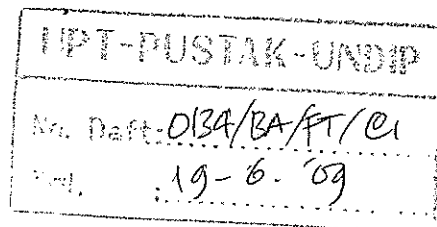


**GBPP SAP & KK  
DALAM BAHASA INGGRIS  
ACADEMIC CURRICULUM DEVELOPMENT  
TAHUN ANGGARAN 2007**



**PROGRAM STUDI TEKNIK PERKAPALAN  
FAKULTAS TEKNIK  
UNIVERSITAS DIPONEGORO  
SEMARANG  
2007**

## FUNDAMENTAL OUTLINE OF STUDY

**COURSE NAMA** : THERMODYNAMICS  
**COURSE CODE** : TKB 106 / 2 SKS  
**DESCRIPTION** : This course content about the first thermodynamics law, nol and second thermodynamics law, control mass adn volume and its aplication in the calculate thermodynamics of steam power system , energy gas system and refrigeration system.  
**GOAL OF GENERAL INSTRUCTIONAL** : Student able to calculate the application thermodynamics of steam power plant , energy gas system and refrigeration system.

No	Goal of Partikular Instructional	Main Subject	Sub of main Subject	Time Est.	Ref.
1	Student able to explain the system congeniality, circumstance, process and system unit at lest 80 % is real correct.	Introduction and unit system	-Thermodynamics -Property, circumstance, process. -System unit International and British. -Temperature & pressure -	100 minute	A , B , C , D
2	Student able to calculate the job of closed system and energy at lest 80 % is real correct.	First Law Thermodynamics and Energy	- congeniality energy. - Work the closed system.	100 minute	A , B C , D
3	Student able to calculate the balance energy at closed system at lest 80 % is real correct.	First Law Thermodynamics and Energy	- Energy balance of closed system - Analysis the energy balance of closed system	100 minute	A , B , C , D
4	Student able to explain the circumstance principle relation of property p-v-T and change exist the hydrogen and refrigerant at lest 80 % is real correct.	Pure substance property	- Prinsiple of Pure substance - Relation of property p-v-T.	100 minute	A , B , C . D
5	Student able to draw the value of[is tables of thermodynamics in diagram of p-v and T-V pure substance property at lest 80 % is real correct	Pure substance property.	- Thermodynamics tables - Diagram of P-V and T-V. - Ideal Gas	100 minute	A , B , C , D
6	Student able to calculate the balance of mass and energy at volume control at lest 80 % is real correct.	Energy balance of control the volume.	- Mass balance of volume control..	100 minute	A , B , C , D
7	Student able to calculate the balance of mass and energy at volume control at lest 80 % is real correct.	Energy balance of control the volume.	- Energy balance of volume control	100 minute	A , B , C . D

8	Meeting to 8	Mid Semester Test (MST)		100 minute	
9	Student able to explain the law of thermodynamics II at least 80 % is real correct.	Law of thermodynamics II	- Congeniality of law of thermodynamics II. - Cycle thermodynamics hukum kedua.	100 minute	A, B, C, D
10	Student able to explain the entropy, entropy change, entropy balance of mass control at least 80 % is real correct.	Entropy.	- Entropy. - Tables of entropy - Entropy balance of control of mass.	100 minute	A, B, C, D
11	Student able to calculate the entropy, entropy balance of volume control at least 80 % is real correct.	Entropy.	- Entropy balance of control volume. - Ideal gas entropy.	100 minute	A, B, C, D
12	Student able to calculate the energy of steam power system at least 80 % is real correct	Steam power plant	- Ideal Cycle Rankine - Turbine efficiency & pump	100 minute	A, B
13	Student able to explain the congeniality of combustion system in, Otto cycle, at least 80 % is real correct.	System of gas energy	- Combustion system - Otto cycle of standard Air.	100 minute	A, B
14	Student able to explain the congeniality cycle of Diesel and cycle of gas turbine at least 80 % is real correct.	System of gas energy	- Cycle of Diesel of standard air - Cycle of gas Turbine	100 minute	A, B
15	Student able to explain the system congeniality, circumstance, process and system at least 80 % is real correct.	Refrigeration System	- Refrigeration System. - Heater cycle.	100 minute	A, B
16	Meeting to 16	Final Semester Test (FST)		100 minute	

Note :

Direct contact activity : 1920 menite  
 Program activity : 1920 menite  
 Self supporting activity : 1920 menite

Reference :

- A. Moran J. Michael, 1996, Fundamentals of Engineering Thermodynamics, John Wiley & Sons Inc.
- B. Filino Harahap, 1999, Engineering Thermodynamics, Airlangga.
- C. Van Wylen J. Gordon, 1973, Fundamentals of classical Thermodynamics, John Wiley & Sons Inc.
- D. Warner F, 1985, Thermodynamics for engineer, PN of Book Hall

## UNIT OF PROSEDURAL STUDY

COURSE NAME : THERMODYNAMICS  
 COURSE CODE : TKB106 / 2 SKS  
 TIME : 2 X 50 Minutes  
 MEETING TO : 1

- A. GOAL**
- a. GGI : Student able to calculate the application thermodynamics of steam power system , energy gas system and cooling system.
  - b. GPI : Student able to explain the system congeniality, circumstance, process and system unit at least 80 % is real correct.
  - c. SOFT SKILL : student of shipbuilding technology of semester II able to work along and able to the opinion of about system congeniality, mount the circumstance, process and unit system.
- B. MAIN SUBJECT** : Introduction and unit system
- C. SUB OF MAIN SUBJECT:**
- congeniality thermodynamics
  - Property, circumstance, process.
  - System unit International, British.
  - Temperature & pressure

### D. STUDY ACTIVITY:

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Expalining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining abaut , thermodynamics, property, circumstance, process, system units</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as fcedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaning relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate :Giving question or case study for discussion to measure the student absorption.

Reference :

- A. A. Moran J. Michael, 1996, Fundamentals of Engineering Thermodynamics, John Wiley & Sons Inc.
- B. Filino Harahap, 1999, Engineering Thermodynamics, Airlangga.
- C. Van Wylen J. Gordon, 1973, Fundamentals of classical Thermodynamics, John Wiley & Sons Inc.
- D. Warner F, 1985, Thermodynamics for engineer, PN of Book Hall

## UNIT OF PROSEDURAL STUDY

COURSE NAME : THERMODYNAMICS  
 COURSE CODE : TKB106 / 2 SKS  
 TIME : 4 X 50 Minutes  
 MEETING TO : 2 and 3

**A. GOAL**

- a. GGI : Student able to calculate the application thermodynamics of steam power system , energy gas system and cooling system.
- b. GPI : Student able to calculate the job of closed system and energy at lest 80 % is real correct.  
 Student able to calculate the balance energy at closed system at lest 80 % is real correct.
- c. SOFT SKILL : student of shipbuilding technology of semester II able to work along and able to [release] the opinion [of] about congeniality work [at] closed system and congeniality of system thermodynamics I. Energy and law of thermodynamics I

**B. MAIN SUBJECT** : First Law Thermodynamics.

- C. SUB OF MAIN SUBJECT:**
- congeniality energy
  - Work the closed system.
  - Energy balance of closed system
  - Analysis the energy balance of closed system

**D. STUDY ACTIVITY:**

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Expalining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about energy and kinds of it and also work in closed system calculation of energy balance in closed system.</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaining relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate :Giving question or case study for discussion to measure the student absorption.

Reference :

- A. A. Moran J. Michael, 1996, Fundamentals of Engineering Thermodynamics, John Wiley & Sons Inc.
- B. Filino Harahap, 1999, Engineering Thermodynamics, Airlangga.
- C. Van Wylen J. Gordon, 1973, Fundamentals of classical Thermodynamics, John Wiley & Sons Inc.
- D. Warner F, 1985, Thermodynamics for engineer, PN of Book Hall

## UNIT OF PROSEDURAL STUDY

COURSE NAME : THERMODYNAMICS  
 COURSE CODE : TKB106 / 2 SKS  
 TIME : 4 X 50 Minutes  
 MEETING TO : 4 and 5

### A. GOAL

- a. GGI : Student able to calculate the application thermodynamics of steam power system , energy gas system and cooling system.
- b. GPI : Student able to explain the circumstance principle, relation of property p-v-T and change exist the hydrogen and refrigerant at least 80 % is real correct.  
 Student able to draw the value of tables of thermodynamics in diagram of p-v and T-V pure substance property at least 80 % is real correct.
- c. SOFT SKILL : Student of shipbuilding technology of semester II able to work along and able to release the opinion about pure congeniality property irrigate and refrigerant and diagram of p-v and T-V

### B. MAIN SUBJECT

: Pure substance property

### C. SUB OF MAIN SUBJECT:

- relation of Property p-v-T.
- Thermodynamics tables
- Diagram of P-V and T-V.

### D. STUDY ACTIVITY:

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Explaining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about pure Clarification irrigate the, relation p-v-T.</li> <li>• Clarification of tables of thermodynamics, diagram of p-v and T-V</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item</li> <li>• Explaining relevansian with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate : Giving question or case study for discussion to measure the student absorption.

Reference :

- A. A. Moran J. Michael, 1996, Fundamentals of Engineering Thermodynamics, John Wiley & Sons Inc.
- B. Filino Harahap, 1999, Engineering Thermodynamics, Airlangga.
- C. Van Wylen J. Gordon, 1973, Fundamentals of classical Thermodynamics, John Wiley & Sons Inc.
- D. Warner F, 1985, Thermodynamics for engineer, PN of Book Hall

## UNIT OF PROSEDURAL STUDY

COURSE NAME : THERMODYNAMICS  
 COURSE CODE : TKB106 / 2 SKS  
 TIME : 4 X 50 Minutes  
 MEETING TO : 6 and 7

**A. GOAL**

- a. GGI : Student able to calculate the application thermodynamics of steam power system , energy gas system and cooling system.
- b. GPI : Student able to calculate the balance of mass and energy at volume control at least 80 % is real correct.
- c. SOFT SKILL : Student of shipbuilding technology of semester II able to work along and able to release the opinion about energy balance and mass.

**B. MAIN SUBJECT** : Energy balance of control the volume.

- C. SUB OF MAIN SUBJECT:**
- Mass balance of volume control.
  - Energy balance of volume control.

**D. STUDY ACTIVITY:**

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Explaining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about balance of mass and energy of volume control.</li> <li>• Calculation analysis the balance of mass and energy of volume control</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaining relevansian with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate : Giving question or case study for discussion to measure the student absorption.

Reference :

- A. Moran J. Michael, 1996, Fundamentals of Engineering Thermodynamics, John Wiley & Sons Inc.
- B. Filino Harahap, 1999, Engineering Thermodynamics, Airlangga.
- C. Van Wylen J. Gordon, 1973, Fundamentals of classical Thermodynamics, John Wiley & Sons Inc.
- D. Warner F, 1985, Thermodynamics for engineer, PN of Book Hall

## UNIT OF PROSEDURAL STUDY

COURSE NAME : THERMODYNAMICS  
 COURSE CODE : TKB106 / 2 SKS  
 TIME : 2 X 50 Minutes  
 MEETING TO : 9

- A. GOAL**
- a. GGI : Student able to calculate the application thermodynamics of steam power system , energy gas system and cooling system.
  - b. GPI : Student able to explain the law of thermodynamics II at lest 80 % is real correct.
  - c. SOFT SKILL : Student of shipbuilding technology of semester II able to work along and able to the opinion about congeniality of law of thermodynamics II.
- B. MAIN SUBJECT** : Law of thermodynamics II
- C. SUB OF MAIN SUBJECT:** - Congeniality of law of thermodynamics II  
 - Cycle thermodynamics II

**D. STUDY ACTIVITY:**

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Explaining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about law of thermodynamics II</li> <li>• Calculation of second thermodynamics cycle</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaining relevausion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate : Giving question or case study for discussion to measure the student absorption.

Reference :

- A. Moran J. Michael, 1996, Fundamentals of Engineering Thermodynamics, John Wiley & Sons Inc.
- B. Filino Harahap, 1999, Engineering Thermodynamics, Airlangga.
- C. Van Wylen J. Gordon, 1973, Fundamentals of classical Thermodynamics, John Wiley & Sons Inc.
- D. Warner F, 1985, Thermodynamics for engineer, PN of Book Hall



## UNIT OF PROSEDURAL STUDY

COURSE NAME : THERMODYNAMICS  
 COURSE CODE : TKB106 / 2 SKS  
 TIME : 4 X 50 Minutes  
 MEETING TO : 10 and 11

- A. GOAL**
- a. GGI : Student able to calculate the application thermodynamics of steam power system, energy gas system and cooling system.
  - b. GPI : Student able to explain the entropy, entropy change, entropy balance of mass control at least 80 % is real correct.  
 Student able to calculate the entropy, entropy balance of volume control at least 80 % is real correct.
  - c. SOFT SKILL : Student of shipbuilding technology of semester Ii able to work along and able to [release] the opinion [of] about congeniality of entropy and entropy of system control the mass and volume.
- B. MAIN SUBJECT** : Entropy.
- C. SUB OF MAIN SUBJECT:**
- Tables of entropy
  - Entropy balance of control of mass and volume.
  - Ideal gas entropy.

**D. STUDY ACTIVITY:**

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Explaining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about entropy</li> <li>• Explaining, tables of entropy, entropy balance of mass control and control the volume, calculation of entropy balance of control of mass and volume</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaining relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate : Giving question or case study for discussion to measure the student absorption.

Reference :

- A. Moran J. Michael, 1996, Fundamentals of Engineering Thermodynamics, John Wiley & Sons Inc.
- B. Filino Harahap, 1999, Engineering Thermodynamics, Airlangga.
- C. Van Wylen J. Gordon, 1973, Fundamentals of classical Thermodynamics, John Wiley & Sons Inc.
- D. Warner F, 1985, Thermodynamics for engineer, PN of Book Hall

## UNIT OF PROSEDURAL STUDY

COURSE NAME : THERMODYNAMICS  
 COURSE CODE : TKB106 / 2 SKS  
 TIME : 2 X 50 Minutes  
 MEETING TO : 12

### A. GOAL

- a. GGI : Student able to calculate the application thermodynamics of steam power system , energy gas system and cooling system.
- b. GPI : Student able to calculate the energy of steam power system at lest 80 % is real correct.
- c. SOFT SKILL : Student of shipbuilding technology of semester II able to work along and able to release the opinion of about steam power system.

B. MAIN SUBJECT : Steam power plant

C. SUB OF MAIN SUBJECT: - Ideal Cycle Rankine  
 - Turbine efficiency & pump

### D. STUDY ACTIVITY:

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Explaining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about component of ideal energy steam Rankine cyclus and turbine efficiency.</li> <li>• As facilitator/ moderator</li> <li>• Giving practice</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaning relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate : Giving question or case study for discussion to measure the student absorption.

Reference :

- A. Moran J. Michael, 1996, Fundamentals of Engineering Thermodynamics, John Wiley & Sons Inc.
- B. Filino Harahap, 1999, Engineering Thermodynamics, Airlangga.
- C. Van Wylen J. Gordon, 1973, Fundamentals of classical Thermodynamics, John Wiley & Sons Inc.
- D. Warner F, 1985, Thermodynamics for engineer, PN of Book Hall

## UNIT OF PROSEDURAL STUDY

COURSE NAME : THERMODYNAMICS  
 COURSE CODE : TKB106 / 2 SKS  
 TIME : 4 X 50 Minutes  
 MEETING TO : 13 and 14

### A. GOAL

- a. GGI : Student able to calculate the application thermodynamics of steam power system , energy gas system and cooling system.
- b. GPI : Student able to explain the congeniality of combustion system in, Otto cycle, cycle of Diesel and cycle of gas turbine at least 80 % is real correct.
- c SOFT SKILL : Student of shipbuilding technology of semester II able to work along and able to release the opinion about congeniality of combustion system in, Otto cycle, cycle of Diesel and cycle of gas turbine.

