Department of Surveying and Geoinformatics
School of Environmental Technology
Federal University of Technology
Minna, Nigeria

SVG412: Photogrammetry and Remote Sensing I

First Semester Examination, 2017/2018 Session

DURATION: 2 Hours.

Answer Question One and any other Two

1. (a) As an expert photogrammetrist, you have been contracted to carry out the topographic mapping of an area which measures 2.5 km by 1.5 km using a UAV with a camera focal length of 20 mm. Design a flight plan for the photogrammetric data acquisition, applying the following details alongside the C-factor:
   a. Ground coverage per image frame is 190.10m by 120.86m
   b. 75% overlap (Side and forward overlap)
   c. 0.7m Contour Interval (20 marks)

   (b) With the aid of a detailed chart, describe the procedures of photogrammetric mapping.

   (10 marks)

2. (a) Write short notes on the following:
   i. Relative orientation
   ii. Image registration
   iii. Image restoration (6 marks)

   (b) Explicitly explain the on-site Calibration procedure of a Camera (4 marks)

   (c)i. Highlight 2 methods of establishing ground controls for photogrammetric survey.
   ii. List 3 factors that determines the number of ground control points required for a photogrammetric project. (5 marks)

3. a. Derive the mathematical model of the application of Coplanarity condition to Aerotriangulation (5 marks)
   b. A telecommunication mast 80 m high appears at the principal point of a truly vertical photograph. On the adjacent of the truly vertical photograph, the base of the mast is on the X-axis and 92.8mm to the left of the principal point. The size of the photograph is 210 mm x 210 mm. If the flying height of the aircraft is 1000 m and the camera focal length is 125 mm, calculate: (i) The distance of the mast top from Y-axis on the adjacent photograph (ii) The percentage overlap between the two photographs. (10 marks)

4. The scale of an aerial photograph is 1 cm = 100 m and the photograph size is 20cm x 20cm. Determine the number of photographs required to cover an area of 100 sq.km if the longitudinal lap and the side lap is 60% and 30% respectively. (8 marks)

   b. Explain two applications of Coplanarity condition equation (7 marks)