

Department of Mathematics

Faculty of Science

MATH 446 (206446) DIFFERENTIAL GEOMETRY

3(3/3-

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Prerequisite MATH 335 (206335)

Course Description

Theory of curves and surfaces by differential methods. Analytic representation. Arc length. Osculating plane. Curvature. Torsion. Formulae of Frenet. Contract. Helices. Natural equations. Evolutes and involutes. Imaginary curves. Ovals. First fundamental form and second fundamental form.

Course Contents

No. of Lecture Hours

1. Concept of a curve	5
- Regular representation	
- Orthogonal projections	
- Implicit representation	
- Regular curves of class C_m . Arc length.	
2. Curvature	12
- Unit tangent vector. Tangent line and normal plane	
- Principal normal unit vector. Osculating Plane	
- Binormal Moving, trihedron and torsion	
3. Frenet equation and intrinsic equations	12
- The Fundamental existence and uniqueness theorem	
- Canonical representation of a curve	
- Involute, evolutes and theory of contract	
4. Concepts of a Surface	12
- Regular parametric representations	
- Simple surface	
- Tangent plane and normal line	
5. Ovals	4
- First fundamental form, second fundamental form of ovals	

Total **45**