B. MAIN SUBJECT : System of gas energy

- C. SUB OF MAIN SUBJECT: - Combustion system  
 - Otto cycle of standard Air.  
 - Cycle of Diesel of standard air  
 - Cycle of gas Turbine

### D. STUDY ACTIVITY:

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Explaining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about combustion system in, Otto cycle of standard air, cycle of Diesel of air of standard and cycle of gas turbine.</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this scssion and summary the item which have been given.</li> <li>• Explaning relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate :Giving question or case study for discussion to measure the student absorption.

Reference :

- A. Moran J. Michael, 1996, Fundamentals of Engineering Thermodynamics, John Wiley & Sons Inc.
- B. Filino Harahap, 1999, Engineering Thermodynamics, Airlangga.
- C. Van Wylen J. Gordon, 1973, Fundamentals of classical Thermodynamics, John Wiley & Sons Inc.
- D. Warner F, 1985, Thermodynamics for engineer, PN of Book Hall

## UNIT OF PROSEDURAL STUDY

COURSE NAME : THERMODYNAMICS  
 COURSE CODE : TKB106 / 2 SKS  
 TIME : 2 X 50 Minutes  
 MEETING TO : 15

**A. GOAL**

- a. GGI : Student able to calculate the application thermodynamics of steam power system , energy gas system and cooling system.
- b. GPI : Student able to explain the system cooling system and heating system at least 80 % is real correct.
- c. SOFT SKILL : Student of shipbuilding technology of semester II able to work along and release the opinion about cooling system and heating system

**B. MAIN SUBJECT** : Refrigeration System

**C. SUB OF MAIN SUBJECT:** - Refrigeration cycle.  
 - Heater cycle.

**D. STUDY ACTIVITY:**

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Explaining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about of congeniality of cooler system, refrigeration cycle, and heater cycle</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaining relevansian with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate : Giving question or case study for discussion to measure the student absorption.

Reference :

- A. Moran J. Michael, 1996, Fundamentals of Engineering Thermodynamics, John Wiley & Sons Inc.
- B. Filino Harahap, 1999, Engineering Thermodynamics, Airlangga.
- C. Van Wylen J. Gordon, 1973, Fundamentals of classical Thermodynamics, John Wiley & Sons Inc.
- D. Warner F, 1985, Thermodynamics for engineer, PN of Book Hall

## LECTURING CONTRACT

COURSE NAME : THERMODYNAMICS  
KODE MATA KULIAH : TKB106  
LECTURER : IR KIRYANTO, MT  
SEMESTER : II  
MEETING TIME : 2 X 50 MINUTE/WEEK  
MEETING PLACE : ROOM B 105

### 1. RELEVANCE

Items in this course thermodynamics give the base for shipping expert in designing, calculating main engine of ship. Beside that can give the base for scheme and calculation of fluid machine, machine of cooling and marine power plant and engine of gas energy.

### 2. DESCRIPTION

Course thermodynamics to study the law of thermodynamics to zero about heat transfer, law of thermodynamics I, about balance of energy and law of thermodynamics II, entropy and entropy balance. Herein after pursuant to the law of thermodynamics is application of evaluation of thermodynamics of engine cycle convert the energy that is steam power plant, engine of gas energy, engine of heater and cooling machine.

### 3. GOAL OF GENERAL INSTRUCTIONAL.

Student after following process learn to teach the eye of course thermodynamics expected able to:

- Explaining approach in thermodynamics system
- Explaining law of thermodynamics zero, first law of thermodynamics, second law of thermodynamics
- Reading tables of thermodynamics and to draw of diagram P-V, diagram of T-V and diagram Mouljier to air and refrigerant
- Able to calculate and analyse the system thermodynamics that is steam power plant, engine of gas energy, system of heater and cooler system.

### 4. LECTURING STRATEGY

In applying more amount lecturing strategy use the discourse in the early lecturing of concerning theory, illustrate the real problems about machine calor, read of tables of thermodynamics and making of diagram P-V, T-V And P-H and also which to be continue with the discussion / question and answer

## 5. REFERENCE AND STUDY MATERIAL

- A. Moran J. Michael, 1996, Fundamentals of Engineering Thermodynamics, John Wiley & Sons Inc.
- B. Filino Harahap, 1999, Engineering Thermodynamics, Airlangga.
- C. Van Wylen J. Gordon, 1973, Fundamentals of classical Thermodynamics, John Wiley & Sons Inc.
- D. Warner F, 1985, Thermodynamics for engineer, PN of Book Hall

## 6. ASSIGNMENT

Duty which is obliged to be done in course thermodynamics is cover with:

- A. Each literature in the course should have been read before attend the lecture.
- B. Middle evaluation of semester will be executed at week 8. Evaluation will use the form of essay and choice.
- C. For the fundamental of discussion needing deeper emphasis of matter analyze needed by discussion with the problem or occurrence which is often met in field.

## 7. ASSESSMENT CRITERION

Assessment conducted by instructor by using the following criteria:

Value		Range
By Letter	By Number	
A	4	$\geq 80$
AB	3,5	79 – 75
B	3	74 – 69
BC	2,5	68 – 63
C	2	62 – 57
CD	1,5	56 – 51
D	1	50 – 45
E	0	$\leq 44$

To determine the final value is the following criterion,

- presence 5 %
- assignment 10 %
- Middle semester evaluation 30 %
- Final semester evaluation 45 %
- Being active in discussion 10 %

## 8. LECTURING SCHEDULE

No	Week	Topic of Discussion	Reference
1	Meeting to 1	Introduction and unit system:	A , B , C , D
2	Meeting to 2	First Law Thermodynamics and Energy	A , B , C , D
3	Meeting to 3	First Law Thermodynamics and Energy	A , B , C , D
4	Meeting to 4	Pure substance property	A , B , C , D
5	Meeting to 5	Pure substance property.	A , B , C , D
6	Meeting to 6	Energy balance of control the volume.	A , B , C , D
7	Meeting to 7	Energy balance of control the volume.	A , B , C , D
8	Meeting to 8	Mid Semester Test (MST)	
9	Meeting to 9	Law of thermodynamics II	A , B , C , D
10	Meeting to 10	Entropy.	A , B , C , D
11	Meeting to 11	Entropy.	A , B , C , D
12	Meeting to 12	Steam power plant	A , B
13	Meeting to 13	System of gas energy	A , B
14	Meeting to 14	System of gas energy	A , B
15	Meeting to 15	Refrigeration System	A , B
16	Meeting to 16	Final Semester Test (FST)	

### Reference :

- A. Moran J. Michael, 1996, Fundamentals of Engineering Thermodynamics, John Wiley & Sons Inc.
- B. Filino Harahap, 1999, Engineering Thermodynamics, Airlangga.
- C. Van Wylen J. Gordon, 1973, Fundamentals of classical Thermodynamics, John Wiley & Sons Inc.
- D. Warner F, 1985, Thermodynamics for engineer, PN of Book Hall

## FUNDAMENTAL OUTLINE OF STUDY

**COURSE NAME** : SHIPBOARD SYSTEM  
**COURSE CODE/SKS** : TKB133 / 2 SKS  
**DESCRIPTION** : Shipboard system course to study about existing pipe system covering system of ship pipe ( shipboard system piping) that is system of pipe bilge, ballast, fire system, water sanitary, air ventilate and system of ship piping ( engine piping system) that is system of cooler pipe, fuel, lubricant, air pressure, system of air cooling.

**GOAL OF GENERAL INSTRUCTIONAL** : Student able to calculate and draw diagram system of service of ship pipe line that is system of pipe bilge, reciprocate the, fire company, sanitary, air ventilate and system of pipe of service of shipboard system of cooler pipe, fuel, lubricant, air pressure, system of air cooling system .

No	Goal of Partikular Instructional	Main Subject	Sub of main Subject	Time Est.	Ref.
1	Student able to explain the system congeniality in ship and its component at lest 80 % is real correct.	Shipboard system component in ship	- Congeniality system in ship - Piping system component - Material and piping dimension - Joint of piping	100 minute	A , B , C , D
2	Student able to explain the system bilge of ship at lest 80 % is real correct.	Bilge system	- Bilge system. - Bilge system diagram. - Description of bilge system.	100 minute	A , B , C , D
3	Student able to explain the ballast system on ship at lest 80 % is real correct.	Ballast system	- Ballast system - Ballast system diagram - Description of ballast system.	100 minute	A , B , C , D
4	Student able to explain the fire fighting system on ship at lest 80 % is real correct. *	Fire fighting system	- Fire fighting system - Water fire fighting system. - CO 2 fire fighting system. - foam fire fighting system.	100 minute	A , B , C , D
5	Student able to explain the sanitary system on ship at lest 80 % is real correct.	Sanitary system	- System sanitary - Fresh water sanitary system - Sea water sanitary system. - Fecal system.	100 minute	A , B , C , D
6	Student able to explain scuper system on ship at lest 80 % is real correct.	Scuper system	- Scuper system - Scuper system diagram.	100 minute	A , B , C , D
7	Student able to explain the air system, sounding, and ventilation system on ship at lest 80 % is real correct.	Air system, sounding dan ventilation	- Air system, sounding and ventilation - Diagram Air system, sounding and ventilation	100 minute	A , B , C , D



8	Meeting to 8	Mid Semester Test (MST)		100 minute	
9	Student able to draw the pipe system with isometric system at least 80 % is real correct.	Design of isometric drawing	- Isometry system - Isometric drawing method. - Isometri diagram	100 minute	A, B, C, D
10	Student able to explain the fuel system on ship at least 80 % is real correct.	Fuel system	- Fuel system - Fuel system diagram. - Operation of fuel system .	100 minute	A, B, C, D
11	Student able to explain the lubrication system on ship at least 80 % is real correct..	Lubrication system	- Lubrication system. - Lubrication system diagram. - Operation lubrication system.	100 minute	A, B, C, D
12	Student able to explain the air pressuresystem on ship at least 80 % is real correct..	Air pressure system	- Air pressure system - Air pressure system diagram. - Operation Air pressure system	100 minute	A, B
13	Student able to explain the fresh and sea water cooling system on ship at least 80 % is real correct..	Fresh and sea water cooling system	- Fresh and sea cooling water system - Fresh and sea water cooling system diagram - Operation of fresh and sea water cooling system	100 minute	A, B
14	Student able to explain the exhaust system on ship at least 80 % is real correct..	Exhaust piping system	- Exhaust piping system - Exhaust piping system diagram	100 minute	A, B
15	Student able to explain air condition system and refrigeration on ship at least 80 % is real correct..	Air conditioning system and refrigeration	- Air conditioning - Air conditioning diagram - Operation of Air conditioning and refrigeration	100 minute	A, B
16	Meeting to 16	Final Semester Test (FST)		100 minute	

Note :

Direct contact activity : 1920 menite  
 Program activity : 1920 menite  
 Self supporting activity : 1920 menite

Reference :

- Khetagurov, M 1982, Marine Auxiliary Machinery and System , Peace publishers Moscow.
- Buyung Farabi, 1984, Shipboard system, ITS Surabaya.
- Davit W Smith, 1983, Marine Auxiliary Machinery, Butterworths.
- Raswari, 1998, Design of pipe System, Airlangga.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD SYSTEM  
**COURSE CODE/SKS** : TKB133 / 2 SKS  
**TIME** : 2 X 50 Minutes  
**MEETING TO** : 1

### A. GOAL

- a. GGI : Student able to calculate and draw diagram system of service of ship pipe line that is system of pipe bilge, reciprocate the, fire company, sanitary, air ventilate and system of pipe of service of shipboard system of cooler pipe, fuel, lubricant, air pressure, system of air cooling system .
- b. GPI : Student able to explain the system congeniality in ship and its component at least 80 % is real correct.
- c. SOFT SKILL : Student of shipbuilding technology of semester VI able to work along and able to release the opinion about inboard system.

**B. MAIN SUBJECT** : Shipboard system component in ship

**C. SUB OF MAIN SUBJECT:** - Congeniality system in ship  
 - Piping system component  
 -Material and piping dimension  
 - Joint of piping.

### D. STUDY ACTIVITY:

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Explaining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	Explaining about , Congeniality system in ship, piping system component, material and piping dimension joint of piping. <ul style="list-style-type: none"> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summarize the item which have been given.</li> <li>• Explaining relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate :Giving question or case study for discussion to measure the student absorption.

#### Reference :

- A. Khetagurov, M 1982, Marine Auxiliary Machinery and System , Peace publishers Moscow.
- B. Buyung Farabi, 1984, Shipboard System on Ship, ITS Surabaya..
- C. Davit W Smith, 1983, Marine Auxiliary Machinery, Butterworths.
- D. Raswari, 1998, Design of piping System, Airlangga.

## UNIT OF PROSEDURAL STUDY

COURSE NAME : SHIPBOARD SYSTEM  
 COURSE CODE/SKS : TKB133 / 2 SKS  
 TIME : 2 X 50 Minutes  
 MEETING TO : 2

### A. GOAL

- a. GGI : Student able to calculate and draw diagram system of service of ship pipe line that is system of pipe bilge, reciprocate the, fire company, sanitary, air ventilate and system of pipe of service of shipboard system of cooler pipe, fuel, lubricant, air pressure, system of air cooling system .
- b. GPI : Student able to explain the system bilge of ship at lest 80 % is real correct.
- c. SOFT SKILL : Student of shipbuilding technology of semester VI able to work along and able to release the opinion about bilge system.

B. MAIN SUBJECT : Bilge system

- C. SUB OF MAIN SUBJECT: - Bilge system.  
 - Bilge system diagram.  
 - Description of bilge system.

### D. STUDY ACTIVITY:

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Explaining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about , bilge system, diagram of bilge system and description of bilge system.</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaining relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate : Giving question or case study for discussion to measure the student absorption.

Reference :

- A. Khetagurov, M 1982, Marine Auxiliary Machinery and System , Peace publishers Moscow.
- B. Buyung Farabi, 1984, Shipboard System on Ship, ITS Surabaya..
- C. Davit W Smith, 1983, Marine Auxiliary Machinery, Butterworths.
- D. Raswari, 1998, Design of piping System, Airlangga.

## UNIT OF PROSEDURAL STUDY

COURSE NAME : SHIPBOARD SYSTEM  
 COURSE CODE/SKS : TKB133 / 2 SKS  
 TIME : 2 X 50 Minutes  
 MEETING TO : 3

### A. GOAL

- a. GGI : Student able to calculate and draw diagram system of service of ship pipe line that is system of pipe bilge, reciprocate the, fire company, sanitary, air ventilate and system of pipe of service of shipboard system of cooler pipe, fuel, lubricant, air pressure, system of air cooling system .
- b. GPI : Student able to explain the ballast system on ship at least 80 % is real correct.
- c. SOFT SKILL : Student of shipbuilding technology of semester VI able to work along and able to release the opinion about ballast system.

B. MAIN SUBJECT : Ballast system

- C. SUB OF MAIN SUBJECT : - Ballast system  
 - Ballas system diagram  
 - Description of ballast system.

### D. STUDY ACTIVITY:

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Expalining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about , ballast system, diagram, of ballast system and descripton.</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaning relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate : Giving question or case study for discussion to measure the student absorption.

### Reference :

- A. Khetagurov, M 1982, Marine Auxiliary Machinery and System , Peace publishers Moscow.
- B. Buyung Farabi, 1984, Shipboard System on Ship, ITS Surabaya..
- C. Davit W Smith, 1983, Marine Auxiliary Machinery, Butterworths.
- D. Raswari, 1998, Design of piping System, Airlangga.

