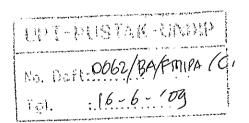


# TEACHING-LEARNING CONTRACT LEARNING PROGRAM OUTLINE LEARNING UNIT PROGRAM

# NONPARAMETRIC REGRESSION PAS 130



STATISTICS STUDY PROGRAM OF MATHEMATICS DEPARTMENT
MATHEMATICS AND SCIENCE FACULTY
DIPONEGORO UNIVERSITY
SEMARANG
2007

# TEACHING-LEARNING CONTRACT

Course Title: Nonparametric Regression

Code/Credit: PAS 130/3

Semester : VII

#### 1. Course Advantage

Nonparametric Regression is a method of data analyze with unknown form function. In this course include about assumption and model in Nonparametric Regression, techniques of Smoothing and election of optimal parameter smoothing and also goodness of fit of model

# 2. Course Description

This course study about assumption and model of Nonparametric Regression , when Nonparametric Regression be used, methods of estimation of Nonparametric Regression are like : kernel method, orthogonal series, spline smoothing, k-NN smoothing, regressogram, median smoothing, delta dirac estimator and also method in election of parameter of smoothing are like : method of plug in, cross validation, penalizing function method and bootstrap method. Also studied the technique of Nonparametric Regression of correlation data and goodness of fit of the model.

# 3. General Instructional Aim

After following this course, student will be able to analyze of data with Nonparametric Regression

#### 4. Lecture Strategic

This course method is given by explain of class. Clarification started with congeniality of definition concept, then given by problem example that related to given items. Besides given also problems for practice so that can be seen how long the understanding of student to existing items. Also given Self-Supporting Task.

#### 5. References

- (1) Hardle, W., Applied Nonparametric Regression, 1990, Cambridge University Press
- (2) Bruce, A dan Gao, Hong-Ye, Applied wavelet Analysis with S-PLUS,, 1996, Springer, New York
- (3) Racine, J., Consistent Significance Testing for Nonparametric Regression, Departement of Economics, BSN 3403, University of South Florida, Tampa, FL

#### 6. Task

Task will be given to minimize twice in one semester. Mid term evaluation given with closed book system and final evaluation given by making one handing out about lecturing items and presented.

#### 7. Scoring Criteria

Criteria of scoring in this course is

Nilai	Point	
A	4	
AB	3,5	
В	3	
BC	2,5	
C	2	
CD	1,5	
D	1	
E	0	

Scoring in this course title consist of three component, that are task and examination. Examination will be held twice, that is mid-term and final exam. Midterm exam is arranged after seventh lecturing, while final exam item is arranged after fourteenth lecturing.

Final score decision is based on this scoring indicator such as:

No	Component	Percentage
1	Task	20 %
2	Midterm	30 %
3	Final Exam	50 %
	TOTAL	100%

# 8. Lecture Schedule

Week	Material	Reference
1	Teaching-learning contract,	
	Introduction of learning.	
2	Nonparametric regression:	[1] 3 - 23
	Common Model, common	
	Assumption, estimation of Least	
	square of nonparametric	
	regression, design model.	
3	Smoothing Technique: kernel	[1] 23-74
!	Technique, orthogonal series	[2] 38-44
	Technique	
4	Smoothing Technique: k-NN	[1] 23-74
:	Technique, regressogram,	[2] 38-44
	median smoothing	
5	Practice in laboratory	[1] 23-74
	computation.	[2] 38-44
6	Smoothing Technique: delta	[1] 23-74
	dirac series estimator, Spline	[2] 38-44
	smoothing	
7	Practice in laboratory	[1] 23-74
	computation.	[2] 38-44
8	Mid term	

