PO 1, PO 2, PO 3, PO 5		LEARNING	ASSIGNMENT
v	MATDSCT5.2	PO 3, PO 4, PO 7, PO10	MATDSCT2.1	ASSIGNMENTS	
VI	MATDSCT6.1	PO 6, PO 7, PO 10.	MATDSCT5.2	GROUP DISCUSSION	
VI	MATDSCT6.2	PO 3, PO 4, PO 5, PO 8, PO 9, PO 10.	MATDSCT1.1 & MATDSCT2.1		TERM END
VII	MATDSCT7.1	PO 3, PO 4, PO5, PO 7, PO 9.	MATDSCT1.1 & MATDSCT2.1		EXAM
VII	MATDSCT7.2	PO 2, PO 4, PO 5, PO 10	MATDSCT3.1		
VII	MATDSCT7.3	PO 2, PO 4, PO 5, PO 10	MATDSCT3.1		
VIII	MATDSCT8.1	PO 2, PO 4, PO 5, PO 10	MATDSCT5.1		
VIII	MATDSCT8.2	PO 2, PO 4, PO 5, PO 10	MATDSCT4.1		VIVA-VOCE
VIII	MATDSCT8.3	PO 2, PO 4, PO 5, PO 10	MATDSCT7.3		

\*\* Pedagogy for student engagement is predominantly Lecture. However, other pedagogies enhancing better student engagement to be recommended for each course. This list includes active learning/ course projects / Problem based or Project based Learning / Case Studies / Self Study like Seminar, Term Paper or MOOC.

\*\*\* Every Course needs to include assessment for higher order thinking skills (Applying/ Evaluating / Creating). However, this column may contain alternate assessment methods that help formative assessment ( i.e. assessment for Learning).

# I- SEMESTER

### Syllabus for B.Sc. with Mathematics as Major Subject B.Sc. (Hons) Mathematics

#### SEMESTER – I

MATDSCT 1.1: Algebra - I and Calculus – I				
Teaching Hours : 4 Hours/Week	Credits: 4			
Total Teaching Hours: 56 Hours	Max. Marks: 100			
	(S.A60 + I.A 40)			

Course Learning Outcomes: This course will enable the students to

- Learn to solve system of linear equations.
- Solve the system of homogeneous and non homogeneous linear of *m* equations in *n* variables by using concept of rank of matrix.
- Students will be familiar with the techniques of integration and differentiation of function with real variables.
- Students learn to solve polynomial equations.
- Learn to apply Reduction formulae.

Unit-I: Matrix: Recapitulation of Symmetric and Skew Symmetric matrices, Algebra of Matrices; Row and column reduction to Echelon form. Rank of a matrix; Inverse of a matrix by elementary operations; Solution of system of linear equations; Criteria for existence of non-trivial solutions of homogeneous system of linear equations. Solution of non-homogeneous system of linear equations. Cayley- Hamilton theorem, inverse of matrices by Cayley-Hamilton theorem (without proof) 14 Hours

Unit-II: Theory of equations: Euclid's algorithm, Polynomials with integral coefficients, Remainder theorem, Factor theorem, Fundamental theorem of algebra(statement only), Irrational and complex roots occurring in conjugate pairs, Relation between roots and coefficients of a polynomial equation, Symmetric functions, Transformation, Reciprocal equations, Descartes' rule of signs, Multiple roots, Solving cubic equations by Cardon's method, Solving quartic equations by Descarte's Method. 14 Hours

Unit-III: Successive Differentiation and Integral Calculus-I: nth Derivatives of Standard functions  $e^{ax+b}$ ,  $a^x$ ,  $(ax + b)^n$ ,  $\log(ax + b)$ ,  $\sin(ax + b)$ ,  $\cos(ax + b)$ ,  $e^{ax}$  $\sin(bx + c)$ ,  $e^{ax}\cos(bx + c)$ , Leibnitz theorem and its applications.

