ST. ALOYSIUS COLLEGE(AUTONOMOUS), JABALPUR

Reaccredited 'A+ 'Grade by NAAC(CGPA:3.68/4.00)
College with Potential for Excellence by UGC
DST-FIST Supported & STAR College Scheme by DBT

Faculty of Science

Bachelor of Science (B.Sc.)

SUBJECT: MATHEMATICS

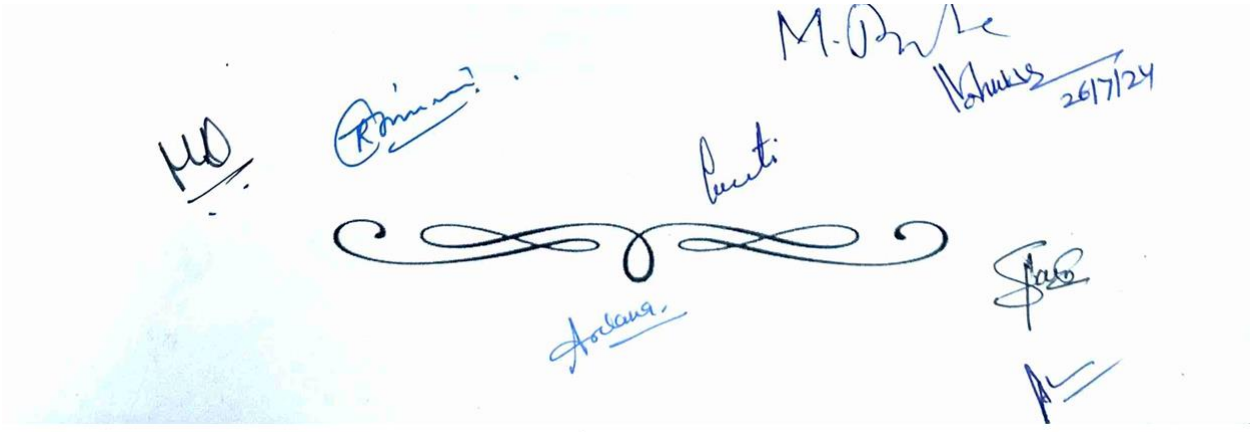
B.Sc. I Semester

Paper- Major/ Minor

Algebra, Vector Analysis and Geometry

Course Outcomes

CO.No.	Course Outcomes	Cognitive Level
CO1	Know the development of Indian Mathematics (500-1250) BC.	U
CO2	Determine the Rank of a matrix, Eigen values, Eigen Vectors & Inverse of a matrix.	E
CO3	Recognize consistent and inconsistent systems of linear equation.	Ap
CO4	Solving System of linear Equations (3 unknowns).	E, Ap
CO5	Using the knowledge of vector calculus in geometry.	Ap,



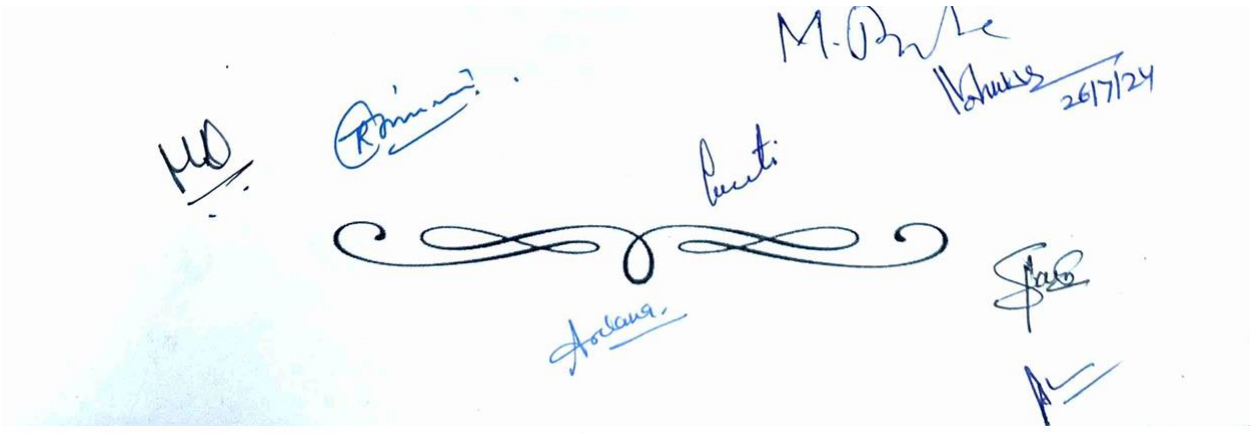
CO6	Enhance the knowledge of three dimensional geometrical figure (eg. Cone and cylinder).	U, Ap

