Savitribai Phule Pune University
Department of Geography
Credit System (Certificate course in GIS and Remote Sensing):
Details of the Subjects and Credits -2019

Subject Code	Subject Title	Credits per Subject
CR 101	Remote Sensing	04
CR 102	Geographic Information System	04
CR 103	Image Interpretation and analysis	04
	Total Credit	**12**

Note:

1. For four credits 4 hours practical per week.
2. The concerned teacher may add some points related to the subject.

Code: CR 101	Remote Sensing	
No. of Credits: 04		No. of Practicals:20
Sr. No.	**Topic**	**Lectures**
1	Study of Satellite image Annotation (information) LANDSAT, SPOT and IRS and Referencing Scheme (analog)	3
2	Referencing Scheme (Digital) and Browsing Satellite data from NRSC website	3
3	Study on Spectral and image characteristics of optical and microwave SAR data for identification / characterization major earth features	3
4	Study and use of IR – Thermal Radiation Measuring Instrument and Drawing of Isotherm	3
5	Study of Thermal Image and interpretation, Computing Radiance Image from satellite data, Derivation of brightness temperature	3
6	Interpretation of SAR data (from satellite) for Land use study	2
7	Study of Ground Data collection instruments. (Radiometer, Spectrometers, GPS) and ground data collection using Radiometer, Spectrometers, GPS.	3

Books:

1. Chang, K. T. (2008): Introduction to Geographic Information Systems, Avenue of the Americas, McGraw-Hill, New York
2. Environmental Systems Research Institute, Inc. (1998): Understanding GIS: The ARC/INFO Method, ESRI Press, Redland
3. Ahmed, E. L., Rabbany (2002): Introduction to Global Positioning System, Artech House, Boston
4. Kresse, W. and Danko, D. (2002): Springer Handbook of Geographic Information, Springer Drecht, London
5. Bao, J., Tsui, Y. (2005): Fundamentals of Global Positioning System Receivers, John Wiley Sons, Inc., Hoboken

Code: CR 102 Geographic Information System		
No. of Credits: 04		**No. of Practicals:20**
Sr. No.	**Topic**	**Lectures**
1	Familiarization with GIS software	1
2	Georeferencing and projection	1
3	GIS data creation	2
4	Spatial and Non Spatial Queries	2
5	Vector based spatial analysis	2
6	Raster based spatial analysis	2
7	Network analysis	2
8	DEM generation	2
9	Map Composition - Preparation of base map from toposheet including legend, scale and annotation	2
10	GPS – Introduction, function and mechanism and Fieldwork.	2

Books:

1. Longley, P. A., Goodchild, M. F., Maguire, D. J., Rhind, D. W. (2002): Geographical Information Systems and Science, John Wiley & Sons, Chichester
2. Lo, C. P., Yeung, A. W. (2002): Concepts Techniques of Geographical Information Systems, Prentice-Hall of India, New Delhi
3. Chang, K. T. (2008): Introduction to Geographic Information Systems, Avenue of the Americas, McGraw-Hill, New York
4. Korte, G. B. (2001): The GIS Book, Onward Press, Bangalore
5. Demers, M. N. (2000): Fundamentals of Geographic Information Systems, John Wiley and Sons, New Delhi
6. Burrough, P. A. and McDonnell, R. A. (2000): Principles of Geographical Information Systems, Oxford University Press, New York
7. Heywood, I., Cornelisus, S., Carver, S. (2011): An Introduction to Geographical Information Systems, Pearson Education, New Delhi
8. Ahmed, E. L. Rabbany (2002): Introduction to Global Positioning Systems, Artech House, Boston

Code: CR 103 Image Interpretation and Analysis		
No. of Credits: 04		**No. of Practicals:20**
Sr. No.	**Topic**	**Practicals**
1.	Identification of features on single vertical aerial photograph	1
2.	Study of satellite imagery in different bands and visual interpretation	1
3.	Interpretation of cultural and physical features from different satellite images.	2
4.	Importing data into software's format, creating subset image	1
5.	Creating Histogram	1
6.	Image registration – image to map, image to image, image to user coordinates	2
7.	Image enhancement techniques – contrast enhancement, density slicing, transfer functions	2
8.	Filtering – high pass, low pass filter, edge enhancement	2
9.	Spectral indices	1
10.	Image fusion, PCA	2
11.	Image classification techniques – supervised, unsupervised, fuzzy	2
12.	Accuracy assessment	1
13.	Digital analysis of microwave data – rectification, speckle removal and fusion with optical data	2

Books:

1. Lillesand, T. M., Kiefer, R. W. and Chipman, J. W. (2008): Remote Sensing and Image Interpretation, John Wiley & Sons, New Delhi
2. Joseph, G. (2004): Fundamentals of Remote Sensing, Universities Press, Hyderabad, India
3. Agarwal, C. S. Garg, P. K. (2000): Remote Sensing, Wheeler A. H., New Delhi
4. Drury, S. A. (2001): Image Interpretation in Geology, Blackwell, Oxford
5. Wolf, P .R. (1974): Elements of Photogrammetry, McGraw Hill Inc., Kogaknscha
6. Elements of Practical Geography by R. L Singh, Published by Kalyani Publishers, 1979
7. Applied General Statistics by Croxton F. E., Cowden, D. J. and Klein, S. Pretice- Hall of India 1975.
8. Frank, H. and Althoen, S.C., statistics Cocepts and Applications, Cambridge University Press, 1994.
9. Understanding Map Projection, GIS by ESRI, 2003-2004, USA
10. Robinson, A. H., Morrison, J. L., Muehrcke, P. C., Kimerling, A. J. Guptill, S. C. (1995): Elements of Cartography, Wiley, New York
11. Understanding Map Projection (2003-2004): GIS by ESRI, Redlands
12. Tamaskar, B. G.,Deshmukh, V. M. (1974): Geographical Interpretation of Indian Topographical Maps, Orient Longman Ltd., Bombay