Recapitulation of definite integral and its properties. Reduction formulae for  $\int \sin^n x \, dx$ ,  $\int \cos^n x \, dx$ ,  $\int \sin^n x \cos^m x \, dx$ ,  $\int \tan^n x \, dx$ ,  $\int \cot^n x \, dx$ ,  $\int \sec^n x \, dx$ ,  $\int \csc^n x \, dx$ ,  $\int \sec^n x \, dx$ ,  $\int \sec^n x \, dx$ ,  $\int \sec^n x \, dx$ ,  $\int \cosh^n x$ 

**14 Hours** 

**Unit-IV: Partial Derivatives:** Functions of two or more variables-explicit and implicit functions, partial derivatives. Homogeneous functions- Euler's theorem and extension of Euler's theorem, total derivatives, differentiation of implicit and composite functions, Jacobians and standard properties and illustrative examples. Taylor's and Maclaurin's series for functions of two variables, Maxima-Minima of functions of two variables. 14 Hours

- 1. University Algebra N.S. Gopala Krishnan, New Age International (P) Limited.
- 2. Algebra Natarajan, Manicavasagam Pillay and Ganapathy.
- 3. Theory of Matrices B S Vatsa, New Age International Publishers.
- 4. Matrices A R Vasista, Krishna Prakashana Mandir.
- 5. Differential Calculus Shanti Narayan, S. Chand & Company, New Delhi.
- 6. Applications of Calculus, Debasish Sengupta, Books and Allied (P) Ltd., 2019.
- 7. Calculus Lipman Bers, Holt, Rinehart & Winston.
- 8. Calculus S Narayanan & T. K. Manicavachogam Pillay, S. Viswanathan Pvt. Ltd., vol. I & II.
- 9. Schaum's Outline of Calculus Frank Ayres and Elliott Mendelson, 5th ed. USA: Mc. Graw.
- 10. Shanthinarayan Integral Calculus, New Delhi: S. Chand and Co. Pvt. Ltd.
- 11. Shanthinarayan and P K Mittal, Integral Calculus, Reprint. New Delhi: S. Chand and Co. Pvt. Ltd., 2013.

# Practical

MATDSCP 1.1: Practical's on Algebra - I and Calculus – I				
Practical Hours : 4 Hours/Week	Credits: 2			
Total Practical Hours: 56 Hours	Max. Marks: 50			
	(S.A25 + I.A 25)			

Course Learning Outcomes: This course will enable the students to

- Learn *Free and Open Source Software (FOSS)* tools for computer programming
- Solve problem on algebra and calculus theory studied in **MATDSCT 1.1** by usingFOSS software's.
- Acquire knowledge of applications of algebra and calculus through

#### FOSSPractical/Lab Work to be performed in Computer Lab (FOSS)

**Suggested Software's**: Maxima/Scilab /Python/R.

Introduction to the software and commands related to the topic.

- 1. Computation of addition and subtraction of matrices,
- 2. Computation of Multiplication of matrices.
- 3. Computation of Trace and Transpose of Matrix
- 4. Computation of Rank of matrix and Row reduced Echelon form.
- 5. Computation of Inverse of a Matrix using Cayley-Hamilton theorem.
- 6. Solving the system of homogeneous and non-homogeneous linear algebraic equations.
- 7. Finding the nth Derivative of *e*<sup>ax</sup>, trigonometric and hyperbolic functions
- 8. Finding the nth Derivative of algebraic and logarithmic functions.
- 9. Finding the nth Derivative of  $e^{ax} \sin(bx + c)$ ,  $e^{ax} \cos(bx + c)$ .
- 10. Finding the partial derivatives of some functions.
- 11. Program to verify the Euler's theorem and it's extension.
- 12. Program to find the Jacobians.
- 13. Programs to construct series using Maclaurin's expansion for functions of two variables.

# **Open Elective**

(For students of Science stream who have not chosen Mathematics as one of Core subjects)

MATOET 1.1: Optional Mathematics – I				
Teaching Hours : 3 Hours/Week	Credits: 3			
Total Teaching Hours: 42 Hours	Max. Marks: 100			
	(S.A60 + I.A 40)			

Course Learning Outcomes: This course will enable the students to

- Learn to solve system of linear equations.
- Solve the system of homogeneous and non homogeneous m linear equations by using the concept of rank of matrix.
- Students will be familiar with the techniques of differentiation of function with realvariables.
- Identify and apply the intermediate value theorems and L'Hospital rule.
- Learn to apply Reduction formulae.