Selection methods of parameter smoothing: cross validation method  Selection methods of parameter moothing: penalizing	
nethod Selection methods of parameter	
Selection methods of parameter	[1] 147-189
	[1] 147-189
moothing: penalizing	•
unction method, plug in	
nethod.	
election methods of parameter	[1] 147-189
moothing: Bootstrap method	
ractice in laboratory	[1] 147-189
omputation.	,
echnique of nonparametric	[1]203-216
egression to correlation data:	•
on parametric prediction of time	
eries, Smoothing of dependent	
Tor .	
oodness of fit test of	[3] 1-16
onparametric regression.	
ractice in laboratory	[1]203-216
emputation.	[3] 1-16
nal Exam	
	delection methods of parameter moothing: Bootstrap method ractice in laboratory omputation.  The description of the parametric regression to correlation data: on parametric prediction of time reries, Smoothing of dependent ror.  The dodness of fit test of opparametric regression.

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# LEARNING PROGRAM OUTLINE

Course Title

: Noparametric Regression

Code / Credit

: PAS 130/3

Course Description

: Nonparametric Regression is a method of data analyze with unknown form function . In this course include about assumption and model in Nonparametric Regression, techniques of Smoothing and election of optimal parameter

smoothing and also goodness of fit test of model

General Instructional Aim : After following this course, student will be able to analyze

data with Nonparametric Regression

No.	Specific	Subject	Sub Subject		References
	Instructional Aim		A Paragraphic Control of the Control		
1	After studying this	nonparametric	<ul> <li>Common Model</li> </ul>	1X150	[1] 3 - 23
	course, students are	regression	■ Common	minutes	
	expected to have	model	Assumption		
	ability to explain		■ Least square		
	common model,		estimation of		
	assumption and		nonparametric		
	design model in non		regression		
	parametric		■ Design model		
	regression				
2	After studying this	Smoothing	<ul><li>Kernel</li></ul>	5x150	[1] 23-74
	course, students are	technique	Technique	minutes	[2] 38-44
	expected to have		orthogonal series		
	ability to application	7	Technique		
	non parametric		<ul> <li>k-NN Technique</li> </ul>		
	regression	; ;	Regressogram,	, , , , , , , , , , , , , , , , , , ,	

Γ	technique.		
	l comique.		Technique
			Spline smooth-
			ing
	3		■ Delta dirac
	į		series estimator
			Median
			Smoothing
3	After studying this	Selection of	• Cross validation 4x150 [1] 147-189
	course, students are	parameter	method minutes
	expected to have	smoothing	• penalizing
	ability to find	_	function method
	smoothing	i E	■ plug in method
	parameter optimal.		■ Bootstrap
	-		method
4	After studying this	nonparametric	
	course, students are	Technique in	
	expected to have	correlation	parametric of minutes time series
	ability to application	data model	
	nonparametric	data model	<ul> <li>Smoothing with</li> </ul>
	-		dependent error
	Technique in		
	correlation data		
	model		
5	After studying this	•	Bootstrap method 2X150 [3] 1-16
	course, students are	ř	minutes
	expected to have	parametric	
	ability to test of	regression	
	goodness of fit of		
	non parametric	, mg	
	regression	, m. fr.	
		<u>-</u>	

# 6. References:

- (1) Hardle, W., Applied Nonparametric Regression, 1990, Cambridge University Press
- (2) Bruce,A dan Gao,Hong-Ye, Applied wavelet Analysis with S-PLUS,,1996,Springer,New York
- (3) Racine, J., Consistent Significance Testing for Nonparametric Regression, Departement of Economics, BSN 3403, University of South Florida, Tampa, FL

COURSE TITLE

: Nonparametric Regression

CODE / CREDIT

: PAS 130 / 3

**DURATION** 

: 2X150 MINUTES

**WEEK** 

: 1 and 2

A. INSTRUCTIONAL AIM:

1. GENERAL

: After following this course, student will be able to

analyze of data with Nonparametric Regression

2. SPECIFIC

: After studying this course, students are expected to have

ability to explain common model, assumption and design

model in nonparametric regression

B. SUBJECT

: Non parametric regression model

C. SUB SUBJECT

Common model and assumption.

