

	UNIVERSITAS PENDIDIKAN INDONESIA SEMESTER LEARNING PLAN (RPS)
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COURSE IDENTITY

Course Name	Course Code	Credits	Workload	Course Group	Semester	Prerequisite Course	Date of Issue
THERMAL REMOTE SENSING SYSTEMS	SA508	2	90	Study Programme Expertise Course (MKKP)	1	—	2025-09-09 11:26:56

Prepared by Course Lecturer	Reviewed by Study Programme QA Team	Approved by Head of Study Programme
Silmi Afina Aliyan, M.T.	Shafira Himayah, S.Pd., M.Sc.	Dr. Lili Somantri, S.Pd., S.S., M.Si.

COURSE DESCRIPTION AND GRADUATE LEARNING OUTCOMES (CPL)

Course Description	This course is an advanced course for students. It provides an understanding of and the ability to analyse spatial data through the interpretation of remote sensing imagery and digitisation as the product of satellite recording that utilises the thermal emission of objects. The course covers the definition of remote sensing, components such as thermal energy emission, sensors, geometric aspects of thermal infrared imagery, and the interpretation and use of thermal infrared imagery.
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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 master the theoretical concepts of Remote Sensing, covering both active and passive remote sensing systems, visual and digital image interpretation concepts, and the application of remote sensing for geospheric information.
3	To be capable of conducting self-evaluation of the work group under their responsibility, and capable of managing learning independently; and capable of documenting, storing, securing, and retrieving data to ensure validity and prevent plagiarism.
4	To be capable of planning, interpreting, analysing, classifying, extracting, validating, and visualising data and information derived from science and technology-based remote sensing.

No.	Course Learning Outcomes (CPMK)
1	Students are able to master all aspects of thermal remote sensing systems so as to contribute to development through their utilisation (S1, S2, S3, S6, P4, KU1).
2	Students are able to understand and analyse data through image interpretation, particularly in the study of thermal remote sensing systems, which requires specialisation grounded in other areas of knowledge (S8, S9, P4, KU2, KU4, KK1).
3	Students are proficient in analysing image digitisation data using ENVI software (KU1, KU2, KU4, KU8, KK1, KK3).
4	Students are able to examine current issues relating to the potential and management in the utilisation of thermal remote sensing systems (S7, KU3, KU6, KU7, KU8).

No.	CPMK	Sub-CPMK
1	CPMK - 1	Students are able to understand the definition and general overview of thermal remote sensing systems.
2	CPMK - 1	Students are able to understand the working mechanism of thermal remote sensing systems within the scope of image processing.
3	CPMK - 2	Students are able to understand and analyse the types of thermal remote sensing systems.
4	CPMK - 3	Students are able to understand the methods of thermal remote sensing data processing.
5	CPMK - 4	Students are able to analyse the results of thermal remote sensing systems.

No.	Course Materials
1	Syllabus and course regulations, objectives, scope, procedures, and assignment models in learning.
2	TIR Domain on the EM Wave Spectrum, Radiation, Emissivity, Kinetic Temperature.
3	Thermal properties of materials and diurnal temperature.
4	Characteristics of Thermal Infrared Imagery.

5	Types of thermal sensors: Landsat, MODIS, ASTER.
6	Application of thermal remote sensing systems for volcanic studies.
7	Application of thermal remote sensing systems for soil and mineral studies.
8	Application of thermal remote sensing systems for urban studies.
9	Application of thermal remote sensing systems for Sea Surface Temperature (SST) and El Niño/La Niña studies.
10	Project: Application of thermal remote sensing systems across various fields.

Demonstrable Learning Outcomes at the End of the Course	Creating maps related to thermal phenomena. Conducting case analyses related to thermal phenomena.
Learning Strategy	Case Method ✓
Learning Steps	To understand the concepts and implementation of remote sensing for thermal applications. To be able to identify the parameters required for solving problems using a spatial approach. To be able to conduct observations, measurements, and data collection in the field to support problem-solving. To be proficient in using remote sensing software for thermal applications. To be able to present measurement data and analysis results as information that is easily comprehensible.

No.	References
1	Lillesand, T. M., & Kiefer, R. W. (2007). Penginderaan Jauh dan Interpretasi Citra. Yogyakarta: Gadjah Mada University Press.
2	Philbin, T. (2005). 100 Penciptaan Terbesar Sepanjang Masa. Batam: Kharisma Publishing.
3	Raemer, H. R. (1997). Radar Systems Principles. Florida: CRC Press LLC.
4	Sabin. (1978). Remote Sensing and Interpretation. New York: McGraw-Hill.
5	Skolnik, M. (1990). Radar Handbook (2nd ed.). United States: McGraw-Hill.
6	Sutanto. (1979). Pengetahuan Dasar Interpretasi Citra. Yogyakarta: Gadjah Mada University Press.
7	Wickens, C. D. (1998). The Future of Air Traffic Control. Washington DC: National Academy Press.

