

Savitribai Phule Pune University
Department of Geography
Credit System (Certificate Course in Advance Surveying)
Details of the Subjects and Credits -2019

Subject Code	Subject Title	Credits per Subject
CR 101	Introduction to advance surveying	02
CR 102	Surveying with Theodolite	02
CR 103	Surveying with Dumpy Level	02
CR 104	Surveying with GPS	02
CR 105	Total Station and Survey	02
CR 106	DGPS and Survey	02
CR 107	UAV and Survey	02
	Total Credit	14

Note:

- a) For two credits 2 hours practical per week.
- b) The concerned teacher may add some points related to the subject.

Code: CR 101		Introduction to advance surveying
No. of Credits: 02		No. of Lectures:30
Sr. No.	Topic	Lectures
1	Introduction to advance surveying: Concepts, History, Development.	05
2	Fundamental Requirements of Advance Surveying	06
3	Study of surveying methods and instruments	05
4	Maps Projections and types	07
5	Coordinate System and Transformations	07

Books:

- 1.Basak, N. N. (1994): Surveying and Leveling, Tata McGraw-Hill Education, Delhi
- 2.Bhavikatt , S. S. (2009): Surveying and Leveling, I. K. International, New Delhi
- 3.Kanetkar, T. P. and Kulkarni, S.V. (1960): Surveying and Leveling-Part I and II, A. V. Ghriha Prakashan, Pune
- 4.Pugh, J. C. (1975): Surveying for Field Scientists, Methuen and Co. London
- 5.Roy, S. K. (2004): Fundamentals of Surveying, PHI Learning, New Delhi

Code: GR 102		Surveying with Theodolite
No. of Credits: 02		No. of Lectures: 10
Sr. No.	Topic	Practicals
1	Introduction, Concepts, Mechanism and Pre requirements of the theodolite survey	2
2	Instrument handling and setting	2
3	Field work	3
4	Survey data post processing	2
5	Survey data applications	1

Books:

1. Basak, N. N. (1994): Surveying and Leveling, Tata McGraw-Hill Education, Delhi
2. Bhavikatt, S. S. (2009): Surveying and Leveling, I. K. International, New Delhi
3. Kanetkar, T. P. and Kulkarni, S.V. (1960): Surveying and Leveling-Part I and II, A. V. Ghriha Prakashan, Pune
4. Pugh, J. C. (1975): Surveying for Field Scientists, Methuen and Co. London
5. Roy, S. K. (2004): Fundamentals of Surveying, PHI Learning, New Delhi

Code: CR 103		Surveying with Dumpy Level
No. of Credits: 02		No. of Practical: 10
Sr. No.	Topic	Practicals
1	Introduction, Concepts, Mechanism and Pre requirements of the Dumpy level	2
2	Instrument handling and setting	2
3	Field work	3
4	Survey data post processing	2
5	Survey data applications	1

Books:

1. Basak, N. N. (1994): Surveying and Levelling, Tata McGraw-Hill Education, Delhi
2. Bhavikatt, S. S. (2009): Surveying and Levelling, I. K. International, New Delhi
3. Kanetkar, T. P. and Kulkarni, S.V. (1960): Surveying and Leveling-Part I and II, A. V. Ghriha Prakashan, Pune
4. Pugh, J. C. (1975): Surveying for Field Scientists, Methuen and Co. London
5. Roy, S. K. (2004): Fundamentals of Surveying, PHI Learning, New Delhi

Code: CR 104		Surveying with GPS	
No. of Credits: 02		No. of Practicals: 10	
Sr. No.	Topic	Practicals	
1	Introduction of GPS : Concepts, Mechanism and Pre requirements of the GPS Survey, Coordinate and time systems, Satellite orbital motions, GPS observables, Estimation procedures, Propagation medium, Methods of post processing GPS data,	2	
2	Instrument handling and setting	2	
3	Field work	3	
4	Survey data post processing	2	
5	Survey data applications	1	

Books:

