

# Doc Dave

MPHYS NOTES

## Biomaterials

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# Chapter 1

## Introduction

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1.2 Revision of Bio- and Physical Chemistry

1.3 Chemical Bonding

1.3.1 Amino Acids

1.3.2 Proteins

1.3.3 Simple Sugars

1.3.4 Carbohydrates

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### 2.2 Causes of Material Failure

#### 2.2.1 Microcracks

#### 2.2.2 Crazeing

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# Chapter 3

## Classes of Materials Used in Biophysics

3.1 Metals

3.2 Polymers

3.3 Ceramics

3.4 Composites

3.5 Material Preparation

3.6 Chemical Composition

3.7 Properties and Uses in Medicine and Biosciences

3.8 Failure Mechanisms

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3.8.1 Corrosion

3.8.2 Fracture

3.8.3 Degradation

# Chapter 4

## Implants

4.1 Hard Tissue

4.2 Soft Tissue

4.3 Blood Contacting

4.4 Modelling of Blood Coagulation

# Chapter 5

## Surface Modification

5.1 Plasma Coatings

5.2 Spray Coatings

5.3 Chemical Treatments

5.4 Topographical Modifications

5.5 Nanoindentation

5.6 Applications and Properties of Nanoparticles



# Chapter 6

## Experimental Techniques

- 6.1 Probing the Biomaterial-Biological System Interface
- 6.2 Photoelectron Spectroscopy
- 6.3 Vibrational Spectroscopic Techniques
- 6.4 Secondary Ion Mass Spectroscopy
- 6.5 Electron Microscopy
- 6.6 Scanning Probe and Force Microscopy
- 6.7 Chemical Force Microscopy and Force Measurements
- 6.8 Surface Plasmon Resonance
- 6.9 Quartz Crystal Microbalance with Dissipation