INSTITUT TEKNOLOGI SEPULUH NOPEMBER
FACULTY OF CIVIL, PLANNING AND GEO ENGINEERING
DEPARTMENT OF GEOMATICS ENGINEERING
UNDERGRADUATE PROGRAM

SEMESTER LEARNING PLAN (SLP)

COURSE NAME	CODE	COURSE GROUP	CREDITS		SEMESTER	COMPILATION DATE
Database System	CM234312	Geospatial	**T=2**	**P=1**	3	-

AUTHORIZATION	SLP DEVELOPER	COURSE GROUP COORDINATOR	HEAD OF UNDERGRADUATE PROGRAM
	Yanto Budisusanto, S.T., M.Eng.	Prof. Lalu Muhamad Jaelani, ST, M.Sc, Ph.D	Putra Maulida, ST, MT, Ph.D

Learning Outcome (LO)		
	Expected Learning Outcomes (ELO) that Imposed in the Course	
	ELO-7	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.
	ELO-8	Able to compile scientific reports and provide solutions based on leadership, creativity and communication skills as well as being responsible for the work done.
	Course Learning Outcomes (CLO)	
	CLO-1	Able to use the concept and principle of database in order to identfiy the problems related to geomatics
	CLO-2	Able to design and create spatial database system and analyze the data in term of general problem solutions related to geospatial information
	CLO-3	Able to visualize spatial database using one of SIG tools (e.g. Open Jump, QGIS, ArcGIS, AutoCAD, etc.)
	CLO-4	Able to arrange a report and present the result of spatial database design both orally and writing

<table>
<tr><td></td><td></td><td>Matrix ELO – CLO
<table>
<tr><td>CLO</td><td>ELO-7</td><td>ELO-8</td></tr>
<tr><td>CLO-1</td><td>V</td><td></td></tr>
<tr><td>CLO-2</td><td>V</td><td></td></tr>
<tr><td>CLO-3</td><td>V</td><td></td></tr>
<tr><td>CLO-4</td><td></td><td>V</td></tr>
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<tr><td>Course Description</td><td colspan="2">Spatial database system course will discuss the concept of spatial database and its applications related to geomatics enginering. The practical training will give students experiences to create spatial database using one of spatial database management system (SDBMS) software (e.g. PostgreSQL + PostGIS, etc) and to visualize SDBMS using GIS software (e.g. Open Jump, QGIS, ArcGIS, AutoCAD, etc).</td></tr>
<tr><td>Course Materials</td><td colspan="2">1. Concept of spatial database
2. Architecture and rules of spatial database
3. Basic concept of table
4. Spatial database design
5. Relational algebra in tables
6. Languages used in rational spatial databases
7. Design spatial database system using one of SMBDS software and present its data in GIS tools (e.g. Open Jump, QGIS, ArcGIS, AutoCAD, etc.</td></tr>
<tr><td rowspan="3">References</td><td colspan="2">Main References :</td></tr>
<tr><td colspan="2">1. Waljiyanto, 2009, Sistem Basis Data, Graha Ilmu, Yogyakarta
2. Noname, 2006, Menjadi Seorang Programmer Komputer, Andi dan Wahana Komputer, Yogyakarta
3. Fathansyah, 2007, Basis Data, CV Informatika, Bandung
4. Sutanta, Edhy, 2004, Sistem Basis Data, Graha Ilmu, Yogyakarta
5. Prahasta, Eddy, 2012, Tutorial PostgreSQL, PostGIS dan PgRouting, Informatika, Bandung
Additional References :</td></tr>
<tr><td colspan="2">1. https://www.enterprisedb.com/downloads/postgres-postgresql-downloads#windows
2. https://www.tutorialspoint.com/sql/sql-operators.htm
3. http://postgis.net/windows_downloads/
4. https://www.w3schools.com/</td></tr>
</table>

	5. https://www.e-education.psu.edu/spatialdb/l1.html 6. http://revenant.ca/www/postgis/workshop/
Lecturer	Yanto Budisusanto, S.T., M.Eng. Agung Budi Cahyono, ST, M.Sc, DEA Husnul Hidayat, ST, MT
Prerequisite	No Prerequisite

Class/ Week	**Lesson Learning Outcome (Sub-CLO)**	**Evaluation**		**Forms of Learning, Learning methods, Student Assignments/Task, [Estimated time]**		**Learning Materials [References]**	**Weight (%)**
		Indicator	**Criteria**	**Offline**	**Online**		
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
1	Able to explain the basic concept of spatial database system		Accuracy to give analogy examples related to daily activities	Lecture, Teacher-centered learning [1x(3x45')]		1. Explanation of concept and anology	5.00%
				Discussion, Student-centered learning [1x(3x45')]		2. Discussion of examples in daily activities	
				Literature review, Problem-based learning [1x(3x45')]		3. Explanation about the comprehension of concept and term	
2	Able to explain about the database system architecture		Accuracy to give examples of structure/composition/architecture computer which is operating in stand alone and server	Lecture and discussion (Task 1), Teacher-centered learning [1x(3x45')]		1. Spatial Database Management System (SDBMS)	5.00%
				Lecture and discussion (Task 1),		2. Position of database programming	