Unit-I: Matrices: Recapitulation of Symmetric and Skew Symmetric matrices, Algebra of Matrices; Row and column reduction, Echelon form. Rank of a matrix; Inverse of a matrix by elementary operations; Solution of system of linear equations; Criteria for existence of non-trivial solutions of homogeneous system of linear equations. Solution of non-homogeneous system of linear equations. Cayley- Hamilton theorem, inverse of matrices by Cayley-Hamilton theorem 14 Hours

**Unit-II: Theory of equations**: Euclid's algorithm, Polynomials with integral coefficients, Remainder theorem, Factor theorem, Fundamental theorem of algebra(statement only), Irrational and complex roots occurring in conjugate pairs, Relation between roots and coefficients of a polynomial equation, Symmetric functions, Transformation, Reciprocal equations, Descartes' rule of signs, Multiple roots, Solving cubic equations by Cardon'smethod, Solving quartic equations by Descarte's Method. **14 Hours** 

**Unit-III:** Successive Differentiation and Integral Calculus-I: nth Derivatives of Standard functions  $e^{ax^+}$ ,  $a^x$ ,  $(ax + b)^n$ ,  $\log(ax + b)$ ,  $\sin(ax + b)$ ,  $\cos(ax + b)$ ,  $e^{ax} \sin(bx + c)$ ,  $e^{ax} \cos(bx + c)$ , Leibnitz theorem and its applications.

Recapitulation of definite integrals and its properties. Reduction formulae for  $\int \sin^n x \, dx$ ,  $\int \cos^n x \, dx$ ,  $\int \sin^n x \cos^m x \, dx$ ,  $\int \tan^n x \, dx$ ,  $\int \cot^n x \, dx$ ,  $\int \sec^n x \, dx$ ,  $\int \csc^n x \, dx$ ,  $\int \csc^n x \, dx$ ,  $\int x^n \sin x \, dx$ ,  $\int x^n \cos x \, dx$ ,  $\int x^n (\log x)^m \, dx$  with definite limits. **14 Hours** 

- 1. University Algebra N.S. Gopala Krishnan, New Age International (P) Limited.
- 2. Algebra Natarajan, Manicavasagam Pillay and Ganapathy.
- 3. Theory of Matrices B S Vatsa, New Age International Publishers.
- 4. Matrices A. R. Vasista, Krishna Prakashana Mandir.
- 5. Applications of Calculus, Debasish Sengupta, Books and Allied (P) Ltd., 2019.
- 6. Differential Calculus Shanti Narayan, S. Chand & Company, New Delhi.
- 7. Calculus Lipman Bers, Holt, Rinehart & Winston.
- 8. Calculus S. Narayanan & T. K. Manicavachogam Pillay, S. Viswanathan Pvt. Ltd. vol. I & II.
- 9. Schaum's Outline of Calculus Frank Ayres and Elliott Mendelson, 5th ed. USA: Mc.Graw.
- 10. Shanthinarayan Integral Calculus, New Delhi: S. Chand and Co. Pvt. Ltd.
- 11. Shanthinarayan and P K Mittal, Integral Calculus, Reprint. New Delhi: S. Chandand Co. Pvt. Ltd., 2013. vol. I & II.
- 12. Schaum's Outline of Calculus Frank Ayres and Elliott Mendelson, 5th ed. USA: Mc.Graw.
- 13. Shanthinarayan Integral Calculus, New Delhi: S. Chand and Co. Pvt. Ltd.
- 14. Shanthinarayan and P K Mittal, Integral Calculus, Reprint. New Delhi: S. Chandand Co. Pvt. Ltd., 2013.

# **Open Elective**

 (For Students of all Streams)

 MATOET 1.2: Business Mathematics-I

 Teaching Hours : 3 Hours/Week
 Credits: 3

 Total Teaching Hours: 42 Hours
 Max. Marks: 100

 (S.A.- 60 + I.A. - 40)
 (S.A.- 60 + I.A. - 40)

Course Learning Outcomes: This course will enable the students to

- Translate the real word problems through appropriate mathematical modellling.
- Explain the concepts and use equations, formulae and mathematical expression and relationship in a variety of context.
- Finding the extreme values of functions.
- Analyze and demonstrate the mathematical skill require in mathematically intensiveareas in economics and business.

Unit-I: Algebra – Set theory and simple applications of Venn Diagram, relations, functions, indices, logarithms, permutations and combinations. Examples on commercial mathematics. 14 Hours

**Unit - II: Matrices**: Definition of a matrix; types of matrices; algebra of matrices. Properties of determinants; calculations of values of determinants upto third order; Adjoint of a matrix, elementary row and column operations; solution of a system of linear equations having unique solution and involving not more than three variables. Examples on commercial mathematics.

