

**EC-406B****FUNDAMENTALS OF GLOBAL POSITIONING SYSTEM  
( ELECTIVE - IV )****L T P C  
4 - - 3****COURSE OBJECTIVES:**

1. To know the evolution of of global positioning system .
2. To know the principles of global positioning system.
3. To know various global navigational satellite systems such as GPS, GALILEO, GLONASS.
4. To know various GPS segments and signal structure.
5. To understand different coordinate systems in GPS.

**COURSE OUTCOMES:****After successful completion of the course, the students are able to**

1. understand history of GPS and new trends in the GPS.
2. calculate GPS satellite orbit positions and velocities.
3. define the fundamental working principle of GPS and outline its development.
4. describe global satellite navigation systems, satellite orbital characteristics, and satellite signal structure.
5. define coordinates systems likely to be encountered by GPS users and calculate and discuss GPS coordinates.

**UNIT I****(10)**

**Introduction to Global Navigation Satellite Systems(GNSSs) :** The History of GPS, The Evolution of GPS, Development of NAVSTAR GPS, Block I, Block II satellites, Block IIA, Block IIR and Block II R-M satellites.

**UNIT II****(10)**

GPS working principle, Trilateration, Determination of where the satellites are, Determination of how far the satellites are, Determining the receiver position in 2D or X-Y Plane, Determining the receiver position in 3D or X-Y-Z Plane.

**UNIT III****(10)**

**Other Global Navigation Satellite Systems :** GLONASS, GALILEO, Comparion of 3 GNSS (GPS, GALILEO, GLONASS) interms of constellation and services provided.

**UNIT IV****(10)**

**GPS Satellite constellation and Signals :** GPS system segments, Space segment, Control segment, User segment, GPS Signals, Pseudorandom noise (PRN) code, C/A code , P code Navigation data, Signal structure of GPS.

**UNIT V****(10)**

**Coordinate Systems :** Geoid, Ellipsoid, Coordinate Systems, Geodetic and Geo centric coordinate systems, ECEF coordinates, Datums, world geodetic 1984 (WGS 84), Conversion between Cartesian and geodetic coordinate frame.

**LEARNING RESOURCES:****TEXT BOOK(s):**

G S RAO, Global Navigation Satellite Systems, McGraw-Hill Publications, New Delhi, 2010.

**REFERENCE BOOK(s):**

1. Scott Gleason and Demoz Gebre-Egziabher, GNSS Applications and Methods, Artech House, 2009.
2. James Ba - Yen Tsui, Fundamentals of GPS receivers - A software approach, John Wiley & Sons (2001).

**WEB RESOURCES:**

<http://ocw.mit.edu/courses/earth-atmospheric-and-planetary-sciences/12-540-principles-of-the-global-positioning-system-spring-2012/index.htm>