MINISTRY OF NATIONAL EDUCATION
YOGYAKARTA STATE UNIVERSITY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
Address: Karangmalang, Yogyakarta – 55281
Phone: 0274 – 586168 Psw. 217

LESSON PLAN

Faculty : Mathematics and Natural Science
Department : Mathematics Education
Course / Code : Logic and Sets / MAT 302
Credits : Theory: 2 SKS Practice: 1 SKS
Semester : 1st
Basic Competence : Identifying and differentiating sentence and statement
Indicator : - Students are able to identify sentence and statement
- Students are able to differentiate sentence and statement
Essential Topic : Sentence and statement
Meeting : 1
Learning Activity :
Lecturer : Ariyadi Wijaya (a.wijaya@uny.ac.id)

Component	Detail Activity	Time	Method	Media	Reference	Characters
Opening	– Lecturer informs the learning objectives – Lecturer asks students to give examples of sentences (based on their own knowledge)	10 minutes				
Main	– Lecturer provides groups of words and	80 minutes	Discussion		[C]: 6 - 9	

	asks students to categorize them into sentence and non sentence – Students present their work on identifying sentences. – Class discussion about the definition of sentence – Lecturer provides a set of sentences and asks students to categorize them into statements and non statements – Students present their work on identifying statement. – Class discussion about the definition of statement.					
Closure	– Lecturer and students reflect on the activities that have been done – Lecturer and students conclude the essential topic that has been learned	10 minutes				
Follow Up						

Assessment:

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LESSON PLAN

Faculty : Mathematics and Natural Science
Department : Mathematics Education
Course / Code : Logic and Sets / MAT 302
Credits : Theory: 2 SKS Practice: 1 SKS
Semester : 1st
Basic Competence : Solving problems on logical connectives and making their truth table
Indicator : - Students are able to make the truth table of various logical connectives
- Students are able to do operation of logical connectives
Essential Topic : Logical connectives and truth table:
– Negation
– Disjunction
– Conjunction
Meeting : 2
Learning Activity :

Component	Detail Activity	Time	Method	Media	Reference	Character
Opening	– Lecturer informs the learning objectives	10 minutes				

	– Lecturer asks students to give examples of sentence using logical connective that is commonly found in daily life.					
Main	– Lecturer gives examples of sentence in daily life that is **logically** wrong. e.g. Eating **and** sleeping is strictly prohibited in this area. – Students are asked to discuss the sentences. – Students present their work on analyzing logical connectives. – Class discussion about the logical connectives – Lecturer provides a blank table and asks students to fill in the table with truth values of the logical connectives – Students present their work on the truth table and class discussion about truth table of logical connectives.	80 minutes	Discussion		[C]: 10 - 13	
Closure	– Lecturer and students reflect on the activities that have been done – Lecturer and students conclude the essential topic that has been learned	10 minutes				
Follow Up						

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LESSON PLAN

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Course / Code : Logic and Sets / MAT 302
Credits : Theory: 2 SKS Practice: 1 SKS
Semester : 1st
Basic Competence : Solving problems on logical connectives and making their truth table
Indicator : - Students are able to make the truth table of various logical connectives
- Students are able to do operation of logical connectives
Essential Topic : Logical connectives and truth table:
– Conditional
– Inverse, converse and contraposition
– Biconditional
Meeting : 3
Learning Activity :

