YOGYAKARTA STATE UNIVERSITY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES

LESSON PLAN

FRM/FMIPA/062-01,02
1 April 2010

1. Faculty/Study Program :Mathematics And Natural Sciences
2. Course / Code : Chemistry Laboratory Management /KIC233
3. Credit : Theory: 2 sks Practice:0 sks
4. Semester/Time : Sem: 3 / Time: 4 x 50 minutes
5. Subject : Design and Spatial Planning Laboratory
6. Basic Competence : Understanding the meaning, purpose, description, and scope of laboratory management
7. Indicators : a. explain the meaning, purpose, description, and scope management laboratory
   b. explain the classification and function of the chemical laboratory
8. Essential Concepts :
   a. Understanding laboratory management
   b. Learning objectives of laboratory management
   c. The scope of laboratory management
   d. Description of laboratory management
   e. Function Laboratory
   f. Laboratory Classification

9. Learning Activity

Component	Detail Activity	Time	Method	Media	Referren-ce	Charac ter
Opening	- Opening lesson Regards, preparing students, Presence -Apersepsi Asking for"understandin g the general management "in real life day and directing students' attention to the chemistry	15 minutes	Discussion	LCD, laboratory space, a source book		

	laboratory.					
Main	- Describe the material - Discuss the chemical laboratory resources related to good laboratory management.	60 minutes		LCD, laboratory space, a source book	**A, B, C,D, E**	
Closure	-Closing Interesting conclusions from the material that has been studied.	15 minutes		LCD, laboratory space, a source book		
Follow up	Sending a message to students to study the matter further			LCD, laboratory space, a source book		

10. Assessment

(Instrument test/non test)

Midterm Examination and Main Examination

11.References

A. Regina Tutik P dan Susila Kristianingrum. (2007). *Diktat Kuliah Manajemen Laboratorium.* Yogyakarta: FMIPA UNY.

B. Archenhold, et all.(1978). *School Science Laboratories, A Handbook of Design Management and Organization*. London : John Murray.

C. Anonim. (1972). *Guide for Safety in The Chemical Laboratory*. New York: Van Nostrand Reinhold Company

D. Everet, K & Hughes, D. (1979). *A Guide to Laboratory Design*. London : Butterworths.

E. Lehman, J.W. (2008). *The Student's Lab. Companion. Laboratory Techniques for Organic Chemistry.* New Jersey: Prentice Hall.

Yogyakarta, September 2013

Lecturer,

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YOGYAKARTA STATE UNIVERSITY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES

LESSON PLAN

FRM/FMIPA/062-03
1 April 2010

IDENTITY

1. Faculty/Study Program :Mathematics And Natural Sciences
2. Course / Code : Chemistry Laboratory Management /KIC233
3. Credit : Theory: 2 sks Practice:0 sks
4. Semester/Time : Sem: 3 / Time: 2 x 50 minutes
5. Subject : Design and Spatial Planning Laboratory
6. Basic Competence : capable of designing and managing laboratory space.
7. Indicators : a. identify the location of the standard requirements of the chemical laboratory building
   b. identifying standard requirements component and spatial chemical laboratory
8. Essential Concepts :
   a. Understanding design
   b. Location of safe laboratory
   c. Area of laboratory room
   d. Components of laboratory space
   e. Tata laboratory space

11. Learning Activity

Component	Detail Activity	Time	Method	Media	Referren-ce	Charac ter
Opening	- Opening lesson Regards, preparing students, Presence -Apersepsi Asking for"understandin g the laboratory "has been learned at the meeting ago and directing	15 minutes	Discussion	LCD, laboratory space, a source book		

	students' attention to the chemistry laboratory building.					
Main	- Core Activities - Describe the material - Discuss the chemical laboratory conditions related to the requirements of good laboratory.	60 minutes		LCD, laboratory space, a source book	**A, B, C**	
Closure	- Interesting conclusions from the material that has been studied. - Provide assignment appropriate chemical laboratory design standard requirements	15 minutes		LCD, laboratory space, a source book		
Follow up	Sending a message to students to study the matter further	10 minutes				

