

1.	Title of the course	Introduction to Geodesy
2.	Course number	CE540L
3.	Status of the course	Elective
4.	Structure of credits	3-0-0-3
5.	Offered to	PG
6.	New course/modification to	New
7.	To be offered by	Department of Civil and Environmental Engineering
8.	To take effect from	January 2023
9.	Prerequisite	CoT
10.	Whether approved by the Department	Yes
11.	Course Objective(s): To introduce various dimensions of geodesy like geometric, physical, astronomic, and satellite geodesy. To discuss the reference datum which is essentially required for precise positioning and various positioning-related applications.	
12.	Course Content: Geometric geodesy: horizontal and vertical datums, reference ellipsoid and its properties, curvatures on the ellipsoid, estimation of the parameters defining reference ellipsoid, transformation of coordinates from one datum to another; Physical geodesy: vertical datum, geoid, Mean Sea Level (MSL), gravity and gravity potential, gravimetric geoid modeling, earth gravity models, height systems, time-varying gravity field, and its application; Astronomical geodesy: celestial sphere, definition of terms in astronomy, celestial coordinate systems, precession and nutation, time systems, rotational time systems, earth orientation parameters; Satellite geodesy: introduction, keplerian motion, geometry of ellipse, satellite motion, Global Navigation Satellite System (GNSS), Satellite Laser Ranging (SLR), satellite altimetry, Very Long Baseline Interferometry (VLBI).	
13.	Textbook(s): 1. Torge W, <i>Geodesy</i> , 4th Edition, Walter De Gruyter Inc. (2014). 2. Vaníček P and Krakiwsky E, <i>Geodesy: The Concepts</i> , 2nd Edition, Elsevier (1986).	
14.	Reference(s): 1. Rapp R H, <i>Geometric Geodesy Part I & II</i> , 1st Edition, Department of Geodetic Science and Surveying, The Ohio State University (1993). 2. Seeber G, <i>Satellite Geodesy</i> , 1st Edition, Walter De Gruyter (1996). 3. Thomson D B, <i>Introduction to Geodetic Astronomy</i> , 1st Edition, Department of Surveying Engineering, University of New Brunswick (1981). 4. Vermeer M, <i>Physical Geodesy</i> , 1st Edition, Aalto University Publication Series (2020).	