

ANDHRA UNIVERSITY



Regulations and Syllabus relating to
Qualifying Examination for Doctor of philosophy

In

DEPARTMENT OF GEO-ENGINEERING & RDT

(Remote Sensing and GIS)

(w.e.f. 2015-2016)

The Department of Geo-Engineering has a multi-disciplinary and problem oriented research agenda that focuses on technology development as well as land/ocean/atmosphere applications in the area of Geo-information (GI) science and earth observation. From the perspective of technology development, commendable research in GI science is pursued at the Department, like advanced image processing techniques, digital photogrammetry, microwave remote sensing, spatial data mining, spatial data modelling, spatial decision support systems, etc. On the applications front, like watershed management & Water resources management, ground water exploration, modelling urban dynamics, coastal zone management, biodiversity characterisation, Geo-hazards monitoring, assessment and modelling etc.

Qualifying Examination for Ph.D. Submission in Geo-Engineering (Remote Sensing and GIS)

Unit-1. Fundamentals of Remote Sensing Introduction- Components, platforms: Remote Sensing of the Environment- the Remote Sensing process; Principles of electro-magnetic radiations-atmospheric windows, Energy matter interactions; Sensors, Platforms Remote Sensing Data Products; Multi-spectral Remote Sensing; Thermal infrared Microwave Remote Sensing.

Unit- 2. Photogrammetry and Digital image processing: Fundamentals of aerial photography- classification of aerial photography, scale, resolution, geometric characteristics of aerial photographs, photo recognition elements; Elements of visual interpretation; **Introduction to digital image processing**-data formats, errors; Image rectification and restoration; Image enhancement techniques; Image classification; Data merging and GIS integration; Hyperspectral Remote Sensing, Hyperspectral Image analysis; Digital change detection.

Unit-3:Fundamentals of Geographic Information Systems: Database models and modelling; Spatial data and database systems; Geographic data and data measurement map basics, basic geographic concepts; data structures and data input; Database management; Data Analysis. Global Positioning Systems;

Unit-4. Applications of remote sensing and GIS

Remote Sensing and GIS applications agricultural applications, urban applications, water resources and related applications, urban mapping, disaster management. Vector and raster based spatial analysis;

Unit-5:Network analysis; Point pattern analysis; Surface analysis; Spatial modelling. Object oriented GIS; Mobile GIS; Spatial data mining; Customization and automation in GIS, cloud GIS, OLAP, SDSS, Free and open source tools and web resources, over view of Internet GIS.