12. Assessment

(Instrument test/non test)

Midterm Examination and Main Examination

Yogyakarta, September 2013

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YOGYAKARTA STATE UNIVERSITY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES

LESSON PLAN

FRM/FMIPA/062-04,05
1 April 2010

IDENTITY

1. Faculty/Study Program :Mathematics And Natural Sciences
2. Course / Code : Chemistry Laboratory Management /KIC233
3. Credit : Theory: 2 sks Practice:0 sks
4. Semester/Time : Sem: 3 / Time: 4 x 50 minutes
5. Subject : Management of Laboratory Equipment
6. Basic Competence : Understanding the types, how to care for, how to assemble, and how to use the tools of education and research laboratories, capable of properly caring for and using laboratory equipment
7. Indicators : a. describe the type, how to care for, how to assemble, and how to use the tools of education and research laboratories
8. Essential Concepts :
   a. Classification of materials and equipment based on equipment function
   b. How to take care of: storing, cleaning, and inventory
   c. How to assemble and how to use the tools of education and research laboratories

9. Learning Activity

Component	Detail Activity	Time	Method	Media	Referren-ce	Charac ter
Opening	- Opening lesson Regards, preparing students, Presence -Apersepsi Asking "understanding of laboratory equipment" that has been studied in meetings ago and directing students' attention to the maintenance tool	15 minutes	Discussion	LCD, laboratory equipment, resource books.		

	chemistry laboratory.					
Main	- Describe the material - Discuss the types, how to care for, how to assemble, and how to use the tools of education and research laboratories.	60 minutes		LCD, laboratory equipment, resource books.	**A, B, C, D, E**	
Closure	- Interesting conclusions from the material that has been studied.	15 minutes		LCD, laboratory equipment, resource books.		
Follow up	Sending a message to students to study the matter further	10 minutes				

10. Assessment

(Instrument test/non test)

Midterm Examination and Main Examination

11. References

A.. Archenhold, et all.(1978). *School Science Laboratories, A Handbook of Design Management and Organization*. London : John Murray.

B. Anonim. (1972). *Guide for Safety in The Chemical Laboratory*. New York: Van Nostrand Reinhold Company

C. Everet, K & Hughes, D. (1979). *A Guide to Laboratory Design*. London : Butterworths.

D. Lehman, J.W. (2008). *The Student's Lab. Companion. Laboratory Techniques for Organic Chemistry*. New Jersey: Prentice Hall.

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YOGYAKARTA STATE UNIVERSITY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES

LESSON PLAN

FRM/FMIPA/062-06
1 April 2010

IDENTITY

1. Faculty/Study Program :Mathematics And Natural Sciences
2. Course / Code : Chemistry Laboratory Management /KIC233
3. Credit : Theory: 2 sks Practice:0 sks
4. Semester/Time : Sem: 3 / Time: 2 x 50 minutes
5. Subject : Laboratory Equipment Selection Criteria
6. Basic Competence : Understanding the selection criteria for educational and research laboratory equipment, capable of selecting a tool according to criteria of good appliances, as needs and funds available in the laboratory.
7. Indicators : a. identify selection criteria for chemical laboratory equipment
8. Essential Concepts :
   a. Aspects to consider in the selection tool is the pedagogic aspects (academic),
   b. physical, and special
      Selection of equipment in addition to meeting these three aspects should also consider the needs and funding.
9. Learning Activity

Component	Detail Activity	Time	Method	Media	Referren-ce	Charac ter
Opening	- Opening lesson Regards, preparing students, Presence -Apersepsi Asking "understanding of laboratory equipment" that has been studied in meetings ago and directing students' attention to the purchase of	15 minutes	Discussion	LCD, laboratory equipment, resource books.		