Component	Detail Activity	Time	Method	Media	Reference	Character

Opening	– Lecturer informs the learning objectives – Lecturer asks students to give examples of sentence using logical connective that is commonly found in daily life.	10 minutes				
Main	– Lecturer gives examples of sentence in daily life about conditional and biconditional. e.g. ”When the traffic light turns red, the vehicles stop. When we see vehicle(s) stop, does it mean that the light turn red?” – Students are asked to discuss the problem. – Students present their work on analyzing conditional and biconditional. – Class discussion about conditional and biconditional – Lecturer provides a blank table and asks students to fill in the table with truth values of conditional and biconditional – Students present their work on the truth table and class discussion about truth table of conditional and biconditional.	80 minutes	Discussion		[C]: 14 - 22	
Closure	– Lecturer and students reflect on the activities that have been done – Lecturer and students conclude the essential topic that has been learned	10 minutes				
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Faculty : Mathematics and Natural Science
Department : Mathematics Education
Course / Code : Logic and Sets / MAT 302
Credits : Theory: 2 SKS Practice: 1 SKS
Semester : 1st
Basic Competence : Solving problems on tautology, contradiction, contingency and making their truth table.
Indicator : - Students are able to give examples of tautology, contradiction and contingency.
- Students are able to do prove tautology, contradiction and contingency.
- Students are able to make truth table of tautology, contradiction and contingency.
Essential Topic : Tautology, contradiction and contingency.
Meeting : 4
Learning Activity :

Component	Detail Activity	Time	Method	Media	Reference	Character
Opening	– Lecturer informs the learning objectives – Lecturer asks students to give examples of logical statements.	10 minutes				

Main	– Lecturer gives a set of logical statements (consisting tautology, contradiction and contingency) and asks students to make the truth table of the statements. – Students present their work on making the truth table. – Lecturer emphasizes on the truth table of tautology and contingency and informs about tautology and contradiction. – Lecturer asks students to give examples of tautology, contradiction and contingency and make truth table of them – Students present their work on tautology, contradiction, contingency and their truth table.	80 minutes	Discussion		[C]: 33 - 38	
Closure	– Lecturer and students reflect on the activities that have been done – Lecturer and students conclude the essential topic that has been learned	10 minutes				
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Faculty : Mathematics and Natural Science
Department : Mathematics Education
Course / Code : Logic and Sets / MAT 302
Credits : Theory: 2 SKS Practice: 1 SKS
Semester : 1st
Basic Competence : Deriving logical conclusion.
Indicator : - Students are able to derive conclusion of groups of premises by using modus ponendo ponens, modus tollendo tollens and sylogism.
- Students are able to check the validity of conclusions.
Essential Topic : Deriving conclusion.
Meeting : 5
Learning Activity :

Component	Detail Activity	Time	Method	Media	Reference	Character
Opening	– Lecturer informs the learning objectives – Lecturer gives students some information and asks students to make conclusion based	10 minutes				

	on the information.					
Main	– Lecturer gives a set of problem about deriving conclusion and asks students to draw conclusions. – Students present their work on deriving conclusions. – Lecturer bridges students' work to the three main ways on deriving conclusion (modus ponendo ponens, modus tollendo tollens and syllogism). – Lecturer provides groups of premises and asks students to derive the conclusion for each group of premises. – Students present their work on deriving conclusions. – Lecturers provide problem on deriving conclusions and asks students to check the validity of the conclusions. – Students' presentation and class discussion	80 minutes	Discussion		[C]: 52 - 73	
Closure	– Lecturer and students reflect on the activities that have been done – Lecturer and students conclude the essential topic that has been learned	10 minutes				
Follow Up						

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Faculty : Mathematics and Natural Science
Department : Mathematics Education
Course / Code : Logic and Sets / MAT 302
Credits : Theory: 2 SKS Practice: 1 SKS
Semester : 1st
Basic Competence : Converting open sentences into statements by using quantifier.
Indicator : - Students are able to convert open sentences into statements by using quantifier.
Essential Topic : Quantification:
- Open sentence
- Universal and existential quantifier.

Meeting : 6
Learning Activity :

Component	Detail Activity	Time	Method	Media	Reference	Character
Opening	– Lecturer informs the learning objectives – Lecturer asks students to give examples of open sentence and statements	10 minutes				

Main	– Lecturer gives a set of open sentences and asks students to convert them into statements. – Students present their work on converting open sentences. – Students present their work on deriving conclusions. – Class discussion	80 minutes	Discussion		[C]: 83 - 93	
Closure	– Lecturer and students reflect on the activities that have been done – Lecturer and students conclude the essential topic that has been learned	10 minutes				
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LESSON PLAN

Faculty : Mathematics and Natural Science
Department : Mathematics Education
Course / Code : Logic and Sets / MAT 302
Credits : Theory: 2 SKS Practice: 1 SKS
Semester : 1st
Basic Competence : Identifying sets and working on their operations.
Indicator : - Students are able to identify sets.
- Students are able to work on relation of sets.
- Students are able to work on operation of sets.

