

	UNIVERSITAS PENDIDIKAN INDONESIA
	SEMESTER LEARNING PLAN (RPS)

COURSE IDENTITY

Course Name	Course Code	Credits	Workload	Course Group	Semester	Prerequisite Course
REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEMS FOR COASTAL AREAS, SMALL ISLANDS, AND FISHERIES	SA537	2	90	Study Programme Core Competency Course (MKKP)	5	Basic Remote Sensing

Prepared by Course Lecturer	Reviewed by Study Programme QA Team	Approved by Head of Study Programme
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COURSE DESCRIPTION AND GRADUATE LEARNING OUTCOMES (CPL)

Course Description	The course on Remote Sensing and Geographic Information Systems for Coastal Areas, Small Islands, and Fisheries discusses the theory, concepts, and applications of remote sensing and GIS technology in the study of coastal areas, marine environments, and small islands. The primary focus of this course is the utilisation of optical and radar satellite data for mapping and monitoring coastal ecosystems (mangroves, seagrass beds, coral reefs), analysis of water quality (Total Suspended Solids/TSS, chlorophyll-a), and shallow bathymetry studies to support fisheries management and coastal zone management. Through a case study approach, students are guided to analyse real problems in coastal and marine areas using remote sensing and GIS software. The output of each practicum takes the form of a thematic map based on the analysed case study, enabling students to interpret coastal and marine conditions spatially as a basis for the sustainable management of coastal areas, small islands, and fisheries.
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Graduate Learning Outcomes (CPL) Assigned to This Course

No.	Graduate Learning Outcomes (CPL) Assigned to This Course
1	To demonstrate a sense of responsibility for work in the field of expertise independently.
2	To be capable of mastering the theoretical concepts of geography, applying geospatial technology to solve geosphere problems, and developing models and methods for solving geosphere problems.
3	To be capable of applying logical, critical, systematic, and innovative thinking within the context of the development or implementation of knowledge and technology, while observing and applying humanistic values in accordance with the field of expertise.
4	To be capable of planning, interpreting, analysing, classifying, extracting, validating, and visualising data and information derived from science and technology-based remote sensing.

Course Learning Outcomes (CPMK)

N o.	Course Learning Outcomes (CPMK)
1	To explain the potential and problems of coastal, marine, and small island area development.
2	To understand the basic concepts of sustainable coastal and marine zone management.
3	To identify the physical characteristics and specific ecosystems of coastal areas.
4	To apply remote sensing and GIS technology for bathymetric analysis, coastal ecosystem assessment, and water quality analysis.

Sub-CPMK

N o.	CPMK Ref.	Sub-CPMK Formulation
1	CPMK - 1	To understand the scope of RS-GIS for coastal areas, small islands, and fisheries.
2	CPMK - 1	To identify the natural resource potential of coastal areas (fisheries, energy, tourism).
3	CPMK - 1	To explain issues of degradation, spatial conflict, and pollution.
4	CPMK - 2	To understand the concept of Integrated Coastal Management (ICM).
5	CPMK - 3	To identify the main physical components of coastal areas.
6	CPMK - 3	To describe coastal morphology and shoreline dynamics.
7	CPMK - 3	To understand the application of satellite imagery for shoreline dynamics, abrasion, and sedimentation.
8	CPMK - 4	To explain the principles of sea depth mapping using satellite imagery.
9	CPMK - 4	To process satellite imagery for bathymetric mapping.
10	CPMK - 3	To explain the functions and problems of seagrass beds and coral reefs.
11	CPMK - 4	To produce seagrass and coral reef maps from satellite imagery.
12	CPMK - 4	To produce a mangrove distribution map using vegetation indices.
13	CPMK - 4	To process imagery for TSS estimation in coastal areas.
14	CPMK - 4	To process satellite imagery for mapping chlorophyll-a distribution in coastal areas and small islands.

Course Materials

N o.	Course Materials
1	Introduction and course regulations for Remote Sensing for Coastal Areas, Small Islands, and Fisheries.
2	Development potential of coastal areas and small islands.
3	Development problems of coastal areas and small islands.
4	Concept of sustainable coastal management.
5	Physical characteristics and components of coastal and oceanic areas.
6	Remote sensing for coastal and oceanic area dynamics.

7	Case study: depth/bathymetry using remote sensing data.
8	Practical session: depth/bathymetry analysis using remote sensing data.
9	Case study: specific coastal ecosystems (seagrass beds and coral reefs).
10	Practical session: specific coastal ecosystem analysis (seagrass beds and coral reefs).
11	Case study: mangrove coastal ecosystem.
12	Practical session: mangrove mapping using remote sensing.
13	Practical session: water quality (TSS) using remote sensing.
14	Practical session: water quality mapping (chlorophyll-a) in coastal areas using remote sensing.