#### **14 Hours**

**Unit - III: Differential Calculus**: Constant and variables, functions, Limits & continuity. Differentiability and Differentiation, partial differentiation, rates as a measure, maxima, minima, Partial Derivatives up to second order; Homogeneity of functions and Euler's Theorem; Total Differentials; Differentiation of implicit function with the help of total differentials, Maxima and Minima; cases of one variable involving second or higher order derivatives; Cases of two variables involving not more than one constraint.

#### **14 Hours**

- 1. Basic Mathematics, Allel R.G.A, Macmillan, New Delhi.
- 2. Mathematics for Economics, Dowling, E.T., Schaum's Series, McGraw Hill London.
- 3. Quantitative Techniques in Management, Vohra, N.D., Tata McGraw Hill, NewDelhi.
- 4. Business Mathematics, Soni R.S., Pitamber Publishing House, Delhi.

# **Open Elective**

(For Students of all Streams)

MATOET 1.3: Mathematical Aptitude-I	
Teaching Hours : 3 Hours/Week	Credits: 3
Total Teaching Hours: 42 Hours	Max. Marks: 100
	(S.A 60 + I.A. – 40)

Course Learning Outcomes: This course will enable the students to

- have a strong base in the fundamental mathematical concepts.
- grasp the approaches and strategies to solve problems with speed and accuracy
- gain appropriate skills to succeed in preliminary selection process for recruitment

**Unit-I:** Number System, Types of Numbers, series (AP and GP), Algebraic operations BODMAS, Divisibility, LCM and HCF, Fraction, Simplification.

**Unit-II:** Time and Distance, Problems based on Trains, Boats and Streams.

**Unit-III:** Time, work and wages, Pipes and Cistern, Problems on Clock, Problems on Calendar.

- 1. R.S. Aggarwal, "Quantitative Aptitude for Competitive Examinations", Revised Edition, S. Chandand Co. Ltd, New Delhi, 2018.
- 2. Quantitative Aptitude and Reasoning by R V Praveen, PHI publishers.
- 3. Quantitative Aptitude : Numerical Ability (Fully Solved) Objective Questions, Kiran Prakashan, Pratogitaprakasan, Kic X, Kiran Prakasan publishers.
- 4. Quantitative Aptitude for Competitive Examination by Abhijit Guha, Tata Mc Graw hillpublications.

#### AN AUTONOMOUS COLLEGE OF THE UNIVERSITY OF MYSORE

First Semester B.Sc.(NEP-CBCS) Examination

#### MATHEMATICS

Algebra-I & Calculus -I

Time:2 Hours	Max.marks:60	
Instructions: 1) Section A is compulsory. 2) All questions in section B and C carry equal marks.		
SECTION – A Answer any FIVE questions .Each question carries two marks:	2 × 5=10	
1. a)b)c)d)d		
e)f)g)		
SECTION – B (I &II Unit)		
Answer any FIVE questions .Each question carries Equal marks: 2.	5 × 5=25	
3.		
4.		
5.		
6.		

7. 8.

#### ••

#### SECTION – C (III &IV Unit)

	Answer any FIVE questions .Each question carries equal marks:	$5 \times 5=25$
9.		
10.		
11.		
12.		
13.		
14.		
15.		

#### AN AUTONOMOUS COLLEGE OF THE UNIVERSITY OF MYSORE

#### First Semester B.Sc. (NEP-CBCS)Practical Examination

#### MATHEMATICS

**Time:3Hours** 

Max.marks:20+5(viva)=25

Answer all questions .Each question carries five marks:

1. .....

2. .....

3. ....

4. .....

#### AN AUTONOMOUS COLLEGE OF THE UNIVERSITY OF MYSORE

#### First Semester B.Sc.(NEP-CBCS) Examination -Open Elective

#### MATHEMATICS

Time: 2Hours	Max.marks:60
Instructions: 1) All questions in sections A, B and C carry equal marks.	
SECTION – A	
(Unit-I)	
Answer any FOUR questions .Each question carries equal marks:	$5 \times 4=20$
1.	
a)b)c)c)	
d)f)f)	
SECTION – B	
(Unit-2)	
Answer any FOUR questions .Each question carries equal marks:	5 × 4=20
2.	
a)b)b)	
d)f)f)	
SECTION – C	
(Unit-3)	
Answer any FOUR questions .Each question carries equal marks:	5 × 4=20
3.	

a).....b).....c)..... d).....f)....