Credit and Marking Scheme

	Credits	Marks		Total Marks
		Internal	External	
Theory	6	40	60	**100**
Total	**6**	**100**		

Evaluation Scheme

	Marks	
	Internal	**External**
Theory	3 Internal Exams of 20 Marks (During the Semester) (Best 2 will be taken)	1 External Exams (At the End of Semester)



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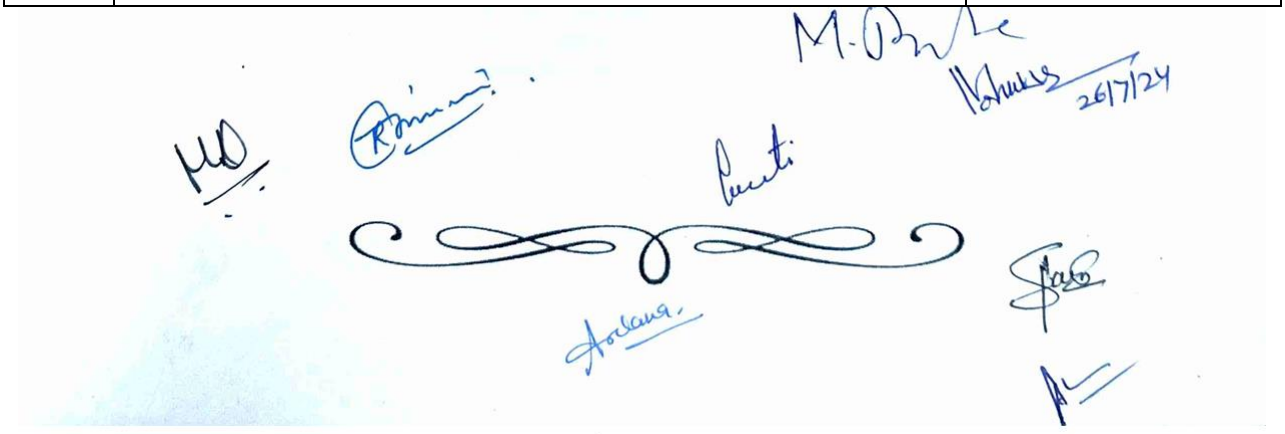
Content of the Course

Theory

No.of Lectures(in hours per week):6 Hrs.per week

Total No.of Lectures:90Hrs. **Maximum Marks:** 60

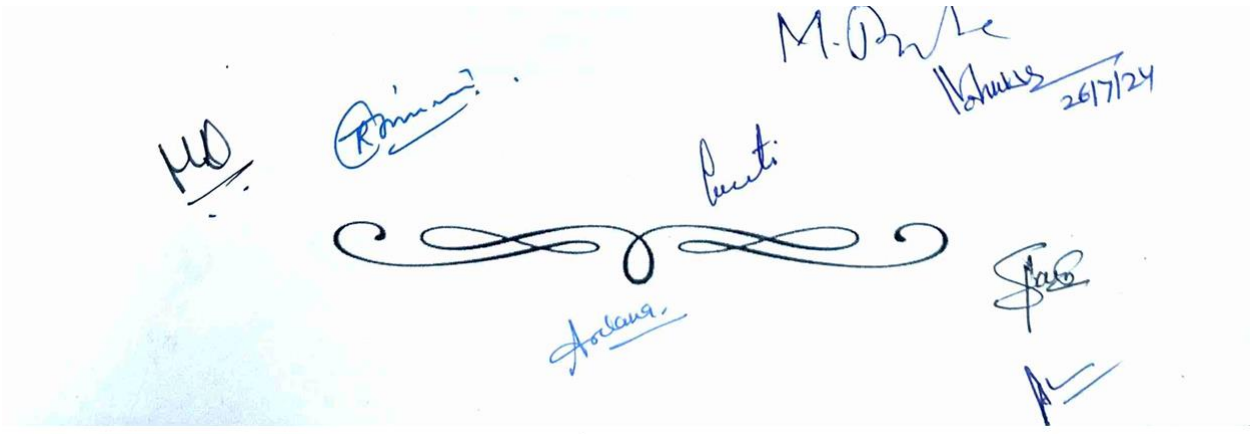
Unit	Topics	No. of Lectures
I	**1.1** Historical Background : **1.1.1.** Development of Indian Mathematics: Later Classical Period(500-1250) **1.1.2.** A brief biography of Varahamihira and Aryabhatta **1.2** Rank of a Matrix **1.3** Echelon and Normal Form of Matrix **1.4** Characteristic Equations of a Matrix **1.4.1** Eigen values **1.4.2** Eigen vectors	**21**
II	**2.1** Cayley's Hamilton Theorem **2.2** Application of Cayley's Hamilton Theorem to find the inverse of a matrix **2.3** Application of Matrix to solve a System of linear equations **2.4** Theorems on consistency and inconsistency of a system of linear equations **2.5** Solving linear equations up to three unknowns	**24**
III	**3.1** Scalar and Vector product of three and four vectors **3.2** Reciprocal vectors **3.3** Vector differentiation **3.3.1** Rules of differentiation	**24**



