Programme	Semester 3	Course Code	GES-205	Credit Hours	3
Course Title	Geodesy and Surveying				

Course Introduction

This course provides introduction to the basic concepts of surveying and to implement different field techniques of surveying, basic understanding of geodetic science as it pertains to the practice of Geomatics. To develop skills and concepts related to the geodetic parameters behind any GIS project. To understand the shape of earth.

Learning Outcomes

On the completion of the course, the students will:

1. Survey
2. GPS
3. Geodetic Coordinates
4. Total Stations

Course Content		Assignments/Readings
Week 1	**Introduction to Basic Concepts:** Definition, Scope, future prospects, surveying classification. Operations in Surveying: Triangulation, Trilateration, Traverse, establishment of ground control, mosaic, diagonal scale, surveying safety, units of measurement in surveying, zero-dimension in relation to different map scales. Theory of errors in observations, precision & accuracy, least square adjustments	
	Functions of Surveying Instruments: Tripod, Level vial, Circular level, Leveling heads, Plumb bob, Optical plumbing assembly.	
Week 2	Telescopes Total station GPS	
	Distance measurement: Horizontal and vertical, Chain, Taping and its errors **:** Horizontal taping , Slope taping, Taping corrections ,Taping procedure	
Week 3	Plane Table(PT) Surveying	
	Compass Survey	
Week 4	Leveling, and Application of Theodolite /Total Station	
	Introduction to prospects of geodesy Earth's shape & size	

Week 5	Introduction Ellipsoid • Earth's gravitational field and geoid	
	Units of measurement Elementary geometry of the ellipsoid and spheroid	
Week 6	Types of geodesy	
	Traditional survey positional techniques	
Week 7	Triangulation	
	Traverse	
Week 8	Trilateration	
	Various types of heights	
Week 9	Ellipsoidal heights	
	Orthometric heights	
Week 10	Geoidal separation	
	Types of latitude	
Week 11	Horizontal and vertical datum	
	Datum and map projection	
Week 12	Transformation parameters	
	WGS 84 Everest ellipsoids	
Week 13	Deflection of the vertical datum	
	Radius of curvature along prime vertical and meridional plane	
Week 14	Geodetic to Geocentric Coordinate Conversions and vice versa	
	Introduction	
Week 15	Datum and coordinate systems	
	Use of GPS in the field	
Week 16	Manipulating GPS data	
	Change of projections and datum	

Textbooks and Reading Material

1. Ghilani, C.D and & Wolf, P.R.(2012) Elementary Surveying, an Introduction to Geomatics", 13th Edition

2. Bhavikatti, S. S. (2010). Surveying and Levelling: I.K. International Publishing House Pvt. Limited.

3. Clancy, J. (2013). Site Surveying and Levelling: Taylor & Francis.

4. Rangwala, S. C. R. P. S. (2005). Surveying and Levelling: Charotar Publishing House Pvt. Limited– A Practical Course 3rd Ed. Springer. ISBN:9783540927259
1. Elithorp, J.A. and Findorff, D.D. (2009). Geodesy for Geomatics and GIS Professionals (2nd ed.). Acton, MA: XanEdu Custom Publishing.
2. GuochangXU. (2012). Sciences of Geodesy-II: Innovations and Future Developments, Springer Publishers.
3. Sickle, J.V. (2015) GPS for Land Surveyors.
4. Lu, Zhiping, Qu, Yunying, Qiao, Shubo, (2014) Introduction to Geodetic Datum and Geodetic Systems.
5. Van, S.J. (2008). GPS for Land Surveyors (3rd Ed.): CRC Press.
6. Wolfgang Torge, (2012). Geodesy, 4thEd. Walter de GruyterInc.
7. P. Vanícek, E.J. Krakiwsky (1986). Geodesy: The Consepts. 2nd Ed. Elsevier Science Publishers B.V.
8. William M. Kaula (2000). Theory of Satellite Geodecy:Applications of Satellites to Geodesy. Dover Publications, Inc. Mineola, New York.

Teaching Learning Strategies

1. Lectures
2. Written Assignments
3. Quizs
4. Lab Work

Assignments: Types and Number with Calendar

1. Practical
2. Quiz
3. Presentation
4. Assignment