# **II SEMESTER**

#### **SEMESTER – II**

MATDSCT 2.1: Number Theory and Calculus – II	
Teaching Hours : 4 Hours/Week	Credits: 4
Total Teaching Hours: 56 Hours Max. Marks: 100	
	(S.A60 + I.A. – 40)

Course Learning Outcomes: This course will enable the students to

- Learn the concept of Divisibility.
- Learn about prime and composite numbers.
- Learn the concept of congruences and its applications.
- Identify and apply the intermediate value theorems and L'Hospital rule.
- Understand the concept of differentiation and fundamental theorems in differentiation and various rules.
- Find the extreme values of functions of two variables.
- Students learn to find areas and volumes using integration.

Unit-I: Number Theory: Division Algorithm, Divisibility, Prime and compositenumbers, Euclidean algorithm, Fundamental theorem of Arithmetic, Thegreatest common divisor and least common multiple. Congruences, Linearcongruences, Simultaneous congruences, Euler's Phi-function, Wilson's, Euler'sand Fermat's Theorems and their applications.14 Hours

**Unit-II: Differential Calculus-I:** Limits, Continuity, Differentiability and properties.Properties of continuous functions. Intermediate value theorem, Rolle's Theorem, Lagrange's Mean Value theorem, Cauchy's Mean value theorem and examples. Taylor's theorem, Maclaurin's series, Indeterminate forms and evaluation of limits using L'Hospitalrule. **14 Hours** 

**Unit-III: Polar Co-ordinates:** Polar coordinates, angle between the radius vector and tangent. Angle of intersection of two curves (polar forms), length of perpendicular from pole to the tangent, 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, asymptotes, evolutes and envelops. **14 Hours** 

**Unit-IV: Integral Calculus-II**: *Line integral*: Definition of line integral and basic properties, examples on evaluation of line integrals. *Double integral*: Definition of Double integrals and its conversion to iterated integrals. Evaluation of double integrals by changing the order of integration and change of variables. Computation of plane surface areas using double integrals. *Triple integral*: Definition of triple integrals and evaluation-change ofvariables, volume as triple integral. **14 Hours** 

- 1. Differential Calculus, Shantinarayan, S. Chand & Company, New Delhi.
- 2. Applications of Calculus, Debasish Sengupta, Books and Allied (P) Ltd., 2019.
- 3. Calculus Lipman Bers, Holt, Rinehart & Winston.
- 4. Calculus Shanthinarayanan & T. K. Manicavachogam Pillay, S. Viswanathan Pvt. Ltd.,vol. I & II.
- 5. Schaum's Outline of Calculus Frank Ayres and Elliott Mendelson, 5th ed. USA:Mc.Graw Hill, 2008.
- 6. Integral Calculus, Shanthinarayan, New Delhi: S. Chand and Co. Pvt. Ltd.
- 7. Integral Calculus, Shantinarayan and P K Mittal, S. Chand and Co. Pvt. Ltd.
- 8. Text Book of B.Sc. Mathematics, G K Ranganath, S Chand & Company.
- 9. David M Burton, Elementary Number Theory, 6th edition, McCraw Hill, 2007.
- 10. Emil Grosswald, Topics from the Theory of Numbers, Modern Birhauser, 1984.
- 11. Ivan Niven, Herbert S. Zuckerman and Hugh L. Montgomery, An Introduction to the Theoryof Numbers, John Willey (New York), 1991.

# PRACTICAL

MATDSCP 2.1: On Number Theory and Calculus – II	
Practical Hours : 4 Hours/Week Credits: 2	
Total Practical Hours: 56 Hours	Max. Marks: 50
	(S.A25 + I.A 25)

Course Learning Outcomes: This course will enable the students to

- Learn *Free and Open Source Software (FOSS)* tools for computer programming
- Solve problem on algebra and calculus by using FOSS software's.
- Acquire knowledge of applications of algebra and calculus through FOSS

#### Practical/Lab Work to be performed in Computer Lab

Suggested Software's: Maxima/Scilab/Maple/MatLab/Mathematica/Python/R.