	equipment chemistry laboratory.					
Main	- Describe the material -Discuss the aspects of academic, physical, and chemical laboratory equipment specialized in relation to the requirements of good laboratory equipment.	60 minutes			**A, B, C, D, E**	
Closure	- Interesting conclusions from the material that has been studied.	15 minutes				
Follow up	Sending a message to students to study the matter further	10 minutes				

10. Assessment

(Instrument test/non test)

Midterm Examination and Main Examination

Yogyakarta, September 2013

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YOGYAKARTA STATE UNIVERSITY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES

LESSON PLAN

FRM/FMIPA/062-07
1 April 2010

IDENTITY

1. Faculty/Study Program :Mathematics And Natural Sciences
2. Course / Code : Chemistry Laboratory Management /KIC233
3. Credit : Theory: 2 sks Practice:0 sks
4. Semester/Time : Sem: 3 / Time: 2 x 50 minutes
5. Subject : Practical Performance Assessment
6. Basic Competence : Understanding the practical assessment techniques, capable of assessing practical activities properly.
7. Indicators : a. explain the assessment technique practical activities properly.
8. Essential Concepts :
   a. Types of tests and non-test evaluation
   b. Components are evaluated: pretest, lab, report
   c. Weight assessment
9. Learning Activity

Component	Detail Activity	Time	Method	Media	Referren-ce	Charac ter
Opening	- Opening lesson Regards, preparing students, Presence -Apersepsi Asking "how to assess the practical activities carried out in chemical Prodi" has ever done and directing students' attention to the assessment of the ideal.	15 minutes	discussion, information.	computer, LCD, laboratory equipment, resource books.		

Main	- Describe the material -Discuss the techniques of good assessment.	60 minutes			**A, B, C, D, E**	
Closure	- Interesting conclusions from the material that has been studied.	15 minutes				
Follow up	Sending a message to students to study the matter further	10 minutes				

10. Assessment

(Instrument test/non test)

Midterm Examination and Main Examination

Yogyakarta, September 2013

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YOGYAKARTA STATE UNIVERSITY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES

LESSON PLAN

FRM/FMIPA/062-08
1 April 2010

IDENTITY

1. Faculty/Study Program :Mathematics And Natural Sciences
2. Course / Code : Chemistry Laboratory Management /KIC233
3. Credit : Theory: 2 sks Practice:0 sks
4. Semester/Time : Sem: 3 / Time: 2 x 50 minutes
5. Subject : Midterm Examination I
6. Basic Competence : Understanding definition, purpose and scope of laboratory management, laboratory functions, ideal layout and spatial design laboratory, the management tools, tool selection criteria, and assesssment of learning activities.

Yogyakarta, September 2013

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YOGYAKARTA STATE UNIVERSITY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES

LESSON PLAN

FRM/FMIPA/062-09,10
1 April 2010

IDENTITY

1. Faculty/Study Program :Mathematics And Natural Sciences
2. Course / Code : Chemistry Laboratory Management /KIC233
3. Credit : Theory: 2 sks Practice:0 sks
4. Semester/Time : Sem: 3 / Time: 4 x 50 minutes
5. Subject : Management of Chemicals
6. Basic Competence : Understanding the types, how to care for, and how to use chemicals, capable of caring for and use chemicals properly
7. Indicators : a. describe the type, how to care for, and how to use chemicals.
8. Essential Concepts :
   a. Classification of chemicals
   b. How to take care of: storing, treating, and inventory
9. Learning Activity