1. Jeff, H. (1995): Differential GPS Explained, Trimble Navigation
2. Mohinder, S. G., Lawrence, R. W. and Angus, P. A. (2001): Global Positioning Systems, Inertial Navigation and Integration, John Wiley and Sons Inc., New York
3. Lawrence, L. and Alex, L. (2008): GPS Made Easy: Using Global Positioning Systems in the Outdoors, Rocky Mountain Books, Calgary

Code: CR 105		Total Station and Survey	
No. of Credits: 02			No. of
Practicals: 10			
Sr. No.	Topic	Practicals	
1	Introduction to Total Station: Principle and Function	02	
2	REM, RDM, Use of Total station for data processing and analysis.	02	
3	Field work: Point data collection (Easting, Northing and Height), Electronic Distance Measurement Survey, Area Measurement Survey Height Measurement Survey,	04	
4	Survey Data Post Processing, Survey Data Applications	02	

Books:

1. Satheesh, G., Sathikumar, R. and Madhu, N. (2007): Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson Education, Delhi
2. Jeff, H. (1995): Differential GPS Explained, Trimble Navigation
3. Lawrence, L. and Alex, L. (2008): GPS Made Easy: Using Global Positioning Systems in the Outdoors, Rocky Mountain Books, Calgary
4. Mohinder, S. G., Lawrence, R. W. and Angus, P. A. (2001): Global Positioning Systems, Inertial Navigation and Integration, John Wiley and Sons Inc., New York
5. Satheesh, G., Sathikumar, R. and Madhu, N. (2007): Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson Education, Delhi

Code: CR 106		DGPS and Survey	
No. of Credits: 02		No. of Practicals: 10	
Sr. No.	Topic	Practicals	
1	Introduction to Differential GPS (DGPS): Principle, Concepts and Function, Dual and Single Frequency DGPS, RTK and Static Surveys in DGPS,	2	
2	Use of DGPS in Topographical Survey, Base, Rover, DGPS Connections and Settings	1	
3	Field Work: Point data collection (Easting, Northing and Height), Electronic Distance Measurement Survey, Area Measurement Survey Height Measurement Survey,	4	
4	Survey Data Post Processing	1	
5	Survey Data Applications	2	

Books:

1. Stinespring, B. M. (2000): The Experimental Evaluation of a DGPS Based Navigational System for the ARIES AUV, Monterey, California: Naval Postgraduate School; Springfield.
2. Jeff, H. (1995): Differential GPS Explained, Trimble Navigation
3. Lawrence, L. and Alex, L. (2008): GPS Made Easy: Using Global Positioning Systems in the Outdoors, Rocky Mountain Books, Calgary
4. Mohinder, S. G., Lawrence, R. W. and Angus, P. A. (2001): Global Positioning Systems, Inertial Navigation and Integration, John Wiley and Sons Inc., New York
5. Satheesh, G., Sathikumar, R. and Madhu, N. (2007): Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson Education, Delhi

Code: CR 107		UAV and Survey	
No. of Credits: 02		No. of Practicals: 10	
Sr. No.	Topic	Practicals	
1	Introduction: History and Development, Concepts, Mechanisms, Functions of UAV.	2	
2	UAV Systems: coordinate frames, kinematics and dynamics, forces and moments, lateral and longitudinal autopilots.	2	
3	UAV Navigation: accelerometers, gyros, GPS. Path planning algorithms:	1	
4	Dubbin's curves, waypoints, Voronoi partitions. Path following and guidance: Straight line and curve following, vision based guidance.	2	
5	Survey Data Post Processing	1	
6	Survey Data Applications	2	

Books:

1. Jeff, H. (1995): Differential GPS Explained, Trimble Navigation
2. Satheesh, G., Sathikumar, R. and Madhu, N. (2007): Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson Education, Delhi
3. Mohinder, S. G., Lawrence, R. W. and Angus, P. A. (2001): Global Positioning Systems, Inertial Navigation and Integration, John Wiley and Sons Inc., New York
4. Lawrence, L. and Alex, L. (2008): GPS Made Easy: Using Global Positioning Systems in the Outdoors, Rocky Mountain Books, Calgary
5. Stinespring, B. M. (2000): The Experimental Evaluation of a DGPS Based Navigational System for the ARIES AUV, Monterey, California: Naval Postgraduate School; Springfield.