- 1. Programs related to Number Theory.
- 2. Program to verify Mean value theorems.
- 3. Program for finding the Taylor's and Maclaurin's expansions of the given functions
- 4. Finding the roots of the equation ,factoring
- 5. Finding the angle between the radius vector and tangent
- 6. Finding the curvatures of the given curves.
- 7. Program to evaluate the line integrals with constant and variable limits.
- 8. Program to evaluate the Double integrals with constant and variable limits.
- 9. Program to evaluate the Triple integrals with constant and variable limits.

# **Open Elective**

(For students of Science stream who have not chosen Mathematics as one of the Core subjects)

MATOET 2.1: Optional Mathematics – II	
Teaching Hours : 3 Hours/Week     Credits: 3	
Total Teaching Hours: 42 Hours Max. Marks:	
	(S.A 60 + I.A. – 40)

Course Learning Outcomes: This course will enable the students to

- Learn the concept of Divisibility.
- Learn about prime and composite numbers.
- Learn the concept of congruences and its applications.
- Understand the concept of differentiation and fundamental theorems in differentiation and various rules.
- Find the extreme values of functions of two variables.
- To understand the concepts of multiple integrals and their applications.

Unit-I: Number Theory: Division Algorithm, Divisibility, Prime and composite numbers, Euclidean algorithm, Fundamental theorem of Arithmetic, The greatest common divisor and least common multiple. Congruences, Linear congruences, Simultaneous congruences, Euler's Phi-function, Wilson's, Euler's and Fermat's Theorems and their applications.
14 hours

**Unit-II: Partial Derivatives:** Functions of two or more variables-explicit and implicit functions, partial derivatives. Homogeneous functions- Euler's theorem and extension of Euler's theorem, total derivatives, differentiation of implicit and composite functions, Jacobians and standard properties and illustrative examples. Taylor's and Maclaurin's series for functions of two variables, Maxima-Minima of functions of two variables. 14 Hours

**Unit-III: Integral Calculus**: *Line integral*: Definition of line integral and basic properties, examples on evaluation of line integrals. *Double integral*: Definition of Double integrals and its conversion to iterated integrals. Evaluation of double integrals by changing the order of integration and change of variables. Computation of plane surface areas, *Triple integral*: Definition of triple integrals and evaluation-change of variables, volume as triple integral.

14 Hours

- 1. Differential Calculus, Shanti Narayan, S. Chand & Company, New Delhi.
- 2. Applications of Calculus, Debasish Sengupta, Books and Allied (P) Ltd., 2019.
- 3. Calculus Lipman Bers, Holt, Rinehart & Winston.
- 4. Calculus Shanthinarayanan & T. K. Manicavachogam Pillay, S. Viswanathan Pvt. Ltd.,vol. I & II.
- 5. Schaum's Outline of Calculus Frank Ayres and Elliott Mendelson, 5th ed. USA:Mc.Graw Hill, 2008.
- 6. Integral Calculus, Shanthinarayan, S. Chand and Co. Pvt. Ltd.
- 7. Integral Calculus, Shantinarayan and P K Mittal, S. Chand and Co. Pvt. Ltd.
- 8. Text Book of B.Sc. Mathematics, G K Ranganath, S Chand & Company.
- 9. David M Burton, Elementary Number Theory, 6<sup>th</sup> edition, McCraw Hill, 2007.
- 10. Emil Grosswald, Topics from the Theory of Numbers, Modern Birhauser, 1984.
- 11. Ivan Niven, Herbert S. Zuckerman and Hugh L. Montgomery, An Introduction to the Theoryof Numbers, John Willey (New York), 1991.

# **Open Elective**

(For Students of all streams)	
MATOET 2.2: Business Mathematics-II	
Teaching Hours : 3 Hours/Week	Credits: 3
Total Teaching Hours: 42 Hours	Max. Marks: 100
	(S.A 60 + I.A. – 40)

Course Learning Outcomes: This course will enable the students to

- Integrate concept in international business concept with functioning of global trade.
- Evaluate the legal, social and economic environment of business.
- Apply decision-support tools to business decision making.
- Will be able to apply knowledge of business concepts and functions in an integratedmanner.