	3.3.2 Derivative of triple products **3.4** Gradient ,Divergence and Curl **3.5** Directional derivatives **3.6** Vector identities **3.7** Vector equations	
IV	**4.1** Vector Integration **4.2** Gauss theorem (without proof) and problems based on it. **4.3** Green theorem (without proof) and problems based on it. **4.4** Stoke theorem (without proof) and problems based on it.	**21**
V	**5.1** General equation of second degree **5.2** Tracing of conics **5.3** System of conics **5.4** Cone: **5.4.1** Equation of cone with given base **5.4.2** generators of cone **5.4.3** condition for three mutually perpendicular generators **5.4.4** Right circular cone **5.5** Cylinder **5.5.1** Equation of cylinder and its properties **5.5.2** Right Circular Cylinder, **5.5.3** Enveloping Cylinder	**30**

References

Text Books:



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2. Shanti Narayan- A Text Book of Vector Calculus, S. Chand & Co., New Delhi.1987.
3. S.L.Loney- The Elements of Coordinate Geometry Part -I New Age International (P) Ltd. Publishers, New Delhi 2016
4. P. K. Jain and Khalil Ahmad- A Text Book of Analytical Geometry of Three Dimensions Willey Eastern Ltd.,1999.
5. Gerard G. Emch.R. Sridharan M.D. Srinivas: Contributions to the History of Indian Mathematics, Hindustan Book Agency Vol. 3,2005
6. मध्यप्रदेश हिंदी ग्रंथ अकादमी की पुस्तके।

Reference Books:

1. **Chandrika Prasad:** A Text Book on Algebra and Theory of Equations, Pothishala Pvt. Ltd.,Allahabad, 2017
2. **N. Jacobson** : Basic Algebra Vol. I and II, W.H.Freeman.2009.
3. **I.S.Luther and I.B.S. P**assi: Algebra Vo. I and II, Narosa Publishing House 1997.
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5. Murray R. Spiegel- Vector Analysis, Schaum Publishing Company.,New York,2017
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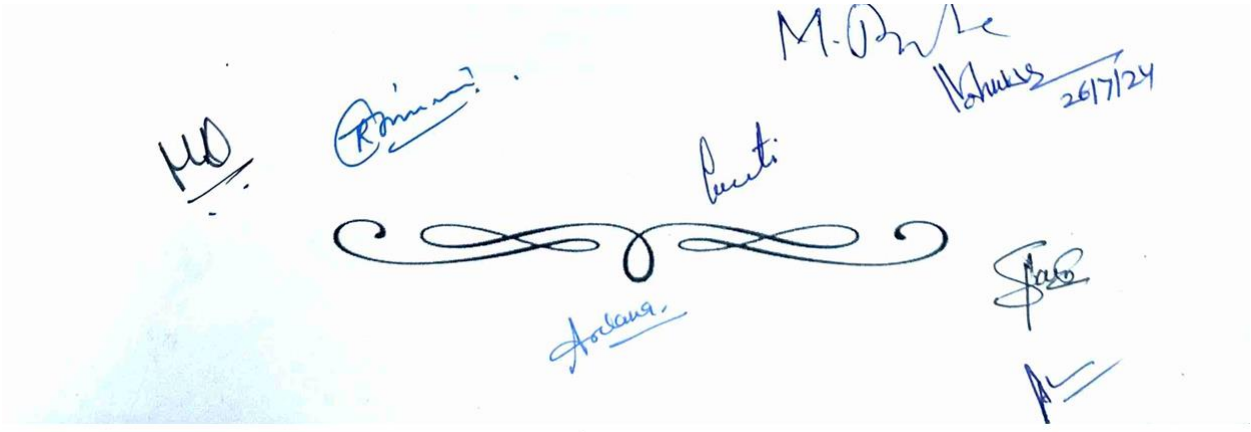
9. N.Saran and R.S. Gupta- Analytical Geometry of Three Dimension, Pothishala Pvt. Ltd. Allahabad .1994.
10. R.J.T. Bell- Elementary Treatise on Coordinate Geometry of Three Dimensions, Macmillan India Ltd.,1994.



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