

 *College of Dentistry*

*DEPARTMENT OF RESTORATIVE DENTAL SCIENCES*

**DOCTOR OF SCIENCE IN DENTISTRY (DScD)**

**628 RDS Course**

**Failure Analysis (2 C.H.)**

**Course description:**

This course covers the methodology of failure analysis: Studies brittle;e fracture, ductile fracture, stress corrosion and electro-chemical corrosion as applied to the failure of metals. Involves some laboratory work and analysis of variety of metallurgical failures.

**Course format:**

Lecture and seminare setting that include recent literature review

**Intended learning outcome:**

Students should develop knowledge in:

* Process of materials selection for clinical applications.
* Importance of oral environment with respect to behavior of clinical components in selection of materials and fabrication process.
* Common modes of failure of clinical appliances.
* Framework for assessing dental materials failures, including determining the mode of failure and making recommendations on failure prevention.

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| **TOPICS TO BE COVERED** |
| Fundamentals of Fracture |
| Ductile fracture |
| Fractographic studies |
| Brittle facture |
| Principles of fracture mechanics |
| Brittle fracture of ceramics |
| Static fatigue |
| Fracture of polymers |
| Impact fracture testing |
| Cyclic stresses-the s-n curve |
| Fatigue in polymeric materials, ceramic, and metals |
| Creep of metals |
| Crack propagation in ceramic and fracture toughness |
| Corrosion of metals-electrochemical considerations |
| Corrosion Rates – Prediction of corrosion rates |
| Passivity |
| Environmental effects – forms of corrosion-corrosion environment |
| Corrosion prevention |
| Oxidation |
| Corrosion of ceramic materials |
| Degradation of polymers |
| Bond rupture |
| Wear of ceramics |

**Evaluation:**

The course will be graded with a 60/40 grade distribution