Unit - I: Commercial Arithmetic: Interest: Concept of Present value and Future value, Simple interest, Compound interest, Nominal and Effective rate of interest, Examples and Problems Annuity: Ordinary Annuity, Sinking Fund, Annuity due, Present Value and Future Value of Annuity, Equated Monthly Installments (EMI) by Interest of Reducing Balance and Flat Interest methods, Examples and Problems. 14 Hours

Unit - II: Measures of central Tendency and Dispersion: Frequency distribution: Raw data, attributes and variables, Classification of data, frequency distribution, cumulative frequency distribution, Histogram and give curves. Requisites of ideal measures of central tendency, Arithmetic Mean, Median and Mode for ungrouped and grouped data. Combinedmean, Merits and demerits of measures of central tendency, Geometric mean: definition, merits and demerits, Harmonic mean: definition, merits and demerits, Choice of A.M., G.M. and H.M. Concept of dispersion, Measures of dispersion: Range, Variance, Standard deviation (SD) for grouped and ungrouped data, combined SD, Measures of relative dispersion: Coefficient of range, coefficient of variation. Examples and problems. **14 Hours** 

Unit - III: Correlation and regression: Concept and types of correlation, Scatter diagram, Interpretation with respect to magnitude and direction of relationship. Karl Pearson's coefficient of correlation for ungrouped data. Spearman's rank correlationcoefficient. (with tie and without tie) Concept of regression, Lines of regression for ungrouped data, predictions using lines of regression. Regression coefficients and their properties (without proof).Examples and problems. 14 Hours

- 1. Practical Business Mathematics, S. A. Bari New Literature Publishing CompanyNew Delhi
- 2. Mathematics for Commerce, K. Selvakumar Notion Press Chennai
- 3. Business Mathematics with Applications, Dinesh Khattar & S. R. Arora S. ChandPublishing New Delhi
- 4. Business Mathematics and Statistics, N.G. Das &Dr. J.K. Das McGraw Hill NewDelhi
- 5. Fundamentals of Business Mathematics, M. K. Bhowal, Asian Books Pvt. Ltd NewDelhi
- 6. Mathematics for Economics and Finance: Methods and Modelling, Martin Anthonyand Norman, Biggs Cambridge University Press Cambridge
- 7. Financial Mathematics and its Applications, Ahmad Nazri Wahidudin VentusPublishing APS Denmark
- 8. Fundamentals of Mathematical Statistics, Gupta S. C. and Kapoor V. K.:, SultanChand and Sons, New Delhi.
- 9. Statistical Methods, Gupta S. P.: Sultan Chand and Sons, New Delhi.
- 10. Applied Statistics, Mukhopadhya Parimal New Central Book Agency Pvt. Ltd.Calcutta.
- 11. Fundamentals of Statistics, Goon A. M., Gupta, M. K. and Dasgupta, B. World PressCalcutta.
- 12. Fundamentals of Applied Statistics, Gupta S. C. and Kapoor V. K.:, Sultan Chandand Sons, New Delhi.

# **Open Elective**

(For Students of all Streams)

MATOET 2.3: Mathematical Aptitude-II	
Teaching Hours : 3 Hours/Week	Credits: 3
Total Teaching Hours: 42 Hours	Max. Marks: 100
	(S.A 60 + I.A. – 40)

Course Learning Outcomes: This course will enable the students to

- Have a strong base in the fundamental mathematical concepts.
- Grasp the approaches and strategies to solve problems with speed and accuracy
- Gain appropriate skills to succeed in preliminary selection process for recruitment

**Unit-I:** Percentage, Average, Problems based on Ages, Ratio and Proportion, Partnership and share, Mixtures.

**Unit-II:** Profit, Loss and Discount, Simple Interest, Compound Interest, Shares and Debentures.

**Unit-III:** Permutations and Combinations, Probability, True discount and Banker's discount.

- 1. R.S. Aggarwal, "Quantitative Aptitude for Competitive Examinations", Revised Edition, S. Chandand Co. Ltd, New Delhi, 2018.
- 2. Quantitative Aptitude and Reasoning by R V Praveen, PHI publishers.
- 3. Quantitative Aptitude : Numerical Ability (Fully Solved) Objective Questions, Kiran Prakashan, Pratogitaprakasan, Kic X, Kiran Prakasan publishers.
- 4. Quantitative Aptitude for Competitive Examination by Abhijit Guha, Tata Mc Graw hillpublication

#### AN AUTONOMOUS COLLEGE OF THE UNIVERSITY OF MYSORE

Second Semester B.Sc.(NEP-CBCS) Examination

#### MATHEMATICS

**Time:2Hours** 

Max.marks:60

Instructions: 1) Section A is compulsory. 2) All questions in section B and C carry equal marks.