## UNIT OF PROSEDURAL STUDY

COURSE NAME : SHIPBOARD SYSTEM  
 COURSE CODE/SKS : TKB133 / 2 SKS  
 TIME : 2 X 50 Minutes  
 MEETING TO : 4

- A. GOAL**
- a. GGI : Student able to calculate and draw diagram system of service of ship pipe line that is system of pipe bilge, reciprocate the, fire company, sanitary, air ventilate and system of pipe of service of shipboard system of cooler pipe, fuel, lubricant, air pressure, system of air cooling system .
  - b. GPI : Studeñt able to explain the fire fighting system on ship at lest 80 % is real correct.
  - c. SOFT SKILL : Student of shipbuilding technology of semester VI able to work along and able to release the opinion about fire fighting system.
- B. MAIN SUBJECT** : Fire fighting system
- C. SUB OF MAIN SUBJECT:** - Fire figting system  
 - Water fire fighting system.  
 - CO 2 fire fighting system.  
 - Foam fire fighting system..

### D. STUDY ACTIVITY:

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Expalining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining abaut fire fighting system, water, CO2 and foam fire fighting system.</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaning relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate : Giving question or case study for discussion to measure the student absorption.

Reference :

- A. Khetagurov, M 1982, Marine Auxiliary Machinery and System , Peace publishers Moscow.
- B. Buyung Farabi, 1984, Shipboard System on Ship, ITS Surabaya..
- C. Davit W Smith, 1983, Marine Auxiliary Machinery, Butterworths.
- D. Raswari, 1998, Design of piping System, Airlangga.

## UNIT OF PROSEDURAL STUDY

COURSE NAME : SHIPBOARD SYSTEM  
 COURSE CODE/SKS : TKB133 / 2 SKS  
 TIME : 2 X 50 Minutes  
 MEETING TO : 5

### A. GOAL

- a. GGI : Student able to calculate and draw diagram system of service of ship pipe line that is system of pipe bilge, reciprocate the, fire company, sanitary, air ventilate and system of pipe of service of shipboard system of cooler pipe, fuel, lubricant, air pressure, system of air cooling system .
- b. GPI : Student able to explain the sanitary system on ship at lest 80 % is real correct.
- c. SOFT SKILL : Student of shipbuilding technology of semester VI able to work along and able to release the opinion about sanitary system.

B. MAIN SUBJECT : Sanitary system

- C. SUB OF MAIN SUBJECT: - System sanitary  
 - Fresh water sanitary system  
 - Sea water sanitary system.  
 - Fecal system

### D. STUDY ACTIVITY:

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Explaining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about sanitary system, fresh water, sea water system and fecal system.</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaining relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate : Giving question or case study for discussion to measure the student absorption.

Reference :

- A. Khetagurov, M 1982, Marine Auxiliary Machinery and System , Peace publishers Moscow.
- B. Buyung Farabi, 1984, Shipboard System on Ship, ITS Surabaya..
- C. Davit W Smith, 1983, Marine Auxiliary Machinery, Butterworths.
- D. Raswari, 1998, Design of piping System, Airlangga.

## UNIT OF PROSEDURAL STUDY

COURSE NAME : SHIPBOARD SYSTEM  
 COURSE CODE/SKS : TKB133 / 2 SKS  
 TIME : 2 X 50 Minutes  
 MEETING TO : 6

### A. GOAL

- a. GGI : Student able to calculate and draw diagram system of service of ship pipe line that is system of pipe bilge, reciprocate the, fire company, sanitary, air ventilate and system of pipe of service of shipboard system of cooler pipe, fuel, lubricant, air pressure, system of air cooling system .
- b. GPI : Student able to explain scuper system on ship at lest 80 % is real correct.
- c. SOFT SKILL : Student of shipbuilding technology of semester VI able to work along and able to release the opinion about inboard system.

B. MAIN SUBJECT : Scuper system

C. SUB OF MAIN SUBJECT: - Scuper system  
 - Scuper system diagram.

### D. STUDY ACTIVITY:

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Explaining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about , scupper system and it's diagram .</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaining relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate : Giving question or case study for discussion to measure the student absorption.

### Reference :

- A. Khetagurov, M 1982, Marine Auxiliary Machinery and System , Peace publishers Moscow.
- B. Buyung Farabi, 1984, Shipboard System on Ship, ITS Surabaya..
- C. Davit W Smith, 1983, Marine Auxiliary Machinery, Butterworths.
- D. Raswari, 1998, Design of piping System, Airlangga.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD SYSTEM  
**COURSE CODE/SKS** : TKB133 / 2 SKS  
**TIME** : 2 X 50 Minutes  
**MEETING TO** : 7

### A. GOAL

- a. GGI : Student able to calculate and draw diagram system of service of ship pipe line that is system of pipe bilge, reciprocate the, fire company, sanitary, air ventilate and system of pipe of service of shipboard system of cooler pipe, fuel, lubricant, air pressure, system of air cooling system .
- b. GPI : Student able to explain the air system, sounding, and ventilation system on ship at least 80 % is real correct.
- c. SOFT SKILL : Student of shipbuilding technology of semester VI able to work along and able to release the opinion about air system, sounding dan ventilation.

**B. MAIN SUBJECT** : Air system, sounding dan ventilation

**C. SUB OF MAIN SUBJECT:** - Air system, sounding and ventilation  
 - Diagram Air system, sounding and ventilation

### D. STUDY ACTIVITY:

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Expaining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about , air system, sounding and ventilation diagram and descripton.</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaning relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate : Giving question or case study for discussion to measure the student absorption.

Reference :

- A. Khetagurov, M 1982, Marine Auxiliary Machinery and System , Peace publishers Moscow.
- B. Buyung Farabi, 1984, Shipboard System on Ship, ITS Surabaya..
- C. Davit W Smith, 1983, Marine Auxiliary Machinery, Butterworths.
- D. Raswari, 1998, Design of piping System, Airlangga.



## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD SYSTEM  
**COURSE CODE/SKS** : TKB133 / 2 SKS  
**TIME** : 2 X 50 Minutes  
**MEETING TO** : 9

### A. GOAL

- a. GGI : Student able to calculate and draw diagram system of service of ship pipe line that is system of pipe bilge, reciprocate the, fire company, sanitary, air ventilate and system of pipe of service of shipboard system of cooler pipe, fuel, lubricant, air pressure, system of air cooling system .  
 b. GPI : Pipe system with isometric system at least 80 % is real correct.  
 c. SOFT SKILL : Student of shipbuilding technology of semester VI able to work along and able to release the opinion about design of isometric drawing.

**B. MAIN SUBJECT** : Design of isometric drawing

**C. SUB OF MAIN SUBJECT:** - Isometry system  
 Isometric drawing metode.  
 - Isometri diagram.

### D. STUDY ACTIVITY:

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>Explaining interest of GPI</li> <li>Expalining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>Explaining about , isometric system drawing and description.</li> <li>Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>Stargazing and noting.</li> <li>Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>Explaning relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate : Giving question or case study for discussion to measure the student absorption.

Reference :

- A. Khetagurov, M 1982, Marine Auxiliary Machinery and System . Peace publishers Moscow.
- B. Buyung Farabi, 1984, Shipboard System on Ship, ITS Surabaya.
- C. Davit W Smith, 1983, Marine Auxiliary Machinery, Butterworths.
- D. Raswari, 1998, Design of piping System, Airlangga.

## UNIT OF PROSEDURAL STUDY

COURSE NAME : SHIPBOARD SYSTEM  
 COURSE CODE/SKS : TKB133 / 2 SKS  
 TIME : 2 X 50 Minutes  
 MEETING TO : 10

**A. GOAL**

- a. GGI : Student able to calculate and draw diagram system of service of ship pipe line that is system of pipe bilge, reciprocate the, fire company, sanitary, air ventilate and system of pipe of service of shipboard system of cooler pipe, fuel, lubricant, air pressure, system of air cooling system .
- b. GPI : Student able to explain the fuel system on ship at least 80 % is real correct.
- c. SOFT SKILL : Student of shipbuilding technology of semester VI able to work along and able to release the opinion about fuel system.

**B. MAIN SUBJECT** : Fuel system

- C. SUB OF MAIN SUBJECT:**
- Fuel system
  - Fuel system diagram.
  - Operation of fuel system .

**D. STUDY ACTIVITY:**

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Explaining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about fuel system, diagram and operation system.</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaining relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate : Giving question or case study for discussion to measure the student absorption.

Reference :

- E. Khetagurov, M 1982, Marine Auxiliary Machinery and System , Peace publishers Moscow.
- F. Buyung Farabi, 1984, Shipboard System on Ship, ITS Surabaya..
- G. Davit W Smith, 1983, Marine Auxiliary Machinery, Butterworths.
- H. Raswari, 1998, Design of piping System, Airlangga.

## UNIT OF PROSEDURAL STUDY

COURSE NAME : SHIPBOARD SYSTEM  
 COURSE CODE/SKS : TKB133 / 2 SKS  
 TIME : 2 X 50 Minutes  
 MEETING TO : 11

### A. GOAL

- a. GGI : Student able to calculate and draw diagram system of service of ship pipe line that is system of pipe bilge, reciprocate the, fire company, sanitary, air ventilate and system of pipe of service of shipboard system of cooler pipe, fuel, lubricant, air pressure, system of air cooling system .
- b. GPI : Student able to explain the lubrication system on ship at lest 80 % is real correct.
- c. SOFT SKILL : Student of shipbuilding technology of semester VI able to work along and able to release the opinion about lubrication system.

B. MAIN SUBJECT : Lubrication system

- C. SUB OF MAIN SUBJECT: - Lubrication system.  
 - Lubrication system diagram.  
 - Operation lubrication system.

### D. STUDY ACTIVITY:

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Expalining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about lubrication system, diagram and operation..</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaning relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate : Giving question or case study for discussion to measure the student absorption.

Reference :

- A. Khetagurov, M 1982, Marine Auxiliary Machinery and System , Peace publishers Moscow.
- B. Buyung Farabi, 1984, Shipboard System on Ship, ITS Surabaya..
- C. Davit W Smith, 1983, Marine Auxiliary Machinery, Butterworths.
- D. Raswari, 1998, Design of piping System, Airlangga.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD SYSTEM  
**COURSE CODE/SKS** : TKB133 / 2 SKS  
**TIME** : 2 X 50 Minutes  
**MEETING TO** : 12

**A. GOAL**

- a. GGI : Student able to calculate and draw diagram system of service of ship pipe line that is system of pipe bilge, reciprocate the, fire company, sanitary, air ventilate and system of pipe of service of shipboard system of cooler pipe, fuel, lubricant, air pressure, system of air cooling system .
- b. GPI : Student able to explain the air pressuresystem on ship at lest 80 % is real correct..
- c. SOFT SKILL : Student of shipbuilding technology of semester VI able to work along and able to release the opinion about air pressure system.

**B. MAIN SUBJECT** : Air pressure system

- C. SUB OF MAIN SUBJECT:**
- Air pressure system
  - Air pressure system diagram.
  - Operation Air pressure system

**D. STUDY ACTIVITY:**

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Expalining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about , air pressure system, diagram and operation</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and ansver</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaining relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whitcboard

**Evaluate** : Giving question or case study for discussion to measure the student absorption.

**Reference :**

- A. Khetagurov, M 1982, Marine Auxiliary Machinery and System , Peace publishers Moscow.
- B. Buyung Farabi, 1984, Shipboard System on Ship, ITS Surabaya..
- C. Davit W Smith, 1983, Marine Auxiliary Machinery, Butterworths.
- D. Raswari, 1998, Design of piping System, Airlangga.

## UNIT OF PROSEDURAL STUDY

COURSE NAME : SHIPBOARD SYSTEM  
 COURSE CODE/SKS : TKB133 / 2 SKS  
 TIME : 2 X 50 Minutes  
 MEETING TO : 13

### A. GOAL

- a. GGI : Student able to calculate and draw diagram system of service of ship pipe line that is system of pipe bilge, reciprocate the, fire company, sanitary, air ventilate and system of pipe of service of shipboard system of cooler pipe, fuel, lubricant, air pressure, system of air cooling system .
- b. GPI : Student able to explain the fresh and sea water cooling system on ship at least 80 % is real correct..
- c. SOFT SKILL : Student of shipbuilding technology of semester VI able to work along and able to release the opinion about fresh and sea water cooling system.

B. MAIN SUBJECT : Fresh and sea water cooling system

- C. SUB OF MAIN SUBJECT:
- Fresh and sea cooling water system
  - Fresh and sea water cooling system diagram
  - Operation of fresh and sea water cooling system

### D. STUDY ACTIVITY:

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Expalining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about fresh and sea water system and descripton.</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaining relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate :Giving question or case study for discussion to measure the student absorption.

Reference :

- A. Khetagurov, M 1982, Marine Auxiliary Machinery and System , Peace publishers Moscow.
- B. Buyung Farabi, 1984, Shipboard System on Ship, ITS Surabaya..
- C. Davit W Smith, 1983, Marine Auxiliary Machinery, Butterworths.
- D. Raswari, 1998, Design of piping System, Airlangga.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD SYSTEM  
**COURSE CODE/SKS** : TKBI33 / 2 SKS  
**TIME** : 2 X 50 Minutes  
**MEETING TO** : 14

### A. GOAL

- a. GGI : Student able to calculate and draw diagram system of service of ship pipe line that is system of pipe bilge, reciprocate the, fire company, sanitary, air ventilate and system of pipe of service of shipboard system of cooler pipe, fuel, lubricant, air pressure, system of air cooling system .
- b. GPI : Student able to explain the exhaust system on ship at least 80 % is real correct..
- c. SOFT SKILL : Student of shipbuilding technology of semester VI able to work along and able to release the opinion about exhaust piping system

**B. MAIN SUBJECT** : Exhaust piping system

**C. SUB OF MAIN SUBJECT:** - Exhaust piping system  
 - Exhaust piping system diagram

### D. STUDY ACTIVITY:

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Expalining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about exhaust piping system, diagram and operation descripton.</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaning relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate :Giving question or case study for discussion to measure the student absorption.

Reference :

- A. Khetagurov, M 1982, Marine Auxiliary Machinery and System , Peace publishers Moscow.
- B. Buyung Farabi, 1984, Shipboard System on Ship, ITS Surabaya .
- C. Davit W Smith, 1983, Marine Auxiliary Machiner., Butterworths.
- D. Raswari, 1998, Design of piping System, Airlangga.

## UNIT OF PROSEDURAL STUDY

COURSE NAME : SHIPBOARD SYSTEM  
 COURSE CODE/SKS : TKB133 / 2 SKS  
 TIME : 2 X 50 Minutes  
 MEETING TO : 15

**A. GOAL**

- a. GGI : Student able to calculate and draw diagram system of service of ship pipe line that is system of pipe bilge, reciprocate the, fire company, sanitary, air ventilate and system of pipe of service of shipboard system of cooler pipe, fuel, lubricant, air pressure, system of air cooling system .
- b. GPI : Student able to explain the explain air condition system and refrigeration on ship at least 80 % is real correct.
- c. SOFT SKILL : Student of shipbuilding technology of semester VI able to work along and able to release the opinion about air conditioning system and refrigeration.

**B. MAIN SUBJECT** : Air conditioning system and refrigeration

- C. SUB OF MAIN SUBJECT:**
- Air conditioning
  - Air conditioning diagram
  - Operation of Air conditioning and refrigeration

**D. STUDY ACTIVITY:**

Level	Instructor Activity	Students' Activity	Media And study appliance
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GPI</li> <li>• Explaining coverage of meeting item of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• Explaining about , ballast system, diagram of ballast system and descripton.</li> <li>• Giving practice.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> <li>• Discussion a question and answer</li> </ul>	OHP/LCD and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feedback what have been learned at this session and summary the item which have been given.</li> <li>• Explaining relevansion with the item.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing and noting.</li> </ul>	OHP/LCD and whiteboard

Evaluate : Giving question or case study for discussion to measure the student absorption.

