

**41. Big Data Analytics for Remote Sensing Laboratory (PH054IU)**

Module designation	<i>This course provides students with hands-on experience of handling remote sensing big data. Students will work with the latest development tools and platforms such as Apache Hadoop, parallel Python, R, Google Earth Engine.</i>
Semester(s) in which the module is taught	1, 2
Person responsible for the module	Dr. Lê Thanh Vân
Language	English
Relation to curriculum	Compulsory
Teaching methods	Practice.
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 55 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): laboratory: 25 Private study including examination preparation, specified in hours: 30
Credit points/ECTS	1 credit/2 ECTS
Required and recommended prerequisites for joining the module	Parallel course: Big Data Analytics for Remote Sensing (PH053IU)



Module objectives/intended learning outcomes	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO1. Apply the knowledge of the latest tools of big data analytics in remote sensing.
	Skill	CLO2. Analyze data to make conclusions to engineering problems in big data and remote sensing.
Attitude	CLO3. Show the need of for further self-learning of big data analytics for remote sensing.	



Content	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: laboratory session (4 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p>		
	Topic	Weight	Level
	Getting started with the computing resources <ul style="list-style-type: none"> ○ Parallel computing: CPUs and GPUs ○ Cloud computing 	1	T, U
	Python programming for big data	1	T, U
	R - advanced spatial statistics for remote sensing big data	2	T, U
	Remote sensing image handling: Image Enhancement, Data Mining	2	T, U
	Remote sensing thematic mapping on Google Earth Engine platform	2	T, U
Examination forms	Take experiment and write report		
Study and examination requirements	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>		



Reading list	<p>Textbooks:</p> <p>[1] Handouts</p> <p>References:</p> <p>[2] <i>Hadoop: The Definitive Guide</i>, 2nd edition, Tom White, 2011, O'Reilly.</p> <p>[3] <i>Big Data: Techniques and Technologies in Geoinformatics</i>, Hassan A. Karimi (editor), 2014, CRC Press.</p> <p>[4] <i>High Performance Computing in Remote Sensing</i>, Antonio J. Plaza and Chein-I Chang (editors), 2008, Chapman & Hall/CRC Computer and Information Science Series</p> <p>Software:</p>
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