SURVEY CAMP

ENGE 355

Durations : 21 days **Year : III** **Part : II**

Course Objectives:

The objective of this course is to provide hands-on experience in field surveying techniques, data collection and processing. It enhances practical skills, teamwork and understanding of real-world surveying challenges.

1 Control Point Extension and Densification (4 days)

- 1.1 Traverse
  - 1.1.1 Using total station
  - 1.1.2 Using GNSS receivers
- 1.2 Link traverse
- 1.3 Leveling to establish control points for other engineering surveys
  - 1.3.1 Two-peg test
  - 1.3.2 Precise leveling
- 1.4 Computation and plotting of data
- 1.5 Prepare a topographical map of the specified area using the control points
  - 1.5.1 Manual map
  - 1.5.2 Digital map

2 Road and Bridge Survey (3 days)

- 2.1 A road alignment survey of at least 600 m
- 2.2 Longitudinal section (L-section) with appropriate grades and formation levels
- 2.3 Cross-sections (X-sections),
- 2.4 Perform volumetric computations based on the surveyed data
- 2.5 A detailed topographic survey of a suitable bridge site area (200 m × 120 m)
- 2.6 Preparation of topographic map, L-section, and X-sections using standard scales

3 Hydropower survey (4.5 days)

- 3.1 Head works
- 3.2 Canal/tunnel
- 3.3 Forebay/surge tank
- 3.4 Penstock
- 3.5 Powerhouse
- 3.6 Tailrace
- 3.7 Discharge and velocity measurement

4 Land Measurement Act of Nepal and Cadastral Survey (4 days)

- 4.1 Data collection
- 4.2 Database preparation
- 4.3 Parcel area computation
- 4.4 Boundary demarcation (Map to ground)

5 Stakeout and Layout Survey (1 days)

- 5.1 Pipeline stakeout
  - 5.1.1 Marking the pipeline centerline and trench boundaries
  - 5.1.2 Setting out bends, intersections and other critical points
  - 5.1.3 Elevation control: Ensuring correct slope and grade for the pipeline
- 5.2 Stakeout of building footprint
  - 5.2.1 Stakeout of the building footprint, including walls and critical points
  - 5.2.2 Verification of staked points using total stations
  - 5.2.3 Horizontal and vertical control

6 Drone Survey (2.5 days)

- 6.1 Manual flight training
- 6.2 Plan flight with different parameters
- 6.3 Generate different products
  - 6.3.1 Ortho mosaic maps
  - 6.3.2 Point clouds
  - 6.3.3 3D model and contour map
  - 6.3.4 DEM
  - 6.3.5 Volumetric computation
  - 6.3.6 Vegetation index map

7 Thematic Map Preparation and Visualization (2 days)

- 7.1 Collecting data using mobile applications / GPS receivers
- 7.2 Mapping using appropriate mapping techniques (Dot density map, proportional map, choropleth map, proportional map)

Evaluation

Assessment	Weightage	Criteria
Attendance and Conduct	30%	At least 90% attendance, punctuality and field ethics
Field Performance	20%	Proficiency in instrument handling and data integrity
Technical Report	20%	Accuracy of drawings and content-wise documentation
Viva-voce and Defense	30%	Conceptual clarity and individual technical defense

References

1. Punmia, B. C., Jain, A. K., Jain, A. K. (2016). Surveying (Vol. 1 & 2). Laxmi Publications.
2. Agor, R. (2015). A textbook of surveying and levelling. Khanna Publishers.
3. Duggal, S. K. (2019). Surveying (Vol. 1 & 2). McGraw Hill Education.
4. Baral, S. (2023). Fundamentals of hydropower engineering. Kathmandu, Nepal: National Book Center.
5. Survey Department, Government of Nepal, Geodetic Survey Branch. Levelling instruction book.
6. Survey Department, Government of Nepal, Geodetic Survey Branch. Triangulation instruction book: Part I.