Demonstrable Learning Outcomes at the End of the Course	At the end of the course, students are able to demonstrate evidence of learning outcomes in the form of thematic maps (bathymetry, coastal ecosystems, TSS, chlorophyll-a), as well as spatial analyses based on case studies, presented in clear and systematic descriptive reports.
Learning Strategy	Case Method ✓ Team-based Project Other
General Description of Learning Steps	Learning in this course is carried out through case studies and project-based learning (PjBL) practicum. At the beginning of each session, the lecturer provides an introduction to the basic concepts of coastal, marine, and small island environments and their management challenges. Students are then guided to understand the physical characteristics and coastal ecosystems through literature discussion and case analysis. The next stage involves remote sensing and GIS practicum, in which students progressively study bathymetric mapping techniques, coastal ecosystems (seagrass, coral, mangroves), and water quality (TSS and chlorophyll-a). Each practicum produces a thematic map based on a case study analysed to understand coastal environmental dynamics. This learning process emphasises active student participation through discussion, hands-on practice, and presentation, sharpening technical and analytical skills.
References	1. Anugrah Nontji. 1987. Laut Nusantara. Jakarta: Penerbit Jambatan. 2. Dahuri, et al. (2001). Integrated Coastal and Ocean Resource Management (2nd ed., Revised). Jakarta: PT. Pradnya Paramita. 3. Lillesand TM and Kiefer RW. 1997. Remote Sensing and Image Interpretation. Yogyakarta: Gadjah Mada University Press. 4. Lo CP. 1995. Applied Remote Sensing. Jakarta: Universitas Indonesia Press. 5. Nybakkern, James W. 1988. Marine Biology: An Ecological Approach. Jakarta: PT Gramedia. 6. Paine DP. 1993. Aerial Photography and Image Interpretation for Resource Management. Yogyakarta: Gadjah Mada University Press. 7. Sabri. 2004. Land Use Change Analysis Using Remote Sensing [thesis]. Bogor: IPB University. 8. Sahala Hutabarat and Stewart M. Evans. 1985. Introduction to Oceanography. Jakarta: Universitas Indonesia Press. 9. Thurman, Harold V. 1983. Essentials of Oceanography. Columbus Ohio: Charles E. Merrill Publishing Company. 10. Weisberg, Joseph and Howard Parish. 1974. Introductory Oceanography. Tokyo: McGraw-Hill Kogakusha, Ltd. 11. Lyzenga, D.R. (1978). Passive Remote Sensing Techniques for Mapping Water Depth and Bottom Features. Applied Optics. 12. Stumpf, R.P., Holderied, K., & Sinclair, M. (2003). Determination of water depth with high-resolution satellite imagery over variable bottom types. Limnology and Oceanography. 13. Gao, J. (2009). Bathymetric mapping by means of remote sensing: methods, accuracy and limitations. Progress in Physical Geography. 14. Joesidawati, M. E., & Suwarsih (2018). Remote Sensing

Technology for Fisheries and Marine Sciences. UMM Press.
15. Semedi, B. et al. (2021). Introduction to Marine Remote Sensing.
UB Press.

LEARNING PLAN

Week	Sub-CPMK	Sub-CPMK Achievement Indicators	Course Materials	Assessment Form (test/no n-test)	Assessment Weight (%)	Synchronous (face-to-face and virtual)	Asynchronous (individual and group assignments)	Duration	Reference No.	Access Time
1	To understand the scope of RS-GIS for coastal areas, small islands, and fisheries.	To understand the course regulations for Remote Sensing for Coastal Areas, Small Islands, and Fisheries.	Introduction and course regulations for Remote Sensing for Coastal Areas, Small Islands, and Fisheries.	Participatory	3	Face-to-face; Expository lecture	Independent material exploration	2×50	1	03-09-2025 10:20
2	To identify the natural resource potential of coastal areas (fisheries, energy, tourism).	To explain the potential and problems of coastal and marine area development, the concept of coastal and marine zone management, zonation, and development policies.	Development potential of coastal areas and small islands.	Short Answer	5	Face-to-face; Expository with interactive media	Independent material exploration	2×50	2	10-09-2025 10:20
3	To explain issues of degradation, spatial conflict, and pollution.	To explain issues of degradation, spatial conflict, and pollution.	Development problems of coastal areas and small islands.	Observation	5	Face-to-face; Expository with interactive media	Independent material exploration	2×50	2	17-09-2025 10:20
4	To understand the concept of Integrated Coastal Management (ICM).	To understand the concept of Integrated Coastal Management (ICM).	Concept of sustainable coastal management.	Observation	5	Face-to-face; Expository with interactive media	Independent material exploration	2×50	2	24-09-2025 10:20
5	To identify the main physical components of coastal areas.	To identify the physical characteristics and main components of coastal and oceanic areas.	Physical characteristics and components of coastal and oceanic areas.	Observation	5	Face-to-face; Expository with interactive media	Independent material exploration	2×50	2	01-10-2025 10:20
6	To describe coastal morphology and shoreline dynamics.	To describe coastal morphology and shoreline dynamics.	Physical characteristics and components of coastal and oceanic areas.	Short Answer	5	Face-to-face; Expository and Q&A	Assignment	2×50	2,3,5	08-10-2025 10:20