**Reference :**

- A. Khetagurov, M 1982, Marine Auxiliary Machinery and System , Peace publishers Moscow.
- B. Buyung Farabi, 1984, Shipboard System on Ship, ITS Surabaya. .
- C. Davit W Smith, 1983, Marine Auxiliary Machinery, Butterworths.
- D. Raswari, 1998, Design of piping System, Airlangga.

## LECTURING CONTRACT

COURSE NAME : SHIPBOARD SYSTEM  
COURSE CODE/SKS : TKB133 / 2 SKS  
LECTURER : IR KIRYANTO, MT / EKO SASMITO HADI, ST.MT.  
SEMESTER : VI  
MEETING TIME : 2 X 50 MINUTE/WEEK  
MEETING PLACE : ROOM B 104

### 1. RELEVANCE

Items in course shipboard system in this ship give the membership for shipping expert in designing, drawing and calculating system of ship pipe. Beside that can give skilled for shipping expert in drawing system piping in three dimension or isometric

### 2. DESCRIPTION

Course of shipboard system in ship study about existing system is the ship, covering pipe system for the service of in ship (shipboard system) and machine service. System of ship service consist of ballast system, bilge system, fire fighting system, sanitary system, ventilation system, system of air conditioning and refrigeration. While system of machine service cover the fuel system, lubricant, engine cooling system.

### 3. GOAL OF GENERAL INSTRUCTIONAL

Student after following process learn to teach the eye of course shipboard system expected able to:

- Explaining kinds of inboard system
- Explaining, mentioning component and draw the, system reciprocate the, system of bilge and fire fighting system of its[his] third bearing and fire [is] system of sanitary of fresh water and sea water, dismissal system, ventilation system, air conduit and anticipate, system of air condition
- Explaining, mentioning component and draw the, system of service of main engine and auxiliary machine of ship that is fuel system, lubricant system, system of cooler of main engine and auxiliary engine.

### 4. LECTURING STRATEGY

In applying more amount lecturing strategy use the discourse in the early lecturing of concerning theory, illustrate the picture of pipe system in good ship of shipboard piping system and also engine piping system and also real problems about system of ship pipe which continue with the discussion / question and answer



## 5. REFERENCE AND STUDY MATERIAL

- A. Khetagurov, M 1982, Marine Auxiliary Machinery and System , Peace publishers Moscow.
- B. Buyung Farabi, 1984, Shipboard system, ITS Surabaya..
- C. Davit W Smith, 1983, Marine Auxiliary Machinery, Butterworths.
- D. Raswari, 1998, Design of pipe System, Airlangga.

## 6. ASSIGNMENT

Duty which is obliged to be done in course thermodynamics is cover with:

1. Each literature in the course should have been read before attend the lecture.
2. Middle evaluation of semester will be executed at week 8. Evaluation will use the form of essay and choice.
3. For the fundamental of discussion needing deeper emphasis of matter analyze needed by discussion with the problem or occurrence which is often met in field.

## 7. ASSESSMENT CRITERION

Assessment conducted by instructor by using the following criteria:

Value		Range
By Letter	By Number	
A	4	$\geq 80$
AB	3,5	79 – 75
B	3	74 – 69
BC	2,5	68 – 63
C	2	62 – 57
CD	1,5	56 – 51
D	1	50 – 45
E	0	$\leq 44$

To determine the final value is the following criterion,

- presence 10 %
- assignment and discussion 10 %
- Middle semester evaluation 35 %
- Final semester evaluation 45 %

## 8. LECTURING SCHEDULE

No	Week	Topic of Discussion	Reference
1	Meeting to 1	Shipboard system component in ship	A , B , C , D
2	Meeting to 2	Bilge system	A , B , C , D
3	Meeting to 3	Ballast system	A , B , C , D
4	Meeting to 4	Fire fighting system	A , B , C , D
5	Meeting to 5	Sanitary system	A , B , C , D
6	Meeting to 6	Scuper system	A , B , C , D
7	Meeting to 7	Air system, sounding dan ventilation	A , B , C , D
8	Meeting to 8	Mid Semester Test (MST)	
9	Meeting to 9	Design of isometric drawing	A , B , C , D
10	Meeting to 10	Fuel system	A , B , C , D
11	Meeting to 11	Lubrication system	A , B , C , D
12	Meeting to 12	Air pressure system	A , B , C , D
13	Meeting to 13	Fresh and sea water cooling system	A , B , C , D
14	Meeting to 14	Exhaust piping system	A , B , C , D
15	Meeting to 15	Air conditioning system and refrigeration	A , B , C , D
16	Meeting to 16	Final Semester Test (FST)	

### Reference :

- A. Khetagurov, M 1982, Marine Auxiliary Machinery and System , Peace publishers Moscow.
- B. Buyung Farabi, 1984, Shipboard System on Ship, ITS Surabaya.
- C. Davit W Smith, 1983, Marine Auxiliary Machinery, Butterworths.
- D. Raswari, 1998, Design of piping System, Airlangga.

## Fundamental Outline of Study

- Name of course** : **Control System Engineering**
- Code/ SCS** : TKB210 / 2
- Semester** : VII (seven)
- Description** : The ships of control system engineering are cover explain of about all the control technique in ship, as close loop and open loop type. This course also study about solution of various transfer function, as transfer function of mechanic, transfer function of mechanic electric, transfer function of hydraulic and also analyzed stability system. Expected in the end student can calculate and planning control system in the ship.
- GGI** : By the end of lecturing, expected student will be able to calculate and planning control system in the ship.
- Referance** : 1. Anymous, *Diktat Teori Sistem Pengendalian*, FTK – ITS Surabaya. 2000.
2. Stanley M Shinnars, *Modern Control System*, And Application, Addison-Wesley Publishing Company. 1972.
3. Fred White, *Principies of Control Engineering*, Edward Arnold. 1995.
4. Katsuhiko Ogata, *Modern Control Engineering 2nd*, Prentice Hall Inc. 1996.
5. Benjamin C Kuo, *Automatic Control System*, Prentice Hall Inc. 1995.
6. Gladwyn Lago, *Control System Theory*, The Ronald Press Company. 1962.
7. Francis H Raven, *Automatic Control Engineering*, McGraw-Hill Book Company. 1968.

No	Goal of Particular Instructional	Main Subject	Sub of Main Subject	Time esti.	Ref .
1	Student will be able to identify and explain various control system type in ship least by 80 % truly	Introduction	<input type="checkbox"/> Definition of Control System Engineering <input type="checkbox"/> Various application of system operation in ship <input type="checkbox"/> Type Operation closed loop and open loop	100 menite	1,2
2	Sturient will be able to calculate various mathematical equation from Laplace transform, and also equation deferensial at least by 80 % truly	Basic Mathematic (Laplace Transform, and Deferential equations)	<input type="checkbox"/> Laplace Transform. <input type="checkbox"/> Deferential equations.	2 x 100 ment	6,7
3	Student will be able to identify and calculate the block diagram and assorted transfer function truly at least by 80 % is real correct.	Transfer function and block diagram	<input type="checkbox"/> Block diagram <input type="checkbox"/> Transfer function	2 x 100 menite	2,3, 4,5
4	Student will be able to identify and calculate assorted signal flow diagram truly by 80 % is real correct.	Signal Flow Diagram	Signal Flow Diagram	100 menite	6,7
5	Student will be able to identify and calculate the mathematical model from physical system truly at least by 80 % is real correct.	Mathematical model from physic system	<input type="checkbox"/> Electric model system <input type="checkbox"/> Mechanical model system <input type="checkbox"/> Hydraulic model system	100 menite	6,7
6	Student will be able to calculate the steady state variable analyses and Routh stability at least by 80 % is real correct	Steady state variable Analysis and Routh stability	<input type="checkbox"/> Steady state Variable analyses <input type="checkbox"/> Routh Stability	2 x 100 menite	2,3, 4,5
7	Student will be able to calculate root locus analyses control system at least by 80 % is real correct	Root locus analyses control system	Root locus analyses control system	2 x 100 menite	4,5
8	Student will be able to Plot the root contour at least by 80 % is real correct	Plot root contour	Plot root contour control system	2 x 100 menite	4,5

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : CONTROL SYSTEM ENGINEERING.  
**CODE / SSC** : TKB210 / 2  
**TIME** : 1 X 120 Minute  
**MEETING TO-** : 1

### A. GOAL

#### 1. Goal of General Instructional :

By the end of lecturing, expected student will be able to calculate and planning control system in the ship.

#### 2. Goal of Particular Instructional :

Student will be able to identify and explain various control system type in ship least by 80 % truly

### B. MAIN SUBJECT

Introduction

### C. SUB of MAIN SUBJECT

- Definition of Control System Engineering
- Various application of system operation in ship
- Type Operation closed loop and open loop

### D. STUDY ACTIVITY

Level	Instructor activity	Student Activity	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GGI and GPI</li> <li>• Explaining coverage of meeting items of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	<ol style="list-style-type: none"> <li>1. explaining about:               <ul style="list-style-type: none"> <li>• Definition of Control System Engineering</li> <li>• Various application of system operation in ship</li> <li>• Type Operation closed loop and open loop.</li> </ul> </li> <li>2. Exemplifying type network which is often utilized in ship.</li> <li>3. Giving practice to identify the electrics network.</li> </ol>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion.</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevantan with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

### E. EVALUATE

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

## F. REFERANCE (1,2)

1. Anymous, *Diktat Teori Sistem Pengendalian*, FTK – ITS Surabaya. 2000.
2. Stanley M Shinnners, *Modern Control System, And Application*, Addison-Wesley Publishing Company. 1972.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : CONTROL SYSTEM ENGINEERING.  
**CODE / SSC** : TKB210 / 2  
**TIME** : 2 X 120 MENIT  
**MEETING TO-** : 2 dan 3

### A. GOAL

#### 1. Goal of General Instructional :

By the end of lecturing, expected student will be able to calculate and planning control system in the ship.

#### 2. Goal of Particular Instructional :

Student will be able to calculate various mathematical equation from Laplace transform, and also equation deferensial at least by 80 % truly

### B. MAIN SUBJECT

Basic Mathematic

### C. SUB of OF MAIN SUBJECT

- Laplace Transform.
- Deferential equations.

### D. STUDY ACTIVITY

Level	Instructor activity	Student Activity	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of CGI and GPI</li> <li>• Explaining coverage of meeting items of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• explaining about :</li> <li>• Laplace Transform.</li> <li>• Deferential equations.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevantion with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

### E. EVALUATE

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

### F. REFERANCE (6,7)

6. Gladwyn Lago, *Control System Theory*, The Ronald Press Company. 1962.
7. Francis H Raven, *Automatic Control Engineering*, McGraw-Hill Book Company. 1968.

## UNIT OF PROSEDURAL STUDY

COURSE NAME : CONTROL SYSTEM ENGINEERING.  
 CODE / SSC : TKB210 / 2  
 TIME : 2 X 120 MENIT  
 MEETING TO- : 4 dan 5

### A. GOAL

#### 1. Goal of General Instructional :

By the end of lecturing, expected student will be able to calculate and planning control system in the ship.

#### 2. Goal of Particular Instructional :

Student will be able to identify and calculate the block diagram and assorted transfer function truly at least by 80 % is real correct.

### B. MAIN SUBJECT

Transfer function and block diagram

### C. SUB of MAIN SUBJECT

- Block diagram
- Transfer function

### D. STUDY ACTIVITY

Level	Instructor activity	Student Activity	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GGI and GPI</li> <li>• Explaining coverage of meeting items of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• explaining about :               <ul style="list-style-type: none"> <li>• Block diagram</li> <li>• Transfer function.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevantion with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

### E. EVALUATE

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

### F. REFERANCE (2,3,4,5)

2. Stanley M Shinnars, *Modern Control System*, And Application, Addison-Wesley Publishing Company. 1972.



3. Fred White, *Principles of Control Engineering*, Edward Arnold. 1995.
4. Katsuhiko Ogata, *Modern Control Engineering 2nd*, Prentice Hall Inc. 1996.
5. Benjamin C Kuo, *Automatic Control System*, Prentice Hall Inc. 1995.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : CONTROL SYSTEM ENGINEERING.  
**CODE / SSC** : TKB210 / 2  
**TIME** : 1 X 120 MENIT  
**MEETING TO-** : 6

### A. GOAL

#### 1. Goal of General Instructional :

By the end of lecturing, expected student will be able to calculate and planning control system in the ship.

#### 2. Goal of Particular Instructional :

Student will be able to identify and calculate assorted signal flow diagram truly by 80 % is real correct.

### B. MAIN SUBJECT

Signal Flow Diagram

### C. SUB of MAIN SUBJECT

Signal Flow Diagram

### D. STUDY ACTIVITY

Level	Instructor activity	Student Activity	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GGI and GPI</li> <li>• Explaining coverage of meeting items of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• explaining about :               <ul style="list-style-type: none"> <li>• Signal Flow Diagram.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevation with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

### E. EVALUATE

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

### F. REFERANCE (6,7)

6. Katsuhiko Ogata, *Modern Control Engineering 2nd*, Prentice Hall Inc. 1996.
7. Benjamin C Kuo, *Automatic Control System*, Prentice Hall Inc. 1995.

## UNIT OF PROSEDURAL STUDY

COURSE NAME : CONTROL SYSTEM ENGINEERING.  
CODE / SSC : TKB210 / 2  
TIME : 1 X 120 MENIT  
MEETING TO- : 7

### A. GOAL

#### 1. Goal of General Instructional :

By the end of lecturing, expected student will be able to calculate and planning control system in the ship.

#### 2. Goal of Particular Instructional :

Student will be able to identify and calculate the mathematical model from physical system truly at least by 80 % is real correct.

### B. MAIN SUBJECT

Mathematical model from physic system

### C. SUB of MAIN SUBJECT

- Electric model system
- Mechanical model system
- Hydroulic model system

### D. STUDY ACTIVITY

Level	Instructor activity	Student Activity	MEDIA
Introduction	<ul style="list-style-type: none"><li>• Explaining interest of GGI and GPI</li><li>• Explaining coverage of meeting items of first</li></ul>	<ul style="list-style-type: none"><li>• Stargazing</li><li>• Submit Question.</li></ul>	OHP, OHT and whiteboard
Presentation	<ul style="list-style-type: none"><li>• explaining about :<ul style="list-style-type: none"><li>• Electric model system</li><li>• Mechanical model system</li><li>• Hydroulic model system.</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Stargazing</li><li>• Discussion</li><li>• Debriefing</li></ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"><li>• Giving question as feed back what have been learned at this session.</li><li>• Sumarry the items which have been given.</li><li>• Explaining relevation with the items to be given here in after.</li></ul>	<ul style="list-style-type: none"><li>• Stargazing</li><li>• Discussion</li><li>• Debriefing</li></ul>	OHP, OHT and whiteboard

### E. EVALUATE

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

### F. REFERANCE (6,7)

6. Gladwyn Lago, *Control System Theory*, The Ronald Press Company. 1962.
7. Francis H Raven, *Automatic Control Engineering*, McGraw-Hill Book Company. 1968.

## UNIT OF PROSEDURAL STUDY

COURSE NAME : CONTROL SYSTEM ENGINEERING.  
CODE / SSC : TKB210 / 2  
TIME : 2 X 120 MENIT  
MEETING TO- : 8 dan 9

### A. GOAL

#### 1. Goal of General Instructional :

By the end of lecturing, expected student will be able to calculate and planning control system in the ship.