• Least square estimation of non parametric

regression

Design model

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	Explain learning contract.	Observing and	OHP,
	<ul><li>2. Describing about general and specific objectives competence</li><li>3. Describing about matter at the first and second</li></ul>	taking notes	transparancy, white board, reference book, and paper
	meeting		

PRESENTATION	4. Giving motivation to student for the importance to understanding this matter to make easy the next matter.  Explaining about nonparametric regression, common model, assumption and design model, estimation of non parametric regression and give counter examples.	Observing, asking, taking notes	OHP, transparancy, white board, reference book, and paper
CLOSING	Giving tasks for take home     Giving outline learning     and description about     matter on the next     meeting	Discuss, asking, observing, taking notes	white board and paper

: Giving problems to the students.

# F. REFERENCE

COURSE TITLE

: Nonparametric Regression

CODE / CREDIT

: PAS 130 / 3

**DURATION** 

: 5X150 MINUTES

WEEK

: 3,4,5,6 and 7

A. INSTRUCTIONAL AIM:

1. GENERAL

: After following this course, student will be able to

analyze of data with Nonparametric Regression

2. SPECIFIC

: After studying this course, students are expected to have

ability to application non parametric regression

Technique.

B. SUBJECT

: Smoothing Technique

C..SUB SUBJECT

kernel Technique

orthogonal series Technique

• k-NN Technique

Regressogram Technique

Spline Technique

Delta dirac series estimator Technique

Median Technique

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	1.Describing about general	Observing and	OHP,
	and specific objectives	taking notes	transparancy,
	competence		white board,
	2.Describing about matter at		reference book,
	the three until seven		and paper

meeting		
3. Giving motivation to student		
for the importance to		
understanding this matter to		
make easy the next matter.		
1. Explaining about non	Observing,	OHP,
parametric regression	asking, taking	transparancy,
Technique and it	notes	white board,
application for example:		reference book,
♦ kernel Technique		and paper
• orthogonal series		} \$
Technique		
♦ k-NN Technique		
◆ Regressogram		
Technique		
♦ Spline Technique		<u> </u>
♦ Delta dirac series		
estimator Technique		
♦ Median Technique		
2. Giving counter examples		777
and practice in		
computation laboratory		
Giving tasks for take home	Discuss, asking,	white board and
Giving outline learning and	observing, taking	paper
description about matter on	notes	
the next meeting		
	for the importance to understanding this matter to make easy the next matter.  1. Explaining about non parametric regression Technique and it application for example:      kernel Technique     orthogonal series     Technique     k-NN Technique     Regressogram     Technique     Spline Technique     Delta dirac series     estimator Technique     Median Technique     Median Technique  2. Giving counter examples     and practice in     computation laboratory  Giving tasks for take home Giving outline learning and description about matter on	3. Giving motivation to student for the importance to understanding this matter to make easy the next matter.  1. Explaining about non parametric regression Technique and it application for example:  • kernel Technique  • orthogonal series Technique  • k-NN Technique  • Regressogram Technique  • Spline Technique  • Delta dirac series estimator Technique  • Median Technique  • Median Technique  • Giving counter examples and practice in computation laboratory  • Giving tasks for take home  • Giving outline learning and description about matter on notes

: Giving problems to the students.

F. REFERENCE

COURSE TITLE

: Nonparametric Regression

CODE / CREDIT

: PAS 130 / 3

**DURATION** 

: 5X150 MINUTES

**WEEK** 

: 9 until 12

A. INSTRUCTIONAL AIM:

1. GENERAL

: After following this course, student will be able to

analyze of data with Nonparametric Regression

2. SPECIFIC

: After studying this course, students are expected to have

ability to find smoothing parameter optimal.