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STUDENT STUDY TIME (WORKLOAD)

Category	Activity	Synchronou s	Asynchrono us	Total (min/hrs)
Learning	Lectures/Tutorials	25×50 min = 1,250 min	19×15 min = 285 min	1,535 min (25.6 hrs)
	Project-based Learning	25×50 min = 1,250 min	20×15 min = 300 min	1,550 min (25.8 hrs)
	Discussion (case-based)	20×10 min = 200 min	14×15 min = 210 min	410 min (6.8 hrs)
SUBTOTAL				3,495 min (58.3 hrs)
Assessment	Participation during learning	7×35 min = 245 min	7×30 min = 210 min	905 min (15.1 hrs)
	Project work	7×50 min = 350 min	7×50 min = 350 min	700 min (11.7 hrs)
	Assignments	5×30 min = 150 min	5×30 min = 150 min	300 min (5.0 hrs)
	Quizzes	-	-	0 min
SUBTOTAL				1,905 min (31.8 hrs)
TOTAL WORKLOAD				5,400 min (90 hrs)
Credits				2
Conformity with Credit Hours	CONFORMS			

CPMK ASSESSMENT CRITERIA

N o .	CPMK	CP L Tax on om y	Weig ht	Achievement Criteria
1	To explain the potential and problems of coastal, marine, and small island area development.	2	18	75% of all students obtain a minimum score of 65 (on a scale of 100).
2	To understand the basic concepts of sustainable coastal and marine zone management.	2	5	75% of all students obtain a minimum score of 65 (on a scale of 100).
3	To identify the physical characteristics and specific ecosystems of coastal areas.	2	15	75% of all students obtain a minimum score of 65 (on a scale of 100).
4	To apply remote sensing and GIS technology for bathymetric analysis, coastal ecosystem assessment, and water quality analysis.	4	42	75% of all students obtain a minimum score of 65 (on a scale of 100).

COLLABORATIVE ASSIGNMENT PLAN

Course Name	Course Code	Credits	Workload	Course Group	Semester	Prerequisite Course
REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEMS FOR COASTAL AREAS, SMALL ISLANDS, AND FISHERIES	SA537	2	90	Study Programme Core Competency Course (MKKP)	5	Basic Remote Sensing

Assignment Title	Collaborative Project: Mapping Coastal Ecosystems and Water Quality Using Remote Sensing and GIS
Learning Method	Team-based Project
Duration (minutes)	
Assessment Weight	40
Sub-CPMK	To produce a mangrove distribution map using vegetation indices.
Assignment Description	Students work in groups to produce thematic maps of coastal ecosystems and water quality using remote sensing data. Each group selects a different case study theme (bathymetry, seagrass, coral reefs, mangroves, TSS, chlorophyll-a). The analysis results are visualised in thematic maps and a descriptive analytical report based on the case study.
Assignment Steps	1. Selection of case study location (from a list provided by the lecturer). 2. Collection of satellite image data (Landsat, Sentinel, or other appropriate data for the theme). 3. Image data processing according to the theme (classification, indices, or specific algorithms). 4. Preparation of a thematic map according to the group's topic. 5. Descriptive analysis of coastal conditions based on the map results. 6. Preparation of a group report in a simple scientific format. 7. Presentation of project results in class.
Final Output	- Thematic maps (bathymetry, seagrass, coral reefs, mangroves, TSS, chlorophyll-a) - Descriptive analysis of mapping results - Structured group report (simple IMRaD format) - Group presentation
Indicators, Criteria, and Assessment Weight	1. Data quality and processing (accuracy, method relevance, map clarity) 2. Completeness of thematic maps (symbols, legend, scale, neatness) 3. Analysis of results (description of ecosystem/water quality conditions) 4. Team collaboration skills 5. Presentation of results (systematic, communicative, data-based) Assessment Criteria: 85–100: Complete report, accurate thematic maps, in-depth descriptive analysis. 70–84: Reasonably complete report, maps lacking detail, analysis still general. 60–69: Unsystematic report, simple maps, shallow analysis. <60: Report not submitted or maps do not match the topic.
Implementation Schedule	Activity: Field Study – RS-GIS for Coastal Areas, Small Islands, and Fisheries Scheduled Time: December

REFERENCES

1. Lillesand TM and Kiefer RW. 1997. Remote Sensing and Image Interpretation. Yogyakarta: Gadjah Mada University Press.
2. Paine DP. 1993. Aerial Photography and Image Interpretation for Resource Management. Yogyakarta: Gadjah Mada University Press.
3. Lyzenga, D.R. (1978). Passive Remote Sensing Techniques for Mapping Water Depth and Bottom Features. Applied Optics.
4. Gao, J. (2009). Bathymetric mapping by means of remote sensing: methods, accuracy and limitations. Progress in Physical Geography.
5. Joesidawati, M. E., & Suwarsih (2018). Remote Sensing Technology for Fisheries and Marine Sciences. UMM Press.