#### 2. Goal of Particular Instructional :

Student will be able to calculate the steady state variable analyses and Routh stability at least by 80 % is real correct

### B. MAIN SUBJECT

Steady state variable Analysis and Routh stability

### C. SUB of MAIN SUBJECT

- Steady state Variable analyses
- Routh Stability

### D. STUDY ACTIVITY

Level	instructor activity	Student Activity	MEDIA
Introduction	<ul style="list-style-type: none"><li>• Explaining interest of GGI and GPI</li><li>• Explaining coverage of meeting items of first</li></ul>	<ul style="list-style-type: none"><li>• Stargazing</li><li>• Submit Question.</li></ul>	OHP, OHT and whiteboard
Presentation	<ul style="list-style-type: none"><li>• explaining about :</li><li>• Steady state Variable analyses</li><li>• Routh Stability.</li></ul>	<ul style="list-style-type: none"><li>• Stargazing</li><li>• Discussion</li><li>• Debriefing</li></ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"><li>• Giving question as feed back what have been learned at this session.</li><li>• Sumarry the items which have been given.</li><li>• Explaining relevanton with the items to be given here in after.</li></ul>	<ul style="list-style-type: none"><li>• Stargazing</li><li>• Discussion</li><li>• Debriefing</li></ul>	OHP, OHT and whiteboard

### E. EVALUATE

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

### F. REFERANCE (2,3,4,5)

2. Stanley M Shinnars, *Modern Control System, And Application*, Addison-Wesley Publishing Company. 1972.

3. Fred White, *Principles of Control Engineering*, Edward Arnold. 1995.
4. Katsuhiko Ogata, *Modern Control Engineering 2nd*, Prentice Hall Inc. 1996.
5. Benjamin C Kuo, *Automatic Control System*, Prentice Hall Inc. 1995.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : CONTROL SYSTEM ENGINEERING.  
**CODE / SSC** : TKB210 / 2  
**TIME** : 2 X 120 MENIT  
**MEETING TO-** : 10 dan 11

### A. GOAL

#### 1. Goal of General Instructional :

By the end of lecturing, expected student will be able to calculate and planning control system in the ship.

#### 2. Goal of Particular Instructional :

Student will be able to calculate root locus analyses control system at least by 80 % is real correct

### B. MAIN SUBJECT

Root locus analyses control system

### C. SUB of MAIN SUBJECT

Root locus analyses control system

### D. STUDY ACTIVITY

Level	Instructor activity	Student Activity	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GGI and GPI</li> <li>• Explaining coverage of meeting items of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• explaining about :</li> <li>• Root locus analyses control system</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevation with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

### E. EVALUATE

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

### F. REFERANCE (4,5)

4. Katsuhiko Ogata, *Modern Control Engineering 2nd*, Prentice Hall Inc. 1996.
5. Benjamin C Kuo, *Automatic Control System*, Prentice Hall Inc. 1995.

## UNIT OF PROSEDURAL STUDY

COURSE NAME : CONTROL SYSTEM ENGINEERING.  
CODE / SSC : TKB210 / 2  
TIME : 2 X 120 MENIT  
MEETING TO- : 12 dan 13

### A. GOAL

#### 1. Goal of General Instructional :

By the end of lecturing, expected student will be able to calculate and planning control system in the ship.

#### 2. Goal of Particular Instructional :

Student will be able to Plot the root contour at least by 80 % is real correct

### B. MAIN SUBJECT

Plot root contour

### C. SUB of MAIN SUBJECT

- Plot root contour control system

### D. STUDY ACTIVITY

Level	Instructor activity	Student Activity	MEDIA
Introduction	<ul style="list-style-type: none"><li>• Explaining interest of GGI and GPI</li><li>• Explaining coverage of meeting items of first</li></ul>	<ul style="list-style-type: none"><li>• Stargazing</li><li>• Submit Question.</li></ul>	OHP, OHT and whiteboard
Presentation	<ul style="list-style-type: none"><li>• explaining about :</li><li>• Plot root contour control system.</li></ul>	<ul style="list-style-type: none"><li>• Stargazing</li><li>• Discussion</li><li>• Debriefing</li></ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"><li>• Giving question as feed back what have been learned at this session.</li><li>• Sumarry the items which have been given.</li><li>• Explaining relevation with the items to be given here in after.</li></ul>	<ul style="list-style-type: none"><li>• Stargazing</li><li>• Discussion</li><li>• Debriefing</li></ul>	OHP, OHT and whiteboard

### E. EVALUATE

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

### F. REFERANCE (4,5)

4. Katsuhiko Ogata, *Modern Control Engineering 2nd*, Prentice Hall Inc. 1996.
5. Benjamin C Kuo, *Automatic Control System*, Prentice Hall Inc. 1995.

## LECTURING CONTRACT

**Course Name** : Control System Engineering  
**Lecturer** : Eko Sasmito Hadi, ST, MT  
**Date and time** : Monday, 09.00 – 11.30  
**Semester** : VII (seven)  
**Prerequisite** : 1. Mathematic III  
2. Mechanical Engineering I  
3. Shipboard electrical system  
4. Ship Support System  
**Place** : Room R. B165

### 1. RELEVANCE

These courses items are very being of benefit to a ship designer in planning and analyze the system control exist at the ship equipment. And also can be determine the needed control stability.

### 2. DESCRIPTION

The ship of control system engineering are cover explain of about all the control technique in ship, as close loop and open loop type. This course also study about solution of various transfer function, as transfer function of mechanic, transfer function of mechanic electric, transfer function of hydraulic and also analyzed stability system. Expected in the end student can calculate and planning control system in the ship.

### 3. GOAL OF GENERAL INSTRUCTIONAL.

By the end of lecturing, expected student will be able to calculate and planning control system in the ship.



#### 4. LECTURING STRATEGY.

Lecturing method in this course is discourse, discussion and team-work. For the special topic or certain topic, student will be asked to presented result of team-work and discussion together.

#### 5. LITERATURE.

1. Anymous, *Diktat Teori Sistem Pengendalian*, FTK – ITS Surabaya. 2000.
2. Stanley M Shinnners, *Modern Control System, And Application*, Addison-Wesley Publishing Company. 1972.
3. Fred White, *Principles of Control Engineering*, Edward Arnold. 1995.
4. Katsuhiko Ogata, *Modern Control Engineering 2nd*, Prentice Hall Inc. 1995.
5. Benjamin C Kuo, *Automatic Control System*, Prentice Hall Inc. 1995.
6. Gladwyn Lago, *Control System Theory*, The Ronald Press Company. 1962.
7. Francis H Raven, *Automatic Control Engineering*, McGraw-Hill Book Company. 1968.

#### 6. ASSIGNMENT

1. Each literature in the course should have been read before attend the lecture.
2. Middle evaluation of semester will be executed at week 8. Evaluation will use the form of essay and choice.
3. For the fundamental of discussion needing deeper emphasis of matter analyze needed by discussion with the problem or occurrence which is often met in field.

## 7. ASSESSMENT CRITERION.

Assessment conducted by instructor by using the following criteria:

Value	Point	Range
By Letter	By Number	
A	4	$\geq 80$
AB	3,5	79 – 75
B	3	74 – 69
BC	2,5	68 – 63
C	2	62 – 57
CD	1,5	56 – 51
D	1	50 – 45
E	0	$\leq 44$

To determine the final value is the following criterion,

- presence 10 %
- assignment 20 %
- Middle semester evaluation 30 %
- Final semester evaluation 30 %
- Being active in discussion 10 %

## 8. LECTURING SCHEDULE

Week	Topic of Discussion	Reference
1	Introduction	<ol style="list-style-type: none"><li>1. Anonymous, <i>Diktat Teori Sistem Pengendalian</i>, FTK – ITS Surabaya. 2000.</li><li>2. Stanley M Shinnars, <i>Modern Control System, And Application</i>, Addison-Wesley Publishing Company. 1972.</li></ol>
2 and 3	Basic Mathematic (Laplace Transform, and Deferential equations)	<ol style="list-style-type: none"><li>6. Gladwyn Lago, <i>Control System Theory</i>, The Ronald Press Company. 1962.</li><li>7. Francis H Raven, <i>Automatic Control Engineering</i>, McGraw-Hill Book Company. 1968.</li></ol>

4 and 5	Transfer function and bloc diagram	<p>2. Stanley M Shinnars, <i>Modern Control System, And Application</i>, Addison-Wesley Publishing Company, 1972.</p> <p>3. Fred White, <i>Principles of Control Engineering</i>, Edward Arnold, 1995.</p> <p>4. Katsuhiko Ogata, <i>Modern Control Engineering 2nd</i>, Prentice Hall Inc. 1996.</p> <p>5. Benjamin C Kuo, <i>Automatic Control System</i>, Prentice Hall Inc. 1995.</p>
6	Signal Flow Diagram	<p>4. Katsuhiko Ogata, <i>Modern Control Engineering 2nd</i>, Prentice Hall Inc. 1996.</p> <p>5. Benjamin C Kuo, <i>Automatic Control System</i>, Prentice Hall Inc. 1995.</p>
7	Mathematical model from physic system	<p>6. Gladwyn Lago, <i>Control System Theory</i>, The Ronald Press Company, 1962.</p> <p>7. Francis H Raven, <i>Automatic Control Engineering</i>, McGraw-Hill Book Company, 1968.</p>
8	<b>Middle test of semester</b>	
9 and 10	Steady state variable Analysis and Routh stability	<p>2. Stanley M Shinnars, <i>Modern Control System, And Application</i>, Addison-Wesley Publishing Company, 1972.</p> <p>3. Fred White, <i>Principles of Control Engineering</i>, Edward Arnold, 1995.</p> <p>4. Katsuhiko Ogata, <i>Modern Control Engineering 2nd</i>, Prentice Hall Inc. 1996.</p> <p>5. Benjamin C Kuo, <i>Automatic Control System</i>, Prentice Hall Inc. 1995.</p>
11 and 12	Root locus analyses control system	<p>4. Katsuhiko Ogata, <i>Modern Control Engineering 2nd</i>, Prentice Hall Inc. 1996.</p> <p>5. Benjamin C Kuo, <i>Automatic Control System</i>, Prentice Hall Inc. 1995.</p>
13 and 14	Plot root contour	<p>4. Katsuhiko Ogata, <i>Modern Control Engineering 2nd</i>, Prentice Hall Inc. 1996.</p> <p>5. Benjamin C Kuo, <i>Automatic Control System</i>, Prentice Hall Inc. 1995.</p>
15	<b>Final test of Semester</b>	

## Fundamental Outline of Study

- Name of course** : Shipboard Electrical System.
- Code/ SCS** : TKB210 / 3
- Semester** : V (five)
- Description** : Shipboard electrical systems include the clarification of about all electrical load of exist in ship, passive load (DC) and also Active load (AC) of each ship condition. The Electrics load's also cover to the load for the navigation system, power system and lighting system. Others is also studied by problem of which deal with type cable of exist in ship, as according to classification. Expected in the end student can calculate and plan the generator capacities needed by ship.
- GGI** : The end of lecturing, expected a student will be able to plan the generator capacities by using principle of power management system.
- Referance** : 1. Anymous, *Diktat Tenaga Listrik*, FTK – ITS Surabaya. 2000.
2. \_\_\_\_\_, *Diktat Induksi dan Induktansi*, FTK – ITS Surabaya 2000.
3. Kadir A Prof Ir, *Mesin Arus Searah*, Djembatan Jakarta 1984.
4. \_\_\_\_\_, *Mesin Sinkron*, Djembatan Jakarta 1998.
5. Hubert C I, *Preventive Maintenance of Electrical Equipment*, McGraw-Hill New York 1985.
6. Biro Klasifikasi Indonesia, Rules For Electrical Installation, Vol IV, BKI, Jakarta. 1996
7. Harrington L.R, Marine Engineering, The Society of Naval Architects and Marine Engeneers, Jersey City 1992
8. Barber-Colman Co.Ltd, Application Information Pow-R-Con, (Online), (<http://www.dynaproducts.com>) 2002
9. Theraja B.L and Theraja A.K, Electrical Technology, Nirja Contruction & Development Co.,Ltd, New Delhi 1994.

No	Goal of Particular Instructional	Main Subject	Sub of Main Subject	Time esti.	Ref.
1	Student will be able to identify the burden of DC and AC and also explain various networks of electrics of DC and AC least by 80 % is real correct.	DC Circuit	Series circuit Network, Parallel and combination at component Resistor system.	100 minute	2,9
		AC Circuit	Series circuit Network, Parallel and combination at component Resistor system, inductive system and capacitive system.		
2	Student will be able to calculate the current, energy at network of electrics of DC and network of electrics AC at least by 80 % is real correct.	DC Circuit	Calculation of Variable electrics at series circuit, Parallel and combination network at component Resistor system.	100 minute	2,9
		AC Circuit	Calculation of Variable electrics at series circuit, Parallel and combination network at component Resistor system, inductive system and capacitive system.		
3	Student will be able to identify kinds of - kinds of motor in concern and asynchronous and also explain its operational accompanied by the example of its applying at least ship by 80 % real correct.	Synchronous motor	AC motor system construction	100 minute	1,3, 4,9
			DC motor system Construction		
		Asynchronous motor.	AC motor system construction		
4	Student will be able to explain the principle work and also explain kinds of - kinds of motor 1 phase and 3 phases and also exemplify its applying at least ship by 80 % is real correct.	AC motor system	<input type="checkbox"/> Principle operation of AC motor system 1 phase and 3 phases <input type="checkbox"/> Principle starter at AC motor system.	100 minute	1,3, 4,9
5	Student will be able to identify the construction of motor DC, elaborating it's operational and also exemplify its applying at least ship by 80 % is real correct.	DC motor system	<input type="checkbox"/> DC motor system with free exiter <input type="checkbox"/> DC motor system with self exiter <input type="checkbox"/> Compont DC motor system	100 minute	1,3, 4,9
6	Student will be able to calculate the electricity requirement for the lighting of on board at least by 80 % is real correct.	Calculation of lamp power.	<input type="checkbox"/> Lamp type utilized in the ship. <input type="checkbox"/> Standart illumination of light in the room of ship. <input type="checkbox"/> Calculation of standart illumination of light in the room of ship.	100 minute	6,7, 9
7	Student will be able to mention several of transformers and also explain the principle work the at least transformer by 80 % is real correct.	Transformer type	<input type="checkbox"/> Step up <input type="checkbox"/> Step down	100 minute	1,9
8	Student will be able to identify the type and insulation of power cable and also exemplify its applying at least ship by 80 % is real correct.	Cable type	<input type="checkbox"/> Type's of cable conection <input type="checkbox"/> Type's of cable according to code <input type="checkbox"/> Cable penetration to frame	2x100 minute	6,7
		Cable insulation	<input type="checkbox"/> Type of insulation <input type="checkbox"/> Type of cable insulation according to utilized room		
9	Student will be able to explain the principle work the generator and identify the at least generator type by 80 % [is] real correct.	Generator AC	<input type="checkbox"/> Type's of generator <ul style="list-style-type: none"> <li>• Asynchounous</li> <li>• Synchronous</li> </ul> <input type="checkbox"/> Principle operation of generator <ul style="list-style-type: none"> <li>• Asynchounous</li> <li>• Synchronous (self exiter dan outside exiter)</li> </ul>	100 minute	1,4, 7,8, 9
10	Student will be able to explain the principle operate for the parallel and calculate the load of parallel generator at least by 80 % is real correct.	Parallel and load calculated in generator parallel.	<input type="checkbox"/> Generator parallel requirement <input type="checkbox"/> Parallel principle's operation <input type="checkbox"/> Parallel prosedure <input type="checkbox"/> Parallel failure <input type="checkbox"/> Automatic and manual parallel device <input type="checkbox"/> Calculation of load division <input type="checkbox"/> The effect of unbalanced load	100 minute	1,4, 5,7, 8,9

11	Student will be able to plan the installation and calculate the variable electrics at machine - electric engine used in the ship at least by 30 % is real correct.	Instalation	<input type="checkbox"/> The master plan of drawing installation on 3 wire system and 1 wire system at the room and deck <input type="checkbox"/> The master plan of drawing installation on 3 wire system and 1 wire system at the all deck of ship	2 x 100 minute	6,7
		The load electrical component	<input type="checkbox"/> Calculated of light load for each ship condition <input type="checkbox"/> Calculated of power load for each ship condition <input type="checkbox"/> Calculated of navigation system load for each ship condition		
12	Student will be able to calculate the generator capacity in the ship at least by 80 % is real correct.	Load calculation	Calculated all electrical load <input type="checkbox"/> Sea going <input type="checkbox"/> Manuver <input type="checkbox"/> Anchoring <input type="checkbox"/> Emergency	100 minute	6,7
13	Student will be able to plan the generator capacities in the ship at least ship by 80 % is real correct.	Capasities plan	<input type="checkbox"/> Election of unit number main generator and emergency <input type="checkbox"/> Election of capacity unit main generator and emergency <input type="checkbox"/> Election of configurate generator capacity.	100 minute	6,7

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD ELECTRICAL SYSTEM.  
**CODE / SSC** : TKB210 / 2  
**TIME** : 1 X 120 Minute  
**MEETING TO-** : 1

### A. GOAL

#### 1. Goal of General Instructional :

The end of lecturing, expected a student will be able to plan the generator capacities by using principle of power management system.