Essential Topic : Set:
- Definition of set
- Relation of sets
- Operation on sets

Meeting : 8
Learning Activity :

Component	Detail Activity	Time	Method	Media	Reference	Character

Opening	– Lecturer informs the learning objectives – Lecturer asks students to give examples of ”collection”, ”group” and ”sets”.	10 minutes				
Main	– Lecturer gives collections of objects and asks students to add more members to each collection. (it is aimed to explain about “well-defined member” of a set) – Students’ presentation and class discussion on identifying set. – Lecturer gives sets of problem on sets, especially related to relation of sets and operation of sets. – Students present their work about relation and operation of sets. – Class discussion	80 minutes	Discussion		[C]: 116 - 122	
Closure	– Lecturer and students reflect on the activities that have been done – Lecturer and students conclude the essential topic that has been learned	10 minutes				
Follow Up						

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LESSON PLAN

Faculty : Mathematics and Natural Science
Department : Mathematics Education
Course / Code : Logic and Sets / MAT 302
Credits : Theory: 2 SKS Practice: 1 SKS
Semester : 1st
Basic Competence : Identifying sets and working on their operations.
Indicator : - Students are able to use properties of sets to simplify sets' operations.
- Students are able to give examples of ordered pair.
- Students are able to determine the Cartesian products of two sets.
- Students are able to determine the number of subsets of a given set.

Essential Topic : Set:
- The properties of a set
- Ordered pair
- Cartesian product
- Power set

Meeting : 9
Learning Activity :

Component	Detail Activity	Time	Method	Media	Reference	Character
Opening	– Lecturer informs the learning objectives – Lecturer gives examples of operation of sets.	10 minutes				
Main	– Lecturer gives students some sets and asks students to find pairs of equivalent sets. – Students are asked to investigate the relation of the pairs of equivalent sets. – Students' presentation and class discussion on finding equivalent sets. – Class discussion to conclude the properties of sets based on the previous activity. – Lecturer gives pairs of sets and asks students to denote the pair of elements of the sets. – Class discussion on denoting elements of sets as ordered pairs and finding the Cartesian product.	80 minutes	Discussion		[C]: 122 - 131	
Closure	– Lecturer and students reflect on the activities that have been done – Lecturer and students conclude the essential topic that has been learned	10 minutes				

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Course / Code : Logic and Sets / MAT 302
Credits : Theory: 2 SKS Practice: 1 SKS
Semester : 1st
Basic Competence : Identifying and differentiating relation and map.
Indicator : - Students are able to identify relations and maps.
- Students are able to differentiate relation and map.
Essential Topic : Relation and map:
- Definition of relation
- Kinds of mapping

Meeting : 11
Learning Activity :

Component	Detail Activity	Time	Method	Media	Reference	Character

Opening	– Lecturer informs the learning objectives – Lecturer gives examples of two sets which are related each other.	10 minutes				
Main	– Lecturer gives pairs of sets and asks students to find/give relation between the pairs. – Students are also given some sets and "rules" to find the "partner" for each set – Students' presentation and class discussion on identifying relations. – Lecturer gives examples of "special relations" and students are asked to investigate the special properties/rules of the relation. – Students' presentation and class discussion to discuss mapping. – Lecturer gives different kinds of mapping and asks students to investigate the maps. – Class discussion on kinds of mapping.	80 minutes	Discussion		[C]: 142 - 147	
Closure	– Lecturer and students reflect on the activities that have been done – Lecturer and students conclude the essential topic that has been learned	10 minutes				
Follow Up						

