

## Course Description

### Physics

#### Ph701: Advanced Radiation Physics (2)

ف701 فيزياء إشعاعية متقدمة (2)

Radioactive waste- X-rays and radiography- Radiation protection in medicine- Radiological emergencies.

#### Ph702: Materials Science (2)

ف702: علم المواد (2)

Polymer Solutions- Polymer Blends and Block Copolymers- The Semi-crystalline State-Mechanical and Dielectric Response.

#### Ph703: Nano-materials Technology (2)

: تقنيات المواد النانومترية (ف703) (2)

Physics of low-dimensional materials, 1D, 2D and 3D confinement, Density of states, Excitons, Coulomb blockade, Surface plasmon, Size and surface dependence of physical, electronic, optical, luminescence, thermos-dynamical, magnetic, catalysis, gas sensing and mechanical properties. Physical and chemical techniques for nanomaterial synthesis, Assembling and self-organization of nanostructures, Nanoscale manipulation, Nanotube and wire formation, Importance of size distribution control, size measurement and size selection.

#### Ph704: Statistics and its Applications (2)

: الإحصاء وتطبيقاته (ف704) (2)

Sampling distribution- Estimation- Hypothesis testing- Regression and correlation- Chi-square and F distributions- Nonparametric statistics- Introducing some distributions with real applications in our life.

#### Ph705: Solar Energy applications

Introduction- تطبيقات الطاقة الشمسية (ف705)

Basic principles of heat transfer- Dimensionless numbers and their physical meanings- Measurements of solar radiation intensities- Solar collectors- Efficiency calculations of solar collectors- Factors effecting the efficiency of solar collectors- Solar energy storage- Solar cells- Applications.

#### Ph706: Analysis of crystal structure

: تحليل البناء البلوري (ف706)

A crystal structure is like a three-dimensional wallpaper design in that it is an endless repetition of some motif (i.e., a group of atoms or molecules). The process of creating the motif involves point group operations (rotation, reflection, and inversion) that define it. The process of creating the wallpaper involves translation (with or without rotation or reflection) to create the complete structure (which we call the lattice). Real-world crystalline structures may be simple lattice structures, or combinations of lattices to make complex crystalline molecules. As long as the structure is repetitive, its structure may be discovered with the application of x-ray diffraction.