#### 2. Goal of Particular Instructional :

Student will be able to identify the burden of DC and AC and also explain various networks of electrics of DC and AC least by 80 % is real correct.

### B. MAIN SUBJECT

AC and DC Circuit

### C. SUB of MAIN SUBJECT

- Series circuit Network, Parallel and combination at component Resistor system.
- Series circuit Network, Parallel and combination at component Resistor system, inductive system and capacitive system.

### D. STUDY ACTIVITY

Level	Instructor activity	Student Activity	Media
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GGI and GFI</li> <li>• Explaining coverage of meeting items of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	CHP, OHT and whiteboard
Presentation	<ol style="list-style-type: none"> <li>1. explaining about:               <ul style="list-style-type: none"> <li>• Series circuit Network, Parallel and combination at component Resistor system.</li> <li>• Series circuit Network, Parallel and combination at component Resistor system, inductive system and capacitive system.</li> </ul> </li> <li>2. Exemplifying type network which is often utilized in ship.</li> <li>3. Giving practice to identify the electrics network.</li> </ol>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevation with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

### E. EVALUATE

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

**F. REFERANCE (2, 9)**

2. \_\_\_\_\_, *Diktat Induksi and Induktansi*, FTK – ITS Surabaya 2000.
9. Theraja B.L and Theraja A.K, *Electrical Technology*, Nirja Contruction & Development Co.,Ltd, New Delhi 1994.



## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD ELECTRICAL SYSTEM.  
**CODE / SSC** : TKB210 / 2  
**TIME** : 1 X 120 MINUTE  
**MEETING TO-** : 2

### A. GOAL

#### 1. Goal of General Instructional :

The end of lecturing, expected a student will be able to plan the generator capacities by using principle of power management system.

#### 2. Goal of Particular Instructional :

Student will be **able to calculate** the current, energy at network of electrics of DC and network of electrics AC at least by 80 % is real correct.

### B. MAIN SUBJECT

The DC and AC Circuit.

### C. SUB OF MAIN SUBJECT

- Calculation of Variable electrics at series circuit, Parallel and combination network at component Resistor system.
- Calculation of Variable electrics at series circuit, Parallel and combination network at component Resistor system, inductive system and capacitive system.

### D. STUDY ACTIVITY

Level	INSTRUCTOR ACTIVITY	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining previous meeting items</li> <li>• Explaining coverage of items of Meeting to 2</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	<ul style="list-style-type: none"> <li>• explaining about :               <ul style="list-style-type: none"> <li>□ Calculation of Variable electrics at series circuit, Parallel and combination network at component Resistor system.</li> <li>□ Calculation of Variable electrics at series circuit, Parallel and combination network at component Resistor system, inductive system and capacitive system.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevansi with the items to be given here in after</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

#### **E. EVALUATE**

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

#### **F. REFERANCE (2, 9)**

2. \_\_\_\_\_, *Diktat Induksi and Induktansi*, FTK – ITS Surabaya 2000.
9. Theraja B.L and Theraja A.K, *Electrical Technology*, Nirja Contruction & Development Co , Ltd, New Delhi 1994.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD ELECTRICAL SYSTEM.  
**CODE / SSC** : TKB210 / 2  
**TIME** : 1 X 120 MINUTE  
**MEETING TO-** : 3

### A. GOAL

#### 1. Goal of General Instructional :

The end of lecturing, expected a student will be able to plan the generator capacities by using principle of power management system.

#### 2. Goal of Particular Instructional :

Student will be able to identify kinds motor in concern and asynchronous and also explain its operational accompanied by the example of its applying at least ship by 80 % real correct.

### B. MAIN SUBJECT

- Synchronous motor
- Asynchronous motor.

### C. SUB OF MAIN SUBJECT

- DC motor system Construction

### D. STUDY ACTIVITY

TAHAP	INSTRUCTOR ACTIVITY	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining previous meeting items</li> <li>• Explaining coverage of items of Meeting to 3</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	1. explaining about : <ul style="list-style-type: none"> <li><input type="checkbox"/> AC motor system construction</li> <li><input type="checkbox"/> DC motor system Constructions</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussions</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Summary the items which have been given.</li> <li>• Explaining relation with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

### E. EVALUATE

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

#### F. REFERANCE 1,3,4,9

1. Anymous, *Diktat Tenaga Listrik*, FTK – ITS Surabaya. 2000.
3. *Kadir* A Prof Ir, *Mesin Arus Searah*, Djembatan Jakarta 1984.
4. \_\_\_\_\_, *Mesin Sinkron*, Djembatan Jakarta 1998.
9. Theraja B.L and Theraja A.K, *Electrical Technology*, Nirja Contruction & Development Co.,Ltd, New Delhi 1994.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD ELECTRICAL SYSTEM.  
**CODE / SSC** : TKB210 / 2  
**TIME** : 1 X 120 MINUTE  
**MEETING TO-** : 4

### A. GOAL

#### 1. Goal of General Instructional :

The end of lecturing, expected a student will be able to plan the generator capacities by using principle of power management system.

#### 2. Goal of Particular Instructional :

Student will be able to explain the principle work and also explain kinds of - kinds of motor 1 phase and 3 phases and also exemplify its applying at least ship by 80 % is real correct.

### B. MAIN SUBJECT

AC motor system

### C. SUB OF MAIN SUBJECT

- Principle operation of AC motor system 1 phase and 3 phases
- Principle starter at AC motor system

### D. STUDY ACTIVITY

TAHAP	INSTRUCTOR ACTIVITY	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining previous meeting items</li> <li>• Explaining coverage of items of Meeting to 4</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	1. Explaining about : <ul style="list-style-type: none"> <li><input type="checkbox"/> Principle operation of AC motor system 1 phase and 3 phases</li> <li><input type="checkbox"/> Principle starter at AC motor system</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevation with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

### E. EVALUATE

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

**F. REFERANCE 1,4,7,8,9**

1. Anymous, *Diktat Tenaga Listrik*, FTK – ITS Surabaya. 2000.
3. **Kadir** A Prof Ir, *Mesin Arus Searah*, Djembatan Jakarta 1984.
4. \_\_\_\_\_, *Mesin Sinkron*, Djembatan Jakarta 1998.
9. Theraja B.L and Theraja A.K, *Electrical Technology*, Nirja Contruction & Development Co.,Ltd, New Delhi 1994.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD ELECTRICAL SYSTEM.  
**CODE / SSC** : TKB210 / 2  
**TIME** : 1 X 120 MINUTE  
**MEETING TO-** : 5

### A. GOAL

#### 1. Goal of General Instructional :

The end of lecturing, expected a student will be able to plan the generator capacities by using principle of power management system.

#### 2. Goal of Particular Instructional :

Student will be able to identify the construction of motor DC, elaborating it's operational and also exemplify its applying at least ship by 80 % is real correct.

### B. MAIN SUBJECT

DC motor system

### C. SUB OF MAIN SUBJECT

- DC motor system with free exiter
- DC motor system with self exiter
- Compount DC motor system

### D. STUDY ACTIVITY

TAHAP	INSTRUCTOR ACTIVITY	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining previous meeting items</li> <li>• Explaining coverage of items of Meeting to 5</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit</li> <li>• Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	1. Explaining about : <ul style="list-style-type: none"> <li><input type="checkbox"/> DC motor system with free exiter</li> <li><input type="checkbox"/> DC motor system with self exiter</li> <li><input type="checkbox"/> Compount DC motor system</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevantan with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

### E. EVALUATE

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

#### F. REFERANCE 1,3,4,9

1. Anymous, *Diktat Tenaga Listrik*, FTK – ITS Surabaya. 2000.
3. Kadir A Prof Ir, *Mesin Arus Searah*, Djembatan Jakarta 1984.
4. \_\_\_\_\_, *Mesin Sinkron*, Djembatan Jakarta 1998.
9. Theraja B.L and Theraja A.K, *Electrical Technology*, Nirja Contruction & Development Co.,Ltd, New Delhi 1994.



## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD ELECTRICAL SYSTEM.  
**CODE / SSC** : TKB210 / 2  
**TIME** : 1 X 120 MINUTE  
**MEETING TO-** : 6

### A. GOAL

#### 1. Goal of General Instructional :

The end of lecturing, expected a student will be able to plan the generator capacities by using principle of power management system.

#### 2. Goal of Particular Instructional :

Student will be able to calculate the electricity requirement for the lighting of on board at least by 80 % is real correct.

### B. MAIN SUBJECT

Calculation of lamp power.

### C. SUB OF MAIN SUBJECT

- Lamp type utilized in the ship.
- Standart illumination of light in the room of ship.
- Calculation of standart illumination of light in the room of ship.

### D. STUDY ACTIVITY

TAHAP	INSTRUCTOR ACTIVITY	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining previous meeting items</li> <li>• Explaining coverage of items of Meeting to 6</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	1. Explaining about : <ul style="list-style-type: none"> <li>□ Lamp type utilized in the ship.</li> <li>□ Standart illumination of light in the room of ship.</li> <li>□ Calculation of standart illumination of light in the room of ship</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevation with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

### E. EVALUATE

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

#### **F. REFERENCE 6,7,9**

6. Biro Klasifikasi Indonesia, Rules For Electrical Installation, Vol IV, BKI, Jakarta. 1996
7. Harrington L.R, Marine Engineering, The Society of Naval Architects and Marine Engineers, Jersey City 1992
9. Theraja B.L and Theraja A.K, Electrical Technology, Nirja Contruction & Development Co.,Ltd, New Delhi 1994.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD ELECTRICAL SYSTEM.  
**CODE / SSC** : TKB210 / 2  
**TIME** : 1 X 120 MINUTE  
**MEETING TO-** : 7

### A. GOAL

#### 1. Goal of General Instructional :

The end of lecturing, expected a student will be able to plan the generator capacities by using principle of power management system.

#### 2. Goal of Particular Instructional :

Student will be able to mention several of transformers and also explain the principle work the at least transformer by 80 % is real correct.

### B. MAIN SUBJECT

Trasformator type

### C. SUB OF MAIN SUBJECT

- Trasformator Step up
- Trasformator Step down

### D. STUDY ACTIVITY

TAHAP	INSTRUCTOR ACTIVITY	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining previous meeting items</li> <li>• Explaining coverage of items of Meeting to 7</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	1. Explaining about : <ul style="list-style-type: none"> <li>□ Trasformator Step up</li> <li>□ Trasformator Step down.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevantion with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

### E. EVALUATE

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

#### F. REFERANCE 1,9

1. Anymous, *Diktat Tenaga Listrik*, FTK – ITS Surabaya. 2000.
9. Theraja B.L and Theraja A.K, *Electrical Technology*, Nirja Contruction & Development Co.,Ltd, New Delhi 1994.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD ELECTRICAL SYSTEM.  
**CODE / SSC** : TKB210 / 3  
**TIME** : 1 X 120 MINUTE  
**MEETING TO-** : 8

### A. GOAL

#### 1. Goal of General Instructional :

The end of lecturing, expected a student will be able to plan the generator capacities by using principle of power management system.

#### 2. Goal of Particular Instructional :

Student will be able to identify the type and insulation of power cable and also exemplify its applying at least ship by 80 % is real correct.

### B. MAIN SUBJECT

Cable type and cable insulation

### C. SUB OF MAIN SUBJECT

- Type's of cable conection
- Type's of cable according to code
- Cable penetration to frame
- Type of insulation
- Type of cable insulation according to utilized room

### D. STUDY ACTIVITY

TAHAP	INSTRUCTOR ACTIVITY	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining previous meeting items</li> <li>• Explaining coverage of items of Meeting to 8</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	1. Explaining about : <ul style="list-style-type: none"> <li>□ Type's of cable conection</li> <li>□ Type's of cable according to code</li> <li>□ Cable penetration to frame</li> <li>□ Type of insulation</li> <li>□ Type of cable insulation according to utilized room.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevation with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

#### **E. EVALUATE**

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

#### **F. REFERANCE 6,7**

6. Biro Klasifikasi Indonesia, Rules For Electrical Installation, Vol IV, BKI, Jakarta. 1996
7. Harrington L.R, Marine Engineering, The Society of Naval Architects and Marine Engeneers, Jersey City 1992

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD ELECTRICAL SYSTEM.  
**CODE / SSC** : TKB210 / 2  
**TIME** : 1 X 120 MINUTE  
**MEETING TO-** : 9

### A. GOAL

#### 1. Goal of General Instructional :

The end of lecturing, expected a student will be able to plan the generator capacities by using principle of power management system.

#### 2. Goal of Particular Instructional :

Student will be able to explain the principle work the generator and identify the at least generator type by 80 % [is] real correct.

### B. MAIN SUBJECT

Generator AC

### C. SUB OF MAIN SUBJECT

- Type's of generator
- Asynchounous
- Synchounous
- Principle operation of generator
- Asynchounous
- Synchounous (self exiter dan outside exiter)

### D. STUDY ACTIVITY

TAHAP	INSTRUCTOR ACTIVITY	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining previous meeting items</li> <li>• Explaining coverage of items of Meeting to 9</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	1. Explaining about : <ul style="list-style-type: none"> <li><input type="checkbox"/> Type's of generator               <ul style="list-style-type: none"> <li>• Asynchounous</li> <li>• Synchounous</li> </ul> </li> <li><input type="checkbox"/> Principle operation of generator               <ul style="list-style-type: none"> <li>• Asynchounous</li> <li>• Synchounous (self exiter dan outside exiter)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumary the items which have been given.</li> <li>• Explaining relevation with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

## E. EVALUATE

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

## F. REFERANCE 1,4,7,8,9

1. **Anymous, *Diktat Tenaga Listrik, FTK – ITS Surabaya. 2000.***
4. \_\_\_\_\_, ***Mesin Sinkron***, Djembatan Jakarta 1998.
7. Harrington L.R, Marine Engineering, The Society of Naval Architects and Marine Engeneers, Jersey City 1992
8. Barber-Colman Co.Ltd, Application Information Pow-R-Con, (Online), (<http://www.dynaproducts.com>) 2002
9. Theraja B.L and Theraja A.K, Electrical Technology, Nirja Contruction & Development Co.,Ltd, iNew Delhi 1994.



## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD ELECTRICAL SYSTEM.  
**CODE / SSC** : TKB210 / 2  
**TIME** : 1 X 120 MINUTE  
**MEETING TO-** : 10

### A. GOAL

#### 1. Goal of General Instructional :

The end of lecturing, expected a student will be able to plan the generator capacities by using principle of power management system.

#### 2. Goal of Particular Instructional :

Student will be able to explain the principle operate for the parallel and calculate the load of parallel generator at least by 80 % is real correct.

### A. MAIN SUBJECT

Parallel and load calculated in generator parallel.