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LESSON PLAN

Faculty : Mathematics and Natural Science
Department : Mathematics Education
Course / Code : Logic and Sets / MAT 302
Credits : Theory: 2 SKS Practice: 1 SKS
Semester : 1st
Basic Competence : Identifying functions and working on their operation (including inverse function and composite function).
Indicator : - Students are able to identify function.
- Students are able to differentiate various functions.
Essential Topic : Function:
- Definition of function
- Kinds of function

Meeting : 12
Learning Activity :

Component	Detail Activity	Time	Method	Media	Reference	Character
Opening	– Lecturer informs the learning objectives	10 minutes				

	– Lecturer gives examples of two sets which are related each other.					
Main	– Lecturer gives various graphs and asks students to investigate the difference among the graphs. – Students' presentation and class discussion on identifying functions. – Lecturer gives different graphs of functions and asks students to investigate the difference among the functions. – Students' presentation and class discussion on kinds of mapping.	80 minutes	Discussion		[C]: 155 - 162	
Closure	– Lecturer and students reflect on the activities that have been done – Lecturer and students conclude the essential topic that has been learned	10 minutes				
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Credits : Theory: 2 SKS Practice: 1 SKS
Semester : 1st
Basic Competence : Identifying functions and working on their operation (including inverse function and composite function).
Indicator : - Students are able to determine the inverse of a function.
- Students are able to determine composite functions.
- Students are able to use properties of a function.

Essential Topic : Function:
- Inverse function
- Composite function
- Properties of a function

Meeting : 13
Learning Activity :

Component	Detail Activity	Time	Method	Media	Reference	Character

Opening	– Lecturer informs the learning objectives – Lecturer gives example of a function. Students are asked to give pairs of absis and ordinate of the function.	10 minutes				
Main	– Lecturer gives various functions and a set of ordinates. Students are asked to find the absis of each ordinate. – Students' presentation on determining the absis of given ordinates and class discussion on inverse functions. – Lecturer gives pairs of function and asks students to find the ordinate of the second function when the absis of the second function is the ordinate of the first function; and vice versa. – Students' presentation and class discussion on composite function.	80 minutes	Discussion		[C]: 162 - 169	
Closure	– Lecturer and students reflect on the activities that have been done – Lecturer and students conclude the essential topic that has been learned	10 minutes				
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Faculty : Mathematics and Natural Science
Department : Mathematics Education
Course / Code : Logic and Sets / MAT 302
Credits : Theory: 2 SKS Practice: 1 SKS
Semester : 1st
Basic Competence : Identifying advanced set.
Indicator : - Students are able to determine the inverse of a function.
- Students are able to determine composite functions.
- Students are able to use properties of a function.
Essential Topic : Set (advanced):
- Denumerable and non-denumerable sets
Meeting : 15
Learning Activity :

Component	Detail Activity	Time	Method	Media	Reference	Character
Opening	– Lecturer informs the learning objectives – Students are asked to give their idea about infinity.	10 minutes				

Main	– Students are asked to give example of functions which have infinite number of elements. – Students' presentation on denumerable set. – Students are asked to identify denumerable sets and give proof. – Students' presentation and class discussion on denumerable set.	80 minutes	Discussion		[C]: 179 - 181	
Closure	– Lecturer and students reflect on the activities that have been done – Lecturer and students conclude the essential topic that has been learned	10 minutes				
Follow Up						

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Credits : Theory: 2 SKS Practice: 1 SKS
Semester : 1st
Basic Competence : Identifying advanced set.
Indicator : - Students are able to determine the inverse of a function.
- Students are able to determine composite functions.
- Students are able to use properties of a function.
Essential Topic : Set (advanced):
- Cardinal number
Meeting : 16
Learning Activity :

Component	Detail Activity	Time	Method	Media	Reference	Character
Opening	– Lecturer informs the learning objectives – Students are asked to mention the elements of given set.	10 minutes				

Main	– Students are given some sets and asked to make pairs of sets which have “same size”. – Students’ presentation on the “size of a set” and class discussion on cardinality.	80 minutes	Discussion		[C]: 181 - 203	
Closure	– Lecturer and students reflect on the activities that have been done – Lecturer and students conclude the essential topic that has been learned	10 minutes				
Follow Up						

Assessment: