	SEMESTER LEARNING PLAN **DEPARTMENT OF GEOMATICS ENGINEERING** **FACULTY OF CIVIL, PLANNING, and GEO ENGINEERING**		
PROGRAM	**UNDERGRADUATE**		
COURSE NAME	**Marine Optic**	**CODE**	**RM184943**
SEMESTER	**Elected**	**CREDITS**	**3 (three)**
LECTURERS	**Lalu Muhammad Jaelani**		
	Filsa Bioresita		

COURSE MATERIALS	1	Introduction to Marin Optics
	2	Water Constituents
	3	Optical Properties of Water
	4	Physical, Chemical and Biological Properties of Water
	5	Water classification
	6	Remote Sensing For Water
	7	Atmospheric Correction Algorithm
	8	Bio-optical algorithm
	9	Measurement in situ
	10	In situ Database
	11	Image processing
	12	Validation
EXPECTED LEARNING OUTCOMES THAT IMPOSED IN THE COURSE	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 sensing, photogrammetry, and cadastral.
	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 OUTCOMES	1	Able to understand the characteristics and constituents of water, and its classification
	2	Able to understand the optical, physical, chemical and biological nature of water
	3	Able to apply the bio-optical algorithms
	4	Able to obtain in-situ data and validate the results of calculations

ABILITY CATEGORIES	*Cognitive Prosecess*	*Analyse*
	Knowledge Domain	*Procedural*
	Psychomotor	*Conscious control*
	Affective	*Change of attitude*

Class	Lesson learning outcome	Criteria dan Assessment Indicator	Weight	Learning Materials	Learning Experience	Learning Methods	Estimated Time
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

1	Able to understand the the scope of to Marine Optics course and its application	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	5	Lecture regulation Syllabus Explanation, Introduction to Marin Optics	Lecture, Discussion	Teacher-centered learning Student-centered learning Problem-based learning	2 x 50' 2 x 60' 2 x 50'
2	Able to understand the water constituents	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	5	Water components	Discussion, exercise	Teacher-centered learning Student-centered learning Problem-based learning	2 x 50' 2 x 60' 2 x 50'
3	Able to understand the optical Properties of Water and its effect to the image capture by the satellite	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	5	Optical Properties of Water	Discussion, exercise, assignment	Teacher-centered learning Student-centered learning Problem-based learning	2 x 50' 2 x 60' 2 x 50'
4	Able to understand the Physical, Chemical and Biological Properties of Water	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	5	Physical, Chemical and Biological Properties of Water	Discussion, exercise, assignment	Teacher-centered learning Student-centered learning Problem-based learning	2 x 50' 2 x 60' 2 x 50'
5	Able to differentiate the Water classification its unique characteristics	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	10	Classification of water based on the characteristics of water constituents	Discussion, exercise, assignment	Teacher-centered learning Student-centered learning Problem-based learning	2 x 50' 2 x 60' 2 x 50'
6	Able o understand the application of Remote Sensing For Watershed research and how to to obtain the data	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	10	Sensor for satellite imagery for aquatic remote sensing, specifications and ways of data acquisition	Discussion, exercise, assignment,practice 1: Obtaining remote sensing data	Teacher-centered learning Student-centered learning Problem-based learning	2 x 50' 2 x 60' 2 x 50'

7	Able to understand the concept and mathematical basis of Atmospheric Correction Algorithm	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	10	Algorithms and Atmospheric Correction Methods	Discussion, exercise, practice	Teacher-centered learning Student-centered learning Problem-based learning	2 x 50' 2 x 60' 2 x 50'
8	Mid semester exam						
9	Able to perform the Atmospheric Correction Algorithm for image correction using tools and softwares	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	5	Atmospheric correction tool	Discussion, exercise, practice, assignment	Teacher-centered learning Student-centered learning Problem-based learning	2 x 50' 2 x 60' 2 x 50'
10 - 11	Able to understand the Bio-optical algorithm and perform it for the data correction	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	10	The choice of algorithm and its use	Discussion, exercise, assignment, practice 2: Processing the image data	Teacher-centered learning Student-centered learning Problem-based learning	3 x 50' 2 x 60' 2 x 50'
12	Able to understand the concept and prosedures for in situ measurement	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	5	International protocol for measuring in situ data	Discussion, exercise, practice, assignment	Teacher-centered learning Student-centered learning Problem-based learning	2 x 50' 2 x 60' 2 x 50'
13	Able to understand and design the In situ Database	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	10	In situ database	Discussion, exercise, practice, assignment	Teacher-centered learning Student-centered learning Problem-based learning	2 x 50' 2 x 60' 2 x 50'
14	Able to perform the Image processing and its interpretation	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	10	Remote sensing image processing for waters	Discussion, exercise, practice, assignment	Teacher-centered learning Student-centered learning Problem-based learning	2 x 50' 2 x 60' 2 x 50'

15	Able to understand the data Validation and its procedures	Material completeness, depth of explanation, effectiveness of communication, accuracy of attitude	10	Method of validation of image processing results	Discussion, exercise, practice, assignment	Teacher-centered learning Student-centered learning Problem-based learning	2 x 50' 2 x 60' 2 x 50'
16	Final semester exam						
						TOTAL	100