### B. SUB OF MAIN SUBJECT

- Generator parallel requirement
- Parallel principle's operation
- Parallel procedure and failure
- Automatic and manual parallel device
- Calculation of load division
- The effect of unbalanced load

### C. STUDY ACTIVITY

TAHAP	INSTRUCTOR ACTIVITY	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining previous meeting items</li> <li>• Explaining coverage of items of Meeting to 10</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit</li> <li>• Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	1. Explaining about : <ul style="list-style-type: none"> <li><input type="checkbox"/> Generator parallel requirement</li> <li><input type="checkbox"/> Parallel principle's operation</li> <li><input type="checkbox"/> Parallel prosedure</li> <li><input type="checkbox"/> Parallel failure</li> <li><input type="checkbox"/> Automatic and manual parallel device</li> <li><input type="checkbox"/> Calculation of load division</li> <li><input type="checkbox"/> The effect of unbalanced load</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevation with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> <li>• Opening conclusion from items which have been given.</li> </ul>	OHP, OHT and whiteboard

#### D. EVALUATE

Give student formative tes for know forwarding of materials course.

#### E. REFERANCE 1,4,5,7,8,9

1. Anymous, *Diklat Tenaga Listrik*, FTK – ITS Surabaya. 2000.
4. \_\_\_\_\_, *Mesin Sinkron*, Djembatan Jakarta 1998.
5. Hubert C I, *Preventive Maintenance of Electrical Equipment*, McGraw-Hill New York 1985.
7. Harrington L.R, *Marine Engineering*, The Society of Naval Architects and Marine Engeneers, Jersey City 1992
8. Barber-Colman Co.Ltd, *Application Information Pow-R-Con*, (Online), (<http://www.dynaproducts.com>) 2002
9. Theraja B.L and Theraja A.K, *Electrical Technology*, Nirja Contruction & Development Co.,Ltd, New Delhi 1994.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD ELECTRICAL SYSTEM.  
**CODE / SSC** : TKB210 / 2  
**TIME** : 1 X 120 MINUTE  
**MEETING TO-** : 11

### A. GOAL

#### 1. Goal of General Instructional :

The end of lecturing, expected a student will be able to plan the generator capacities by using principle of power management system.

#### 2. Goal of Particular Instructional :

Student will be able to plan the installation and calculate the variable electrics at machine - electric engine used in the ship at least by 80 % is real correct.

### B. MAIN SUBJECT

Instalation and load electrical component

### C. SUB OF MAIN SUBJECT

- Instalation
  - The master plan of drawing installation on 3 wire system and 1 wire system at the room and deck
  - The master plan of drawing installation on 3 wire system and 1 wire system at the all deck of ship
- load electrical component
  - Calculated of light load for each ship condition
  - Calculated of power load for each ship condition
  - Calculated of navigation system load for each ship condition

### D. STUDY ACTIVITY

TAHAP	INSTRUCTOR ACTIVITY	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining previous meeting items</li> <li>• Explaining coverage of items of Meeting to 11</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit</li> <li>• Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	1. Explaining about : <ul style="list-style-type: none"> <li>□ Instalation               <ul style="list-style-type: none"> <li>• The master plan of drawing installation on 3 wire system and 1 wire system at the room and deck</li> <li>• The master plan of drawing installation on 3 wire system and 1 wire system at the all deck of ship</li> </ul> </li> <li>□ Load electrical component               <ul style="list-style-type: none"> <li>• Calculated of light load for each ship condition</li> <li>• Calculated of power load for each ship</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

	condition • Calculated of navigation system load for each ship condition		
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevantior with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discsussion</li> <li>• Debriefing</li> <li>• Opening conclusion from items which have been given.</li> </ul>	OHP, OHT and whiteboard

#### E. EVALUATE

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

#### F. REFERANCE 6,7

6. Biro Klasifikasi Indonesia, Rules For Electrical Installation, Vol IV, BKI, Jakarta. 1996
7. Harrington L.R, Marine Engineering, The Society of Naval Architects and Marine Engeneers, Jersey City 1992.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD ELECTRICAL SYSTEM.  
**CODE / SSC** : TKB210 / 2  
**TIME** : 1 X 120 MINUTE  
**MEETING TO-** : 12

### A. GOAL

#### 1. Goal of General Instructional :

The end of lecturing, expected a student will be able to plan the generator capacities by using principle of power management system.

#### 2. Goal of Particular Instructional :

Student will be able to calculate the generator capacity in the ship at least by 80 % is real correct.

### B. MAIN SUBJECT

Load calculation

### C. SUB OF MAIN SUBJECT

Calculated all electrical load

- Sea going
- Manuver
- Anchoring
- Emergency

### D. STUDY ACTIVITY

TAHAP	INSTRUCTOR ACTIVITY	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining previous meeting items</li> <li>• Explaining coverage of items of Meeting to 12</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	1. Explaining about : Calculated all electrical load <input type="checkbox"/> Sea going <input type="checkbox"/> Manuver <input type="checkbox"/> Anchoring <input type="checkbox"/> Emergency	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevation with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> <li>• Opening conclusion from items which have been given.</li> </ul>	OHP, OHT and whiteboard

#### **E. EVALUATE**

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

#### **F. REFERANCE 6,7**

6. Biro Klasifikasi Indonesia, Rules For Electrical Instalation, Vol IV, BKI, Jakarta. 1996
7. Harrington L.R, Marine Engineering, The Society of Naval Architects and Marine Engeneers, Jersey City 1992

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SHIPBOARD ELECTRICAL SYSTEM.  
**CODE / SSC** : TKB210 / 2  
**TIME** : 1 X 120 MINUTE  
**MEETING TO-** : 13

### A. GOAL

#### 1. Goal of General Instructional :

The end of lecturing, expected a student will be able to plan the generator capacities by using principle of power management system.

#### 2. Goal of Particular instructional! :

Student will be able to plan the generator capacities in the ship at least ship by 80 % is real correct.

### B. MAIN SUBJECT

Capacities plan

### C. SUB OF MAIN SUBJECT

- Election of unit number main generator and emergency
- Election of capacity unit main generator and emergency
- Election of configurate generator capacity

### D. STUDY ACTIVITY

TAHAP	INSTRUCTOR ACTIVITY	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining previous meeting items</li> <li>• Explaining coverage of items of Meeting to 13</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	1. Explaining about : <ul style="list-style-type: none"> <li><input type="checkbox"/> Election of unit number main generator and emergency</li> <li><input type="checkbox"/> Election of capacity unit main generator and emergency</li> <li><input type="checkbox"/> Election of configurate generator capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevantion with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> <li>• Opening conclusion from items which have been given.</li> </ul>	OHP, OHT and whiteboard

### E. EVALUATE

Giving question or case study for the discussion of in small group and expostulated to know the understanding of student at items subject.

#### **F. REFERANCE 6,7**

6. Biro Klasifikasi Indonesia, Rules For Electrical Installation, Vol IV, BKI, Jakarta. 1996
7. Harrington L.R, Marine Engineering, The Society of Naval Architects and Marine Engeneers, Jersey City 1992



## LECTURING CONTRACT

<b>Course Name</b>	<b>: Shipboard Electrical System</b>
<b>Lecturer</b>	<b>: Eko Sasmito Hadi, ST, MT</b>
<b>Date and time</b>	<b>: Monday, 09.00 am – 11.30 am</b>
<b>Semester</b>	<b>: V (five)</b>
<b>Prerequisite</b>	<b>: 1. System of ship 2. Ship building Theory I and II</b>
<b>Place</b>	<b>: Room R. B105</b>

### 1. RELEVANCE

This course is benefit to a ship designer in planning totalize the electricity needed by ship in its operational and also can determine the level of generator capacities in ship economical operational by following principle's of power management system.

### 2. DESCRIPTION

Shipboard electrical system include the clarification of about all electrical load of exist in ship, passive load (DC) and also Active load (AC) of each ship condition. The Electrics load's also cover to the load for the navigation system, power system and lighting system. Others is also studied by problem of which deal with type cable of exist in ship, as according to classification. Expected in the end student can calculate and plan the generator capacities needed by ship.

### 3. GOAL OF GENERAL INSTRUCTIONAL

The end of lecturing, expected a student will be able to plan the generator capacities by using principle of power management system.

#### 4. LECTURING STRATEGY

Lecturing method in this course is discourse, discussion and team-work. For the special topic or certain topic, student will be asked to presented result of team-work and discussion together.

#### 5. LITERATURE AND STUDY MATERIAL

1. Anymous, *Diktat Tenaga Listrik*, FTK – ITS Surabaya. 2000.
2. , *Diktat Induksi dan Induktansi*, FTK – ITS Surabaya 2000.
3. Kadir A Prof Ir, *Mesin Arus Searah*, Djembatan Jakarta 1984.
4. , *Mesin Sinkron*, Djembatan Jakarta 1998.
5. Hubert C I, *Preventive Maintenance of Electrical Equipment*, McGraw-Hill New York 1985.
6. Biro Klasifikasi Indonesia, *Rules For Electrical Installation*, Vol IV, BKI, Jakarta. 1996
7. Harrington L.R, *Marine Engineering*, The Society of Naval Architects and Marine Engeneers, Jersey City 1992
8. Barber-Colman Co.Ltd, *Application Information Pow-R-Con*, (Online), (<http://www.dynaproducts.com>) 2005
9. Theraja B.L and Theraja A.K, *Electrical Technology*, Nirja Contruction & Development

#### 6. ASSIGNMENT

1. Each literature in the course should have been read before attend the lecture.
2. Middle evaluation of semester will be executed at week 8. Evaluation will use the form of essay and choice.
3. For the fundamental of discussion needing deeper emphasis of matter analyze needed by discussion with the problem or occurrence which is often met in field.

## 7. ASSESSMENT CRITERION

Assessment conducted by instructor by using the following criteria:

Value		Range
By Letter	By Number	
A	4	$\geq 80$
AB	3,5	79 – 75
B	3	74 – 69
BC	2,5	68 – 63
C	2	62 – 57
CD	1,5	56 – 51
D	1	50 – 45
E	0	$\leq 44$

To determine the final value is the following criterion,

- presence 10 %
- assignment 20 %
- Middle semester evaluation 30 %
- Final semester evaluation 30 %
- Being active in discussion 10 %

## 8. LECTURING SCHEDULE

Week	Topic of Discussion	Reference
1 and 2	The DC and AC Circuit.	<ol style="list-style-type: none"><li>1. Anymous, <i>Diktat Tenaga Listrik</i>, FTK – ITS Surabaya. 2000.</li><li>2. , <i>Diktat Induksi dan Induktansi</i>, FTK – ITS Surabaya 2000.</li><li>3. Kadir A Prof Ir, <i>Mesin Arus Searah</i>, Djembatan Jakarta 1984.</li><li>4. , <i>Mesin Sinkron</i>, Djembatan Jakarta 1998.</li><li>5. <i>Hubert C I, Preventive Maintenance of</i></li></ol>

		<p><i>Electrical Equipment</i>, McGraw-Hill New York 1985.</p> <p>6. <i>Biro Klasifikasi Indonesia, Rules For Electrical Installation</i>, Vol IV, BKI, Jakarta. 1996</p> <p>7. <i>Harrington L.R, Marine Engineering</i>, The Society of Naval Architects and Marine Engineers, Jersey City 1992</p> <p>8. <i>Barber-Colman Co.Ltd, Application Information Pow-R-Con</i>, (Online), (<a href="http://www.dynaproducts.com">http://www.dynaproducts.com</a>) 2005</p> <p>9. Theraja B.L and Theraja A.K, <i>Electrical Technology</i>, Nirja Construction &amp; Development</p>
3	Asynchronous Motor and Synchronous motor.	1,3,4,9
4 and 5	The DC Motor and AC motor	1,3,4,9
6	Determine of lighting power system	6,7,9
7	Transformator	1,9
8	<b>Middle test of semester</b>	
9	Cable and isolation	6,7
10	Generator AC	1,4,7,8,9
11	The parallel and determine parallel load generator	1,4,5,7,8,9
12	The installation and electrical load	6,7
13	Determine load	6,7
14	Capacity planning of generator at the ship	6,7
15	<b>Final test of Semester</b>	

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SYSTEM INFORMATION TECHNOLOGY.  
**CODE / SSC** : TKB214 / 2  
**TIME** : 1 X 120 MINUTE  
**MEETING TO-** : 1

### A. GOAL

#### 1. Goal of General Instructional:

By the end of lecturing, expected by a student will be able to comprehend and Technological application of system information of pursuant to simple data base, in life one day - day and also at development and ship operation.

#### 2. Goal of Particular Instructional:

Student will be able to comprehend entire this items course coverage at least by 80 % is real correct.

### B. MAIN SUBJECT

Explain of about all items coverage

### C. SUB of MAIN SUBJECT

Explain of about all items coverage

### D. STUDY ACTIVITY

Level	Instructor activity	Student Activity	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GGI and GPI</li> <li>• Explaining coverage of meeting items of first</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	Explain of about all items coverage	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevantion with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

### E. EVALUATE

To give question or case study for the discussion to know the student understanding of at coverage of items course material.

### F. REFERANCE (1,2)

1. Fathansyah, Ir. **Basis data**, Penerbit Informatika Bandung 1999
2. Burch John G at all, **Information System: Theory and Practice 3<sup>rd</sup> Edition**, John Willy & Son. New York.1983

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SYSTEM INFORMATION TECHNOLOGY.  
**CODE / SSC** : TKB214 / 2  
**TIME** : 1 X 120 MINUTE  
**MEETING TO-** : 2

### A. GOAL

#### 1. Goal of General Instructional :

By the end of lecturing, expected by a student will be able to comprehend and Technological application of system information of pursuant to simple data base, in life one day - day and also at development and ship operation.

#### 2. Goal of Particular Instructional:

Student will be able to explain the computer and its development at least 80 % truly.

### B. MAIN SUBJECT

Computer introduction and Development

#### SUB MAIN SUBJECT

- Computer component
- Procescor Development.

### C. STUDY ACTIVITY

LEVEL	INSTRUCTOR ACTIVITY	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GGI and GPI</li> <li>• Explaining coverage of meeting items of 2</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	Explain of about <ul style="list-style-type: none"> <li>• Computer component</li> <li>• Procescor Development</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevantion with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

### D. EVALUATE

To give question or case study for the discussion to know the student understanding of at coverage of items course material.

### E. REFERANCE (3)

3. Computer Associates, *OpenIngres: System Reference Guide*, Computer Associates International, New York, 2004.

## UNIT OF PROSEDURAL STUDY

COURSE NAME : SYSTEM INFORMATION TECHNOLOGY.  
KODE MATA KULIAH / SKS : TKB214 / 2  
TIME : 1 X 120 MINUTE  
MEETING TO- : 3

### A. TUJUAN

#### 1. Goal of General Instructional :

By the end of lecturing, expected by a student will be able to comprehend and Technological application of system information of pursuant to simple data base, in life one day - day and also at development and ship operation.

#### 2. Goal of Particular Instructional:

Student will be able to explain the at least concept system information 80 % truly

### B. MAIN SUBJECT

Information system concept

#### SUB MAIN SUBJECT

- Information and data
- System concept
- Development of Information system.

### C. STUDY ACTIVITY

LEVEL	INSTRUCTOR ACTIVITYAN	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"><li>• Explaining interest of GGI and GPI</li><li>• Expiaining coverage of meeting items of 3 th</li></ul>	<ul style="list-style-type: none"><li>• Stargazing</li><li>• Submit Question.</li></ul>	OHP, OHT and whiteboard
Presentation	Explain of about <ul style="list-style-type: none"><li>• Information and data</li><li>• System concept</li><li>• Development of Information system</li></ul>	<ul style="list-style-type: none"><li>• Stargazing</li><li>• Discussion</li><li>• Debriefing</li></ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"><li>• Giving question as feed back what have been learned at this session.</li><li>• Sumarry the items which have been given.</li><li>• Explaining relevantion with the items to be given here in after.</li></ul>	<ul style="list-style-type: none"><li>• Stargazing</li><li>• Discussion</li><li>• Debriefing</li></ul>	OHP, OHT and whiteboard

### D. EVALUATE

To give question or case study for the discussion to know the student understanding of at coverage of items course material.

