

Department of Civil & Environmental Engineering

PhD written test syllabus:

Syllabus for Geotechnical Engineering

Soil classification, Clay mineralogy, Effective stress principle; Permeability and seepage and its analysis; One dimensional and generalized consolidation theories; Shear strength of soils: theory and measurements of shear strength of different type of soils; Site Investigation of soils and rock deposits; Shallow and deep Foundations; Stability analysis: infinite and finite slopes with or without water pressures; Earth pressures – Different types and their coefficients- Classical Theories of Earth pressure – Rankine’s and Coulomb’s Theories for Active and Passive earth pressure- Computation of Lateral Earth Pressure in Homogeneous and Layered soils; Retaining walls – different types - Type of Failures of Retaining Walls; Design of retaining walls - Stability requirements and analytical ability test;

Syllabus for SAR Interferometry

Remote sensing and Image processing: Electromagnetic spectrum, Visible and Reflective Infrared Remote Sensing, Thermal Infrared Remote Sensing, Microwave Remote Sensing, Synthetic Aperture Radar (SAR) Image, Interferometric SAR, image histogram and scattergram and their significance, Variance-Covariance matrix, Correlation matrix, and their significance and analytical ability test;

Syllabus for Geoid modeling

Geodetic Surveying: Leveling methods, Total Station and their uses, Traversing, GNSS: Principle used, Components of GNSS, Data collection methods, DGPS, Errors in observations and corrections and analytical ability test;

Syllabus for CONCRETE 3D PRINTING

Part 1: Concrete technology

Concrete materials: Cement- Production, composition, chemistry; Aggregates- Geology of concrete aggregates; Chemical and mineral admixtures for concrete; High performance concrete; Mixture proportioning; Advanced topics in fresh concrete – Rheology and pumping behaviour of concrete; Advanced topics in hardened concrete - Behavior under various loads, creep and shrinkage, Common durability issues.

Part 2: Concrete 3D printing

Properties of 3D printable concrete: rheological requirements for concrete 3D printing, mixture design, hardened properties of 3D printable concrete and analytical ability test;

Syllabus for Transportation Engineering

Pavement Engineering, Highway Geometric Design and analytical ability test;

MS Written Test Syllabus:

All relevant areas related to the Bachelors Level Civil Engineering Course + verbal and analytical ability test.