			from the database system perspective of hardware and software	Teacher-centered learning [1x(3x45')]			
				Literature review, Student-centered learning [1x(3x45')]		3. Implementation of database architecture	
				Literature review, Student-centered learning [1x(3x45')]		4. Components of database system	
3	Able to explain about data model in database system		Accuracy to give examples for modelling of daily activities (real world)	Practice to identify daily activities (real world) into data model, Problem-based learning [1x(3x45')]		1. Data model	10.00%
				Lecture and discussion, Teacher-centered learning [1x(3x45')]		2. Database schema	
				Lecture and discussion, Teacher-centered learning [1x(3x45')]		3. Database architecture	
				Literature review (Task 2), Student-centered learning [1x(3x45')]		4. Components of database management system	
				Literature review (Task 2), Student-		5. Clasifications of database management system	

				centered learning [1x(3x45')]			
4-5	Able to create tables using database management system software		Accuracy to create tables using database management system tools with many ways and methods	Lecture and discussion, Teacher-centered learning [2x(3x45')]		1. Concept of table	15.00%
				Practical training to create tables using database management system software, Student-centered learning [2x(3x45')]		2. Data charactristics in tables	
				Practical training to create tables using database management system software, Problem-based learning [2x(3x45')]		3.Data determination	
				Task 3, Problem-based learning [2x(3x45')]		4. Database (table) normalization	
6-7	Able to create a relationship model between entities in order to process an event occurred in daily activities (real world) or to create a model from a		Accuracy to identify a relationship between entities and data modelling	Lecture and discussion, Teacher-centered learning [2x(3x45')]		1. Data modelling approach	10.00%
				Lecture and discussion, Teacher-		2. Entity relationship diagram (ERD)	

	work/event/routine in the organization			centered learning [2x(3x45')]			
				Lecture and discussion, Teacher-centered learning [2x(3x45')]		3. Degree and relationship participation	
				Practice (Task 4), Student-centered learning [2x(3x45')]		"4. Identification of real world to data model	
				Practical training to create tables which are connected to each other based on the data rules, Student-centered learning [2x(3x45')]		5. Creating ERD"	
				Practical training to create tables which are connected to each other based on the data rules, Student-centered learning [2x(3x45')]		6. Design of physical database using SDBMS software	
8	Mid-Semester Evaluation			, - Written evaluation [2x45']			**50 %**
				, - Discussion [1x45']			
9	Able to do step by step design of database system		Accuracy to apply steps of database	Lecture and discussion, Teacher-		1. The function of information system	5.00%

			design by the selected case studies	centered learning [1x(3x45')]			
				Lecture and discussion, Teacher-centered learning [1x(3x45')]		2. Information processing (system) cycle	
				Lecture and discussion, Teacher-centered learning [1x(3x45')]		3. Database life (system) cycle	
				Practice to create design of database system, Problem-based learning [1x(3x45')]		4. Design of database system	
10	Able to create queries in database		Accuracy to create examples of queries in database modelling	Lecture and discussion, Teacher-centered learning [1x(3x45')]		1. The meaning of query	5.00%
				Lecture and discussion, Teacher-centered learning [1x(3x45')]		2. Identity constraints (primary/guest)	
				Practice to create examples of tables, Student-centered learning [1x(3x45')]		3. Operation types in tables	

				Practice to create examples of queries on tables, Student-centered learning [1x(3x45')]		4. Relational algebra in tables	
				Practice to create examples of queries on tables, Student-centered learning [1x(3x45')]		5. Implementation of query	
11-12	Able to use SQL language for creating query in database		Accuracy to create query with SQL language which is suitable for the created database	Lecture and discussion, Teacher-centered learning [1x(3x45')]		1. DDL (Data Definition Language), DML (Data Manipulation Language) and Query with SQL	5.00%
				Practice, Student-centered learning [1x(3x45')]		2. Example and practice DDL, DML, and query using SQL by the operation of relational algebra in database	
				Practical training (Task 5), Problem-based learning [1x(3x45')]		3. Implementation of DDL, DML, and query in database	

13-14	Able to input and visualize spatial data to spatial database		Accuracy to create input and visualize spatial database	Lecture and discussion, Teacher-centered learning [2x(3x45')]		1. Concept and meaning of spatial database	10.00%
				Lecture and discussion, Teacher-centered learning [2x(3x45')]		2. Types and formats of spatial database	
				Literature review and presentation, Student-centered learning [2x(3x45')]		3. Transaction in spatial database	
				Practical training (Task 6), Problem-based learning [2x(3x45')]		4. Spatial database operation on tables (spatial columns and input spatial data)	
				Practical training (Task 6), Problem-based learning [2x(3x45')]		5. Spatial query in spatial database	
				Practical training (Task 6), Problem-based learning [2x(3x45')]		6. Visualization of spatial database	
15	Able to explore spatial database using GIS tools (license or opensource)		Accuracy to connect and visualize spatial database and to	Lecture and discussion, Teacher-centered learning [2x(3x45')]		1. The differences of SDBMS and geodatabase	15.00%

			test two-way communication between many GIS tools and SDBMS	Practical training (Task 6), Student-centered learning [2x(3x45')]		2.Visualization of spatial database on many GIS tools	
				Practical training (Task 6), Student-centered learning [2x(3x45')]		3. Test two-way communication between SDBMS and GIS tools	
				Practical training (Task 6), Problem-based learning [2x(3x45')]		4. Spatial query in SDBMS	
				Practical training (Task 6), Problem-based learning [2x(3x45')]		5. Spatial query in GIS tools	
16	**Final Semester Evaluation / Final Semester Examination , Evaluation with a final presentation [1x(3x45')]**						**100 %**