**E. REFERANCE (2,4)**

2. Burch John G at all, *Information System: Theory and Practice 3<sup>rd</sup> Edition*, John Willy & Son. New York.1983.
4. C.J. Date, *An Introduction to database System*, Addison-Wesley. Reading MA, 1995.



## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SYSTEM INFORMATION TECHNOLOGY.  
**CODE / SSC** : TKB214 / 2  
**TIME** : 2 X 120 MENIT  
**MEETING TO-** : 4 dan 5

### A. TUJUAN

#### 1. Goal of General Instructional :

By the end of lecturing, expected by a student will be able to comprehend and Technological application of system information of pursuant to simple data base, in life one day - day and also at development and ship operation.

#### 2. Goal of Particular Instructional:

Student will be able to identify and comprehend the Data of Processing Resource at least by 80 % is real correct.

### B. MAIN SUBJECT

Data Processing Resource

#### SUB MAIN SUBJECT

- Data processing resource
- Organizing Data processing resource
- Selecting Data processing resource

### C. STUDY ACTIVITY

LEVEL	INSTRUCTOR ACTIVITYAN	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of CGI and GPI</li> <li>• Explaining coverage of meeting items of 4 and 5</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	Explain of about <ul style="list-style-type: none"> <li>• Data processing resource</li> <li>• Organizing Data processing resource</li> <li>• Selecting Data processing resource</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevation with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

### D. EVALUATE

To give question or case study for the discussion to know the student understanding of at coverage of items course material.

**E. REFERANCE (2,4)**

2. Burch John G at all, *Information System: Theory and Practice 3<sup>rd</sup> Edition*, John Willy & Son. New York.1983.
4. C.J. Date, *An Introduction to database System*, Addison-Wesley. Reading MA, 1995.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SYSTEM INFORMATION TECHNOLOGY.  
**CODE / SSC** : TKB214 / 2  
**TIME** : 1 X 120 MINUTE  
**MEETING TO-** : 6

### A. TUJUAN

#### 1. Goal of General Instructional :

By the end of lecturing, expected by a student will be able to comprehend and Technological application of system information of pursuant to simple data base, in life one day - day and also at deveiopment and ship operation.

#### 2. Goal of Particular Instructional:

Student will be able to comprehend the at least data bases by 80 % is real correct.

### B. MAIN SUBJECT

Database

#### SUB MAIN SUBJECT

- Database operation
- Objective database
- Database application

### C. STUDY ACTIVITY

LEVEL	INSTRUCTOR ACTIVITYAN	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"><li>• Explaining interest of GGI and GPI</li><li>• Explaining coverage of meeting items of 6</li></ul>	<ul style="list-style-type: none"><li>• Stargazing</li><li>• Submit Question.</li></ul>	OHP, OHT and whiteboard
Presentation	Explain of about <ul style="list-style-type: none"><li>• Database operation</li><li>• Objective basis data</li><li>• Database application</li></ul>	<ul style="list-style-type: none"><li>• Stargazing</li><li>• Discussion</li><li>• Debriefing</li></ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"><li>• Giving question as feed back what have been learned at this session.</li><li>• Sumarry the items which have been given.</li><li>• Explaining relevantion with the items to be given here in after.</li></ul>	<ul style="list-style-type: none"><li>• Stargazing</li><li>• Discussion</li><li>• Debriefing</li></ul>	OHP, OHT and whiteboard

### D. EVALUATE

To give question or case study for the discussion to know the student understanding of at coverage of items course material.

**E. REFERANCE (1,2)**

1. Fathansyah, Ir. **Basis data**, Penerbit Informatika Bandung 1999.
2. Burch John G at all, **Information System: Theory and Practice 3<sup>rd</sup> Edition**, John Willy & Son. New York.1983.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SYSTEM INFORMATION TECHNOLOGY.  
**CODE / SSC** : TKB214 / 2  
**TIME** : 1 X 120 MINUTE  
**MEETING TO-** : 7

### A. TUJUAN

#### 1. Goal of General Instructional :

By the end of lecturing, expected by a student will be able to comprehend and Technological application of system information of pursuant to simple data base, in life one day - day and also at development and ship operation.

#### 2. Goal of Particular Instructional:

Student will be able to explain about system data bases at least by 80 % is real correct

### B. MAIN SUBJECT

Database system

#### SUB MAIN SUBJECT

- Database component
- Data abstraction
- Database language
- System structure

### C. STUDY ACTIVITY

LEVEL	INSTRUCTOR ACTIVITYAN	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GGI and GPI</li> <li>• Explaining coverage of meeting items of 7</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit</li> <li>• Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	Explain of about <ul style="list-style-type: none"> <li>• Database component</li> <li>• Data abstraction</li> <li>• Database language</li> <li>• System structure</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevation with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

### D. EVALUATE

To give question or case study for the discussion to know the student understanding of at coverage of items course material.

**E. REFERANCE (1,2)**

1. Fathansyah, Ir. **Basis data**, Penerbit Informatika Bandung 1999.
2. Burch John G at all, **Information System: Theory and Practice 3<sup>rd</sup> Edition**, John Willy & Son. New York.1983.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SYSTEM INFORMATION TECHNOLOGY.  
**CODE / SSC** : TKB214 / 2  
**TIME** : 2 X 120 MENIT  
**MEETING TO-** : 9 dan 10

### A. TUJUAN

#### 1. Goal of General Instructional :

By the end of lecturing, expected by a student will be able to comprehend and Technological application of system information of pursuant to simple data base, in life one day - day and also at development and ship operation.

#### 2. Goal of Particular Instructional:

Student will be able to explain about Bases of data relational at least by 80 % is real correct

### B. MAIN SUBJECT

Database relational

#### SUB MAIN SUBJECT

- Database language and operation
- Table relation

### C. STUDY ACTIVITY

LEVEL	INSTRUC FOR ACTIVITYAN	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GGI and GPI</li> <li>• Explaining coverage of meeting items of 9 and 10</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	Explain of about <ul style="list-style-type: none"> <li>• Database language and operation</li> <li>• Table relation</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Disccussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevation with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Disccussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

### D. EVALUATE

To give question or case study for the discussion to know the student understanding of at coverage of items course material.

**E. REFERENCE (1,2,5)**

1. Fathansyah, Ir. **Basis data**, Penerbit Informatika Bandung 1999.
2. Burch John G at all, **Information System: Theory and Practice 3<sup>rd</sup> Edition**, John Willy & Son. New York.1983.
5. G. Wiederhold, **Database Design**, Second Edition, McGraw-Hill, New York, 1983



## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SYSTEM INFORMATION TECHNOLOGY.  
**CODE / SSC** : TKB214 / 2  
**TIME** : 2 X 120 MENIT  
**MEETING TO-** : 11 dan 12

### A. TUJUAN

#### 1. Goal of General Instructional :

By the end of lecturing, expected by a student will be able to comprehend and Technological application of system information of pursuant to simple data base, in life one day - day and also at development and ship operation.

#### 2. Goal of Particular Instructional:

Student will be able to explain about data normalization at least by 80 % is real correct

### B. MAIN SUBJECT

Normalization data

#### SUB MAIN SUBJECT

- Attribut table
- Domain and data type
- Normalization data

### C. STUDY ACTIVITY

LEVEL	INSTRUCTOR ACTIVITYAN	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GGI and GPI</li> <li>• Explaining coverage of meeting itens of 11 and 12</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	Explain of about <ul style="list-style-type: none"> <li>• Attribut table</li> <li>• Domain and data type</li> <li>• Normalization data</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevantion with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

### D. EVALUATE

To give question or case study for the discussion to know the student understanding of at coverage of itens course material.

**E. REFERANCE (1,2,5)**

1. Fathansyah, Ir. **Basis data**, Penerbit Informatika Bandung 1999.
2. Burch John G at all, **Information System: Theory and Practice 3<sup>d</sup> Edition**, John Willy & Son. New York.1983.
5. G. Wiederhold, **Database Design**, Second Edition, McGraw-Hill, New York, 1983.

## UNIT OF PROSEDURAL STUDY

**COURSE NAME** : SYSTEM INFORMATION TECHNOLOGY.  
**CODE / SSC** : TKB214 / 2  
**TIME** : 2 X 120 MENIT  
**MEETING TO-** : 13 dan 14

### A. TUJUAN

#### 1. Goal of General Instructional :

By the end of lecturing, expected by a student will be able to comprehend and Technological application of system information of pursuant to simple data base, in life one day - day and also at development and ship operation.

#### 2. Goal of Particular Instructional:

Student will be able to explain and application about data model at least by 80 % is real correct.

### B. MAIN SUBJECT

Model data

#### SUB MAIN SUBJECT

- Model entity-Relationship
- Diagram Entity-Relationship
- Varian entitas
- Varian relation
- Spesialization and generalisation
- Agregation

### C. STUDY ACTIVITY

LEVEL	INSTRUCTOR ACTIVITYAN	STUDENT ACTIVITY	MEDIA
Introduction	<ul style="list-style-type: none"> <li>• Explaining interest of GGI and GPI</li> <li>• Explaining coverage of meeting items of 13 and 14</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Submit</li> <li>• Question.</li> </ul>	OHP, OHT and whiteboard
Presentation	Explain of about <ul style="list-style-type: none"> <li>• Model entity-Relationship</li> <li>• Diagram Entity-Relationship</li> <li>• Varian entitas</li> <li>• Varian relation</li> <li>• Spesialization and generalisation</li> <li>• Agregation</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard
Covering	<ul style="list-style-type: none"> <li>• Giving question as feed back what have been learned at this session.</li> <li>• Sumarry the items which have been given.</li> <li>• Explaining relevanton with the items to be given here in after.</li> </ul>	<ul style="list-style-type: none"> <li>• Stargazing</li> <li>• Discussion</li> <li>• Debriefing</li> </ul>	OHP, OHT and whiteboard

#### **D. EVALUATE**

To give question or case study for the discussion to know the student understanding of at coverage of items course material.

#### **E. REFERANCE (1,2,5)**

1. Fathansyah, Ir. **Basis data**, Penerbit Informatika Bandung 1999.
2. Burch John G at all, **Information System: Theory and Practice 3<sup>rd</sup> Edition**, John Willy & Son. New York.1983.
5. G. Wiederhold, **Database Design**, Second Edition, McGraw-Hill, New York, 1983.

## LECTURING CONTRACT

**Course Name** : System Information Technology  
**Lecturer** : Eko Sasmito Hadi, ST, MT  
**Date and time** : Monday, 09.00 – 11.30  
**Semester** : I  
**Place** : R. B105 Room

### 1. RELEVANCE

This Lecturing items is very be of benefit to a ship designer in development a system information needed in supporting planning design of ship in shipyard.

### 2. DESCRIPTION

Technology of Information System represents the study including about technology of system information at wearer in course of development and ship operation. Covering form of modern structure system information is which is pursuant to data bases. Expected in the end student get comprehend and application of system information in development and ship operation.

### 3. GOAL OF GENERAL INSTRUCTIONAL

By the end of lecturing, expected by a student will be able to comprehend and Technological application of system information of pursuant to simple data base, in life one dr-y - day and also at development and ship operation

### 5. LECTURING STRATEGY

Method of lecturing in this course is discourse, discussion and team-work. To this topic of certain topic of student will be asked to present result of team-work and studied with together.

## 6. LITERATURE STUDY.

1. Fathansyah, Ir. **Basis data**, Penerbit Informatika Bandung 1999.
2. Burch John G at all, **Information System: Theory and Practice 3<sup>rd</sup> Edition**, John Willy & Son. New York.1983.
3. Computer Associates, **OpenIngres: System Reference Guide**, Computer Associates International, New York, 2004.
4. C.J. Date, **An Introduction to database System**, Addison-Wesley. Reading MA, 1995.
5. G. Wiederhold, **Database Design**, Second Edition, McGraw-Hill, New York, 1983.

## 7. ASSIGNMENT

1. Each literature in the course should have been read before attend the lecture.
2. Middle evaluation of semester will be executed at week 8. Evaluation will use the form of essay and choice.
3. For the fundamental of discussion needing deeper emphasis of matter analyze needed by discussion with the problem or occurrence which is often met in field.

## 8. ASSESSMENT CRITERION.

Assessment conducted by instructor by using the following criteria:

Value	Point	Range
By Letter	By number	
A	4	$\geq 80$
AB	3,5	79 – 75
B	3	74 – 69
BC	2,5	68 – 63

C	2	62 – 57
CD	1,5	56 – 51
D	1	50 – 45
E	0	≤ 44

To determine the final value is the following criterion,

- presence 10 %
- assignment 20 %
- Middle semester evaluation 30 %
- Final semester evaluation 30 %
- Being active in discussion 10 %

## 9. LECTURING SCHEDULE

Week	Topic of Discussion	Reference
1	Items coverage	1,2
2	Introduction of computer and development	3
3	Information system concept	2,4
4 and 5	Data Processing Resource	2,4
6	Database	1,2
7	System of database	1,2
8	<b>Middle test of semester</b>	
9 and 10	Relational of database	1,2,5
11 and 12	Normalizes Data	1,2,5
13 and 14	Model data	1,2,5
15	<b>Final test of Semester</b>	

## Fundamental Outline of Study

- Name of course** : System Information Technology.
- Code/ SCS** : TKB214 / 2
- Semester** : I (first)
- Description** : Technology of Information System represents the study including about technology of system information at wearer in course of development and ship operation. Covering form of modern structure system information is which is pursuant to data bases. Expected in the end of study, student get comprehend and application of system information in development and ship operation.
- GGI** : By the end of lecturing, expected by a student will be able to comprehend and Technological application of system information of pursuant to simple data base, in life one day - day and also at development and ship operation
- Referance** : 1. Fathansyah, Ir. **Basis data**, Penerbit Informatika Bandung 1999
2. Burch John G at all, **Information System: Theory and Practice 3<sup>rd</sup> Edition**, John Willy & Son. New York.1983.
3. Computer Associates, **OpenIngres: System Reference Guide**, Computer Associates International, New York, 2004.
4. C.J. Date, **An Introduction to database System**, Addison-Wesley. Reading MA, 1995.
5. G. Wiederhold, **Database Design**, Second Edition, McGraw-Hill, New York, 1983.



No	Goal of Particular Instructional	Main Subject	Sub of main subject	Time Est.	Ref.
1	Student will be able to comprehend entire this items course coverage at least by 80 % is real correct.	All items coverage		120 Minute	1,2
2	Student will be able to explain the computer and its development at least 80 % truly.	Computer Introduction and Development	- Computer component - Processor Development	1 x 120 minute	3
3	Student will be able to explain the at least concept system information 80 % truly.	Information system concept	- Information and data - System concept - Development of Information system	1 x 120 minute	2,4
4	Student will be able to identify and comprehend the Data of Processing Resource at least by 80 % is real correct.	Data Processing Resource	- Data processing resource - Organizing Data processing resource - Selecting Data processing resource	2 x 120 minute	2,4
5	Student will be able to comprehend the at least data bases by 80 % is real correct.	Basis data	- Database operation - Objective basis data - Database application	1 x 120 minute	1,2
6	Student will be able to explain about system data bases at least by 80 % is real correct	Sistem basis data	- Database component - Data abstraction - Database language - System structure	1 x 120 minute	1,2
7	Student will be able to explain about Bases of data relational at least by 80 % is real correct	Basis data relational	- Database language and operation - Table relation	2 x 120 minute	1,2, 5
8	Student will be able to explain about data normalization at least by 80 % is real correct	Normalisasi Data	- Attribut table - Domain and data type - Normalization data	2 x 120 minute	1,2, 5
9	Student will be able to explain and application about data model at least by 80 % is real correct.	Model data	- Model entity-Relationship - Diagram Entity-Relationship - Varian entitas - Specialization and generalisation - Agregation	2 x 120 minute	1,2, 5