



DEPARTMENT OF GEOMATICS ENGINEERING
UNDERGRADUATE PROGRAM IN GEOMATICS ENGINEERING
COURSE SYLLABUS

COURSE	Name	Radargrammetry Application
	Code	RM184949
	Credits	3 (three)
	Semester	Elective Course

COURSE DESCRIPTION

This course will provide science and engineering students in learning one of the mapping technologies, Radar. The basic concept of Radar will be introduced and in the following discussion also about components/equipment and systems of Radar and its use, especially for the process of acquisition, identification, frequency and polarization of Radar data. The methods of taking, types of data and mathematical equations in Radar are discussed in lectures, discussions and presentations in class. In this lecture will also be introduced LiDAR technology. Meanwhile, to understand and gain experience in processing Radar images as well as InSAR, it will also be delivered to students, case studies about the use of data from Radar and simple processing with the radargrammetry method for mapping.

EXPECTED LEARNING OUTCOME

C	Able to identify, formulate, analyze and solve problems in the fields of geodesy, surveying, hydrographic, remote sensing, photogrammetry, and cadastral.
D	Able to perform spatial data acquisition using modern measurement methods, geospatial data processing, using industry standard software, and making standard designs and analyzes in the fields of geodesy, surveying, hydrography, remote
E	Able to apply information & communication technology and the latest technological developments in the fields of geodesy, surveying, hydrographic, remote sensing, photogrammetry, geographic information systems, and cadastral.

COURSE LEARNING OUTCOME

1	Students have knowledge of Radar concepts and applications for mapping
2	Students have knowledge of the basic theories and methods of Radar image processing
3	Students have knowledge of the concepts and applications of LiDAR for mapping
4	Students are able to do Radar image analysis using SAR images and Interferometry techniques for spatial data acquisition
5	Students are able to utilize active sensing technology (Radar) for natural resource management and disaster mitigation

COURSE MATERIALS

1	Radar Concept and Definition
2	Radar Systems and Equipment
3	Radar Fundamental Equations
4	Radar image (SAR and RAR)
5	Radar Geometry Aspects
6	Radar image intensity
7	Radar Interferometry (InSAR)
8	Concept and Introduction of LiDAR technology
9	Mapping Application with Radar/LiDAR

PREREQUISITE

1. Introduction to Remote Sensing,
2. Digital Photogrammetry

REFERENCES

A.	Main References
1	Merrill I Skolnik, 2008, Introduction to Radar Systems, McGraw-Hill international editions
2	Franz W. Leberl, 1990. Radargrammetric Image Processing.
3	Robert M. O'Donnell, 2002. Radar Fundamental. Lincoln Lab - MIT USA (https://www.ll.mit.edu/outreach/introduction-radar-systems)
B.	Additional References
1	SAR Guide Book. 2004. http://www.sarmap.ch
2	Introduction to Radar Remote Sensing (ESA), 2019. https://eo4society.esa.int/echoes-in-space-introduction-to-radar-remote-sensing/