1. Satellite Geometry and Dilution of Precision (DOP)

- Definition of DOP (GDOP, PDOP, HDOP, VDOP, TDOP)
- Effect of satellite geometry on accuracy
- Illustrations of good vs. poor geometry
- Correction strategies (choosing optimal observation time, planning with satellite availability charts)

2. Ionospheric Errors in DGPS

- Nature of ionospheric delays
- Single-frequency vs. dual-frequency receiver issues
- Real-world impacts (position shifts)
- Mitigation: ionospheric models, dual-frequency correction, SBAS corrections

3. Tropospheric Errors in DGPS

- Causes of tropospheric delays (humidity, pressure, temperature)
- Seasonal and local variations
- Graphical representation of effect on signals
- Correction methods: tropospheric models, mapping functions

4. Multipath Errors

- How multipath occurs (reflections from buildings, trees, water)
- Diagrams showing signal reflection
- Impacts on DGPS positioning accuracy
- Correction: antenna design, site selection, signal processing

5. Satellite Clock Errors

- GPS satellite clock drift explanation
- Magnitude of effect on positioning
- Graphical examples
- Corrections: DGPS base station corrections, SBAS signals

6. Ephemeris Errors

- Errors in satellite orbital information
- How incorrect ephemeris affects positioning
- Role of broadcast vs. precise ephemeris
- Correction: IGS products, real-time precise ephemeris

7. DGPS Base Station Errors

- Role of reference station in DGPS

- Sources of base station errors (location, clock drift)
- Effect on rover positions
- Mitigation: well-surveyed base station, real-time monitoring

8. Receiver Noise Errors

- Thermal noise and instrument limitations
- Effect on pseudorange measurements
- Illustrations with noisy vs. smooth signals
- Mitigation: high-quality receivers, signal averaging

9. Cycle Slip in Carrier Phase DGPS

- Explanation of cycle slip phenomenon
- Causes (signal obstruction, low SNR)
- Impacts on carrier-phase positioning
- Correction techniques: slip detection algorithms, reinitialization

10. Loss of Lock and Signal Obstruction

- Causes: trees, tunnels, urban canyons
- Diagrams showing obstruction effects
- Effect on satellite tracking and positioning
- Correction: antenna placement, multi-constellation use

11. Differential Corrections: Real-Time vs. Post-Processing

- Explanation of real-time DGPS corrections
- Explanation of post-processed DGPS corrections
- Advantages and disadvantages of each
- Practical examples of applications

12. Static Survey Corrections in DGPS

- Method of static survey with DGPS
- Averaging out errors over long observation time
- Applications in control point establishment
- Diagram comparing static vs. kinematic DGPS

13. RTK (Real-Time Kinematic) Survey Corrections

- Principle of RTK survey
- Accuracy levels achievable
- Required infrastructure (base, rover, radio link)

- Applications in engineering surveys

14. PPK (Post-Processed Kinematic) Survey Corrections

- Workflow of PPK corrections
- Comparison with RTK method
- Use in drone surveys and hydrographic surveys
- Case study example

15. Wide Area Augmentation System (WAAS / SBAS) Corrections

- Concept of satellite-based augmentation
- Coverage areas (e.g., WAAS, GAGAN, EGNOS)
- Benefits for DGPS users
- Diagram showing correction signal path

16. Use of Ground Control Points (GCPs) for DGPS Accuracy

- Role of GCPs in geospatial surveys
- How DGPS enhances GCP accuracy
- Poster illustrations with UAV mapping
- Correction workflow with GCP validation

17. Comparative Study of DGPS Errors in Open Area vs. Obstructed Area

- Differences in error sources under open sky vs. urban/forest cover
- Experimental data plots (number of satellites, SNR, accuracy)
- Correction techniques suitable for each environment
- Conclusion with best practices