LEARNING PLAN

We ek	Sub-CPMK	Sub-CPMK Achievement Indicators	Course Materials	Assess ment Form (te st/non-te st)	As ses sm ent We igh t (%)	Synchron ous (face-t o-face and virtual)	Asynchro nous (individual and group assignme nts)	Dur atio n	Ref ere nce No.	Acces s Time
1	Students are able to understand the definition and general overview of thermal remote sensing systems.	Students are able to understand the general overview of thermal remote sensing systems.	Syllabus, course regulations, objectives, scope, procedures, and assignment models.	Participatory	5	Face-to-face. Expository using lecture method with interactive media to create interactions that foster critical thinking.	Independent exploration of course materials.	2×50 min	1	04-09-2024 14:40
2	Same as above.	Students are able to understand the basic principles of thermal remote sensing systems.	TIR Domain on the EM Wave Spectrum, Radiation, Emissivity, Kinetic Temperature.	Essay	5	Face-to-face. Expository using lecture method with interactive media to create interactions that foster critical thinking.	Independent exploration of course materials.	2×50 min	4	11-09-2024 14:40
3	Students are able to understand the working mechanism of thermal remote sensing systems.	Students are able to explain the working mechanism of thermal remote sensing systems.	Thermal properties of materials and diurnal temperature.	Essay	5	Face-to-face. Expository using lecture method with interactive media to create interactions that foster critical thinking.	Independent exploration of course materials.	2×50 min	4	18-09-2024 14:40

4	Same as above.	Students are able to identify the various types of resolution and platforms in the working mechanism of thermal remote sensing systems.	Characteristics of Thermal Infrared Imagery.	Essay	5	Face-to-face. Expository using lecture method with interactive media to create interactions that foster critical thinking.	Independent exploration of course materials.	2×50 min	4	25-09-2024 14:40
5	Students are able to understand and analyse the types of thermal remote sensing systems.	Students are able to understand the various types of thermal remote sensing systems.	Types of thermal sensors: Landsat, MODIS, ASTER.	Essay	5	Face-to-face. Expository using lecture method with interactive media to create interactions that foster critical thinking.	Independent exploration of course materials.	2×50 min	4	02-10-2024 14:40
6	Same as above.	Students are able to analyse the various resolutions and platforms in thermal remote sensing systems.	Types of thermal sensors: Landsat, MODIS, ASTER.	Essay	5	Face-to-face. Expository using lecture method with interactive media to create interactions that foster critical thinking.	Independent exploration of course materials.	2×50 min	4	09-10-2024 14:40
7	Same as above.	Students are able to differentiate between the advantages and disadvantages of each platform/sensor.	Types of thermal sensors: Landsat, MODIS, ASTER.	Essay	5	Face-to-face. Expository using lecture method with interactive media to create interactions that foster critical thinking.	Independent exploration of course materials.	2×50 min	1	16-10-2024 14:40

8	MID-SEMESTER EXAMINATION (UTS)				15					23-10-2024 14:40
9	Students are able to understand the methods of thermal remote sensing data processing.	Students are able to obtain thermal remote sensing data appropriate to objectives, applications, and objects of study.	Application of thermal remote sensing for volcanic studies.	Performance	5	Face-to-face. Expository using lecture method with interactive media to create interactions that foster critical thinking.	Independent exploration of course materials.	2×50 min	5	30-10-2024 14:40
10	Same as above (general overview).	Students are able to process thermal remote sensing data appropriately.	Application of thermal remote sensing for soil and mineral studies.	Performance	5	Face-to-face. Expository using lecture method with interactive media to create interactions that foster critical thinking.	Independent exploration of course materials.	2×50 min	4	06-11-2024 14:40
11	Students are able to understand methods of thermal remote sensing data processing.	Students are able to understand methods for processing remote sensing data for vegetation studies.	Application of thermal remote sensing for urban studies.	Performance	5	Face-to-face. Expository using lecture method with interactive media to create interactions that foster critical thinking.	Independent exploration of course materials.	2×50 min	4	13-11-2024 14:40