B. SUBJECT

: Selection methods of parameter smoothing

C. SUB SUBJECT

cross validation method

penalizing function method

plug in method

Bootstrap method

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	Describing about general and specific objectives competence     Describing about matter at the nine until twenty meetings      Giving motivation to	Observing and taking notes	OHP, transparancy, white board, reference book, and paper
	3. Giving motivation to student for the importance to understanding this matter		

PRESENTATION	to make easy the next matter.  1. Explaining about selection method parameter smoothing for examples: cross validation method ,penalizing function method, plug in method and Bootstrap method  2. Giving counter examples and practice in computation laboratory	Observing, asking, taking notes	OHP, transparancy, white board, reference book, and paper
CLOSING	<ol> <li>Giving tasks for take home</li> <li>Giving outline learning and description about matter on the next meeting</li> </ol>	Discuss, asking, observing, taking notes	white board and paper

: Giving problems to the students.

F. REFERENCE

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COURSE TITLE

: Nonparametric Regression

CODE / CREDIT

: PAS 130 / 3

**DURATION** 

: 150 MINUTES

**WEEK** 

: 13

A. INSTRUCTIONAL AIM:

1. GENERAL

: After following this course, student will be able to

analyze of data with Nonparametric Regression

2. SPECIFIC

: After studying this course, students are expected to have

ability to application non parametric Technique in

correlation data model

B. SUBJECT

: Nonparametric technique in correlation data model

**C.SUB SUBJECT** 

Prediction of non parametric of time series

Smoothing with dependent error

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	1. Describing about general	Observing and	OHP,
	and specific objectives	taking notes	transparancy,
	competence		white board,
	2. Describing about matter at		reference book,
	this meeting		and paper
	3. Giving motivation to		
	student for the importance		
	to understanding this		7 7 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
	matter to make easy the		
	next matter.		

PRESENTATION	Explaining about non	Observing,	OHP,
	parametric Technique in	asking, taking	transparancy,
	correlation data model	notes	white board,
	2. Giving counter examples		reference book,
	and practice in		and paper
	computation laboratory		Control of the Contro
CLOSING	3. Giving tasks for take	Discuss, asking,	white board and
	home	observing, taking	paper
	4. Giving outline learning	notes	; 
	and description about matter		
	on the next meeting		

: Giving problems to the students.

F. REFERENCE

COURSE TITLE

: Nonparametric Regression

CODE / CREDIT

: PAS 130 / 3

**DURATION** 

: 2X150 MINUTES

**WEEK** 

: 14 until 15

A. INSTRUCTIONAL AIM:

1. GENERAL

: After following this course, student will be able to

analyze of data with Nonparametric Regression

2. SPECIFIC

: After studying this course, students are expected to have

ability to test of goodness of fit test of nonparametric

regression.

B. SUBJECT

: goodness of fit test of non parametric regression

C..SUB SUBJECT

: Bootstrap method

STAGE	LECTURER ACTIVITIES	STUDENT ACTIVITIES	LEARNING MEDIA
INTRODUCTION	1. Describing about general	Observing and	OHP,
	and specific objectives	taking notes	transparancy,
	competence		white board,
	2. Describing about matter		reference book,
	at the fourteen and fifteen		and paper
	meetings		
	3. Giving motivation to		
	student for the importance		
	to understanding this		
	items to make easy the		
	next matter.		

PRESENTATION	1. Explaining about goodness	Observing,	OHP,
	of fit of non parametric	asking, taking	transparancy,
	regression with bootstrap	notes	white board,
	method.		reference book,
	2. Giving counter examples		and paper
	and practice in computation		e de l'action de la constant de la c
	laboratory		
CLOSING	Giving tasks for take	Discuss, asking,	white board and
	home	observing, taking	paper
	2. Giving outline learning	notes	
	and description about		
	final exam		

: Giving problems to the students.

F. REFERENCE

.

[3] Racine, J., Consistent Significance Testing for Nonparametric Regression, Departement of Economics, BSN 3403, University of South Florida, Tampa,FL