SECTION – A

 Answer any FIVE questions .Each question carries two marks:
 2 × 5=10

 1. a).....b)......b)......c)....d).....d).....
 e)......f)......g).....

 BECTION – B
 (I &II Unit)

 Answer any FIVE questions .Each question carries Equal marks:
 5 × 5=25

 2.
 3.

 4.
 5.

 6.
 7.

 8.
 8.

#### SECTION – C (III &IV Unit)

Answer any FIVE questions .Each question carries equal marks:	$5 \times 5=25$
9.	
10.	
11.	
12.	
13.	
14.	
15.	

#### AN AUTONOMOUS COLLEGE OF THE UNIVERSITY OF MYSORE

#### Second Semester B.Sc.(NEP-CBCS)Practical Examination

#### MATHEMATICS

#### **Time:3Hours**

Max.marks:20+5(viva)=25

Answer all questions .Each question carries five marks:

- 1. .....
- 2. .....
- 3. ....
- 4. .....

#### AN AUTONOMOUS COLLEGE OF THE UNIVERSITY OF MYSORE

#### Second Semester B.Sc.(NEP-CBCS) Examination – Open Elective

#### MATHEMATICS

Time:2Hours	Max.marks:60
Instructions: 1) All questions in sections A, B and C carry equal marks.	
SECTION – A	
(Unit-I)	
Answer any FOUR questions .Each question carries equal marks:	5 × 4=20
1.	
a)b)c)c)	
d)f)f)	
SECTION – B	
(Unit-2)	
Answer any FOUR questions .Each question carries equal marks:	5 × 4=20
2.	
a)b)c)c)	
d)f)f)	
SECTION – C	
(Unit-3)	
Answer any FOUR questions .Each question carries equal marks:	5 × 4=20
3.	

a).....b).....c)..... d).....f).....

Sl	MEMBER NAME	ADDRESS
No		
1.	Prathiba urs .L.	Assistant Professor, Department of Mathematics,
		JSS College for Women ,Mysuru
2.	Netravathi.S	Assistant Professor, Department of Mathematics ,
2		JSS College for women "Mysuru
3.	Dileepkumar. H.S	Assistant Professor, Department of Mathematics,
4	Sumo S	Assistant Professor Department of Mathematics
4.	Suma.S	JSS College for Women .Mysuru
5.	Dr. Javanthi, C	Associate Professor. Department of Mathematics
		Teresian College, Mysuru.
6.	Chandrashekara .A.C	Assistant Professor, Department of Mathematics,
		Maharani's Science College ,Mysuru
7.	Ranjitha.M	Assistant Professor, Department of Mathematics,
		JSS Ooty Road College ,Mysuru
8.	Dr .Mahadeva swamy.B.S	Assistant Professor, Department of Mathematics,
		Maharani's Science College ,Mysuru
9.	Dr .Dharmendra.B.N	Assistant Professor, Department of Mathematics,
		Maharani's Science College, Mysuru
10.	Ramu.S.T	Assistant Professor, Department of Mathematics,
		Govt. First Grade College , K.R.Nagar
11.	Dr. Renuka devi	Assistant Professor, Department of Mathematics
		Govt. First Grade College, Kuvempunagar, Mysuru
12.	Sowmya .T.T	Assistant Professor, Department of Mathematics, Christ College, Mysuru
13	Dr Honnegowda C K	Assistant Professor Department of Mathematics
10.	Dimogowaa.e.ix	Maharani's Science College Mysuru
14	Iavashree	Assistant Professor Department of Mathematics
14.	Jayashice	Marimallappa 's College . Mysuru
15.	Mahadeva swamy	Assistant Professor, Department of Mathematics.
	5	JSS Ooty Road College, Mysuru
16.	RaviKumar.C.K	Assistant Professor, Department of Mathematics,
		Maharani's Science College ,Mysuru
17.	Mythri	Assistant Professor, Department of Mathematics,
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19	Ashwini	Assistant Professor, Department of Mathematics,
		JSS Ooty Road College ,Mysuru
20	Ravi	Assistant Professor, Department of Mathematics,
		Yuvaraja's College, Mysuru