

# CONTENTS

		Page	
Chapter	<b>1</b>	<b>VECTORS</b> .....	1
		Addition of vectors. Multiplication of a vector by a scalar. Linear dependence and independence. Bases and components. Scalar product of vectors. Orthogonal vectors. Orthonormal bases. Oriented bases. Vector product of vectors. Triple products and vector identities.	
<hr/>			
Chapter	<b>2</b>	<b>VECTOR FUNCTIONS OF A REAL VARIABLE</b> .....	21
		Lines and planes. Neighborhoods. Vector functions. Bounded functions. Limits. Properties of limits. Continuity. Differentiation. Differentiation formulas. Functions of class $C^m$ . Taylor's formula. Analytic functions.	
<hr/>			
Chapter	<b>3</b>	<b>CONCEPT OF A CURVE</b> .....	43
		Regular representations. Regular curves. Orthogonal projections. Implicit representations of curves. Regular curves of class $C^m$ . Definition of arc length. Arc length as a parameter.	
<hr/>			
Chapter	<b>4</b>	<b>CURVATURE AND TORSION</b> .....	61
		Unit tangent vector. Tangent line and normal plane. Curvature. Principal normal unit vector. Principal normal line and osculating plane. Binormal. Moving trihedron. Torsion. Spherical indicatrices.	
<hr/>			
Chapter	<b>5</b>	<b>THE THEORY OF CURVES</b> .....	80
		Frenet equations. Intrinsic equations. The fundamental existence and uniqueness theorem. Canonical representation of a curve. Involutives. Evolutes. Theory of contact. Osculating curves and surfaces.	
<hr/>			
Chapter	<b>6</b>	<b>ELEMENTARY TOPOLOGY IN EUCLIDEAN SPACES</b> .....	102
		Open sets. Closed sets. Limit points. Connected sets. Compact sets. Continuous mappings. Homeomorphisms.	
<hr/>			
Chapter	<b>7</b>	<b>VECTOR FUNCTIONS OF A VECTOR VARIABLE</b> .....	121
		Linear functions. Continuity and limits. Directional derivatives. Differentiable functions. Composite functions. Functions of class $C^m$ . Taylor's formula. Inverse function theorem.	
<hr/>			
Chapter	<b>8</b>	<b>CONCEPT OF A SURFACE</b> .....	150
		Regular parametric representations. Coordinate patches. Definition of a simple surface. Tangent plane and normal line. Topological properties of simple surfaces.	

# CONTENTS

<b>Chapter 9</b>	<b>FIRST AND SECOND FUNDAMENTAL FORMS</b> .....	<b>171</b>
	First fundamental form. Arc length and surface area. Second fundamental form. Normal curvature. Principal curvatures and directions. Gaussian and mean curvature. Lines of curvature. Rodrigues' formula. Asymptotic lines. Conjugate families of curves.	
<hr/>		
<b>Chapter 10</b>	<b>THEORY OF SURFACES—TENSOR ANALYSIS</b> .....	<b>201</b>
	Gauss-Weingarten equations. The compatibility equations and the theorem of Gauss. The fundamental theorem of surfaces. Some theorems on surfaces in the large. Elementary manifolds. Tensors. Tensor algebra. Applications of tensors to the equations of surface theory.	
<hr/>		
<b>Chapter 11</b>	<b>INTRINSIC GEOMETRY</b> .....	<b>227</b>
	Mappings of surfaces. Isometric mappings. Intrinsic geometry. Geodesic curvature. Geodesic coordinates. Geodesic polar coordinates. Arcs of minimum length. Surfaces with constant Gaussian curvature. Gauss-Bonnet theorem.	
<hr/>		
<b>Appendix I</b>	<b>EXISTENCE THEOREM FOR CURVES</b> .....	<b>263</b>
<hr/>		
<b>Appendix II</b>	<b>EXISTENCE THEOREM FOR SURFACES</b> .....	<b>264</b>
<hr/>		
	<b>INDEX</b> .....	<b>267</b>