12	Same as above.	Students are able to understand processing methods for soil and rock studies using thermal remote sensing.	Application of thermal remote sensing for SST and El Niño/La Niña studies.	Performance	5	Face-to-face. Expository using lecture method with interactive media to create interactions that foster critical thinking.	Independent exploration of course materials.	2×50 min	4	20-11-2024 14:40
13	Same as above.	Students are able to understand methods for processing thermal imagery data for meteorological and climatological studies.	Application of thermal remote sensing for SST and El Niño/La Niña studies.	Performance	5	Face-to-face. Expository using lecture method with interactive media to create interactions that foster critical thinking.	Independent exploration of course materials.	2×50 min	4	27-11-2024 14:40
14	Students are able to analyse results of thermal remote sensing systems.	Analysing results of thermal remote sensing image data.	Project: Application of thermal remote sensing across various fields.	Performance	5	Face-to-face. Expository using lecture method with interactive media to create interactions that foster critical thinking.	Independent exploration of course materials.	2×50 min	6	04-12-2024 14:40
15	Same as above.	Analysing results of thermal remote sensing image data.	Project: Application of thermal remote sensing across various fields.	Performance	5	Face-to-face. Expository using lecture method with interactive media to create interactions that foster critical thinking.	Independent exploration of course materials.	2×50 min	6	11-12-2024 14:40

16	FINAL SEMESTER EXAMINATION (UAS)	Analysing results of thermal remote sensing image data.	Project: Application of thermal remote sensing across various fields.	Performance	15	UAS	Independent exploration of course materials.	2×50 min	4	18-12-2024 14:40
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STUDENT LEARNING WORKLOAD

Activity	Synchronous (Face-to-face / Virtual)	Asynchronous (Structured / Independent)	Student Learning Preparation	Total Learning Hours
Lectures/Tutorials	14 × 90 min = 1,260 min	—	—	1,260 min (21.0 hrs)
Project-based Learning	—	8 × 90 min = 720 min	8 × 30 min = 240 min	960 min (16.0 hrs)
Discussion (Case-based)	8 × 60 min = 480 min	—	8 × 30 min = 240 min	720 min (12.0 hrs)
TOTAL (Learning)				2,940 min (49.0 hrs)
ASSESSMENT				
Participation During Learning	16 × 60 min = 960 min	—	—	960 min (16.0 hrs)
Project Work	—	8 × 90 min = 720 min	—	720 min (12.0 hrs)
Assignments	—	8 × 60 min = 480 min	—	480 min (8.0 hrs)
Quizzes	4 × 30 min = 120 min	—	—	120 min (2.0 hrs)
Formative	—	—	—	90 min (1.5 hrs)
Summative	—	—	—	90 min (1.5 hrs)
TOTAL (Assessment)				2,460 min (41.0 hrs)
TOTAL WORKLOAD				5,400 min (90 hrs)
Ideal Hours				90 hrs
Credits (SKS)				2
Conformity with Credit Hours				COMPLIANT

CPMK ASSESSMENT CRITERIA

No.	CPMK	Taxonomy	Weight (%)	CPMK Achievement Criteria
1	Students are able to master all aspects of thermal remote sensing systems and contribute to development through their utilisation.	2	25	75% of all students achieve a minimum score of 65 (scale of 100).
2	Students are able to understand and analyse data through image interpretation in the context of thermal remote sensing systems.	2	30	75% of all students achieve a minimum score of 65 (scale of 100).
3	Students are proficient in analysing image digitisation data using ENVI software.	4	20	75% of all students achieve a minimum score of 65 (scale of 100).

4	Students are able to examine current issues relating to the potential and management in the utilisation of thermal remote sensing systems.	3	25	75% of all students achieve a minimum score of 65 (scale of 100).
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COLLABORATIVE TASK DESIGN

Task Title	Processing Thermal Imagery Data for LST Map Production
Learning Method	Case Method
Assessment Weight	50
Sub-CPMK	Students are able to understand the methods of thermal remote sensing data processing.
Task Description	Processing thermal imagery data for LST (Land Surface Temperature) map production.
Assignment Steps	(To be determined by the course lecturer.)
Deliverables	(To be determined by the course lecturer.)
Assessment Indicators, Criteria, and Weights	(To be determined by the course lecturer.)
Implementation Schedule	(To be determined by the course lecturer.)

References

No.	References
1	Lillesand, T. M., & Kiefer, R. W. (2007). Penginderaan Jauh dan Interpretasi Citra. Yogyakarta: Gadjah Mada University Press.
2	Philbin, T. (2005). 100 Penciptaan Terbesar Sepanjang Masa. Batam: Kharisma Publishing.
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6	Sutanto. (1979). Pengetahuan Dasar Interpretasi Citra. Yogyakarta: Gadjah Mada University Press.
7	Wickens, C. D. (1998). The Future of Air Traffic Control. Washington DC: National Academy Press.