Component	Detail Activity	Time	Method	Media	Referren-ce	Charac ter
Opening	- Opening lesson Regards, preparing students, Presence -Apersepsi Asking "chemicals" that have been known and directing students' attention to how to care for, and how to use chemicals.	15 minutes	discussion, information.	computer, LCD, laboratory equipment, resource books.		
Main	- Describe the material - Discuss the types, how to care for, and how	60 minutes	discussion, information.	computer, LCD, laboratory equipment, resource	**A, B, C, D, E**	

	to use chemicals			books.		
Closure	- Interesting conclusions from the material that has been studied.	15 minutes	discussion, information.	computer, LCD, laboratory equipment, resource books.		
Follow up	- Sending a message to the students to learn the material I-VIII meeting to deal with the Insert Test I at the next meeting.	10 minutes				

10. Assessment

(Instrument test/non test)

Midterm Examination and Main Examination

Yogyakarta, September 2013

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YOGYAKARTA STATE UNIVERSITY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES

LESSON PLAN

FRM/FMIPA/062-11,12
1 April 2010

IDENTITY

1. Faculty/Study Program :Mathematics And Natural Sciences
2. Course / Code : Chemistry Laboratory Management /KIC233
3. Credit : Theory: 2 sks Practice:0 sks
4. Semester/Time : Sem: 3 / Time: 4 x 50 minutes
5. Subject : Safety in the Laboratory
6. Basic Competence : Understand security tools and P3K, capable of working safely
7. Indicators : explain some self-protection equipment and P3K
8. Essential Concepts :
   a. Personal protection equipment
   b. P3K
9. Learning Activity

Component	Detail Activity	Time	Method	Media	Referren-ce	Charac ter
Opening	- Opening lesson Regards, preparing students, Presence -Apersepsi Asking some self-protection equipment that has been known and directing students' attention to other equipment	15 minutes	discussion, information.	computer, LCD, laboratory equipment, resource books.		
Main	- Describe the material - Discuss the kinds of personal protection and P3K.	60 minutes	discussion, information.	computer, LCD, laboratory equipment, resource books.	**A, B, C, D, E**	

Closure	- Interesting conclusions from the material that has been studied.	15 minutes	discussion, information.	computer, LCD, laboratory equipment, resource books.		
Follow up	- Sending a message to students to study the matter further.	10 minutes				

10. Assessment

(Instrument test/non test)

Midterm Examination and Main Examination

Yogyakarta, September 2013

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YOGYAKARTA STATE UNIVERSITY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES

LESSON PLAN

FRM/FMIPA/062-13
1 April 2010

IDENTITY

1. Faculty/Study Program :Mathematics And Natural Sciences
2. Course / Code : Chemistry Laboratory Management /KIC233
3. Credit : Theory: 2 sks Practice:0 sks
4. Semester/Time : Sem: 3 / Time: 2 x 50 minutes
5. Subject : Laboratory Waste Management
6. Basic Competence : Understanding how to manage laboratory waste, capable of managing simple laboratory waste
7. Indicators : explains how to manage laboratory waste
8. Essential Concepts :
   a. Definition and classification of laboratory waste
   b. How to manage laboratory waste
9. Learning Activity

Component	Detail Activity	Time	Method	Media	Referren-ce	Charac ter
Opening	- Opening lesson Regards, preparing students, Presence -Apersepsi Asking how to manage the waste that has been known and directing students' attention to the proper management	15 minutes	discussion, information.	computer, LCD, laboratory equipment, resource books.		
Main	- Describe the material - Discuss the classification and the manner of waste	60 minutes	discussion, information.	computer, LCD, laboratory equipment, resource	**A, B, C, D, E**	

	management.			books.		
Closure	- Interesting conclusions from the material that has been studied.	15 minutes	discussion, information.	computer, LCD, laboratory equipment, resource books.		
Follow up	- Sending a message to students to study the matter further.	10 minutes				

10. Assessment

(Instrument test/non test)

Midterm Examination and Main Examination

Yogyakarta, September 2013

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YOGYAKARTA STATE UNIVERSITY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES

LESSON PLAN

FRM/FMIPA/062-14
1 April 2010

IDENTITY

1. Faculty/Study Program :Mathematics And Natural Sciences
2. Course / Code : Chemistry Laboratory Management /KIC233
3. Credit : Theory: 2 sks Practice:0 sks
4. Semester/Time : Sem: 3 / Time: 2 x 50 minutes
5. Subject : Dangerous Experiment Techniques
6. Basic Competence : Understanding the dangerous experiment technique, capable of doing dangerous experiments safely.
7. Indicators : a. perform dangerous experiments techniques
8. Essential Concepts :
   a. Examples of some hazardous experiments and techniques to do it safely: dilution of sulfuric acid, steam distillation, vacuum distillation, extraction sokhlet, how filter and sediment dekantir
9. Learning Activity

Component	Detail Activity	Time	Method	Media	Referren-ce	Charac ter
Opening	- Opening lesson Regards, preparing students, Presence -Apersepsi Asking "how to dilute concentrated sulfuric acid" has ever done and directing students' attention to safety.	15 minutes	discussion, information.	computer, LCD, laboratory equipment, resource books.		
Main	- Describe the material - Discuss techniques dangerous	60 minutes	discussion, information.	computer, LCD, laboratory equipment, resource	**A, B, C, D, E**	

	experiment.			books.		
Closure	- Interesting conclusions from the material that has been studied.	15 minutes	discussion, information.	computer, LCD, laboratory equipment, resource books.		
Follow up	- Sending a message to students to study the matter further.	10 minutes				

10. Assessment

(Instrument test/non test)

Midterm Examination and Main Examination

Yogyakarta, September 2013

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YOGYAKARTA STATE UNIVERSITY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES

LESSON PLAN

FRM/FMIPA/062-15
1 April 2010

IDENTITY

1. Faculty/Study Program :Mathematics And Natural Sciences
2. Course / Code : Chemistry Laboratory Management /KIC233
3. Credit : Theory: 2 sks Practice:0 sks
4. Semester/Time : Sem: 3 / Time: 2 x 50 minutes
5. Subject : MSDS (Material Safety Data Sheet)
6. Basic Competence : Understanding the content and how to search for MSDS, capable of caring for and use chemicals properly
7. Indicators : a. explain the content and how to search for MSDS
8. Essential Concepts :
   a. Definition, content and how to search for MSDS
   b. Example MSDS various materials: sulfuric acid, hydrochloric acid, zinc oxide, sodium chloride, mercury
9. Learning Activity

Component	Detail Activity	Time	Method	Media	Referren-ce	Charac ter
Opening	- Opening lesson Regards, preparing students, Presence -Apersepsi Asking "chemicals" that have been known and directing students' attention to the contents of the MSDS	15 minutes	discussion, information.	computer, LCD, laboratory equipment, resource books.		
Main	- Describe the material - Discuss the content of the MSDS and how	60 minutes	discussion, information.	computer, LCD, laboratory equipment, resource	**A, B, C, D, E**	

	to find it.			books.		
Closure	- Interesting conclusions from the material that has been studied.	15 minutes	discussion, information.	computer, LCD, laboratory equipment, resource books.		
Follow up	- Sending a message to students to study the matter further.	10 minutes				

10. Assessment

(Instrument test/non test)

Midterm Examination and Main Examination

Yogyakarta, September 2013

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YOGYAKARTA STATE UNIVERSITY
FACULTY OF MATHEMATICS AND NATURAL SCIENCES

LESSON PLAN

FRM/FMIPA/062-16
1 April 2010

IDENTITY

1. Faculty/Study Program :Mathematics And Natural Sciences
2. Course / Code : Chemistry Laboratory Management /KIC233
3. Credit : Theory: 2 sks Practice:0 sks
4. Semester/Time : Sem: 3 / Time: 2 x 50 minutes
5. Subject : Midterm Examination II
6. Basic Competence : Understanding material management, safety in the laboratory, laboratory waste management, dangerous experiment techniques, and MSDS

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