


## **SYLLABUS**

### **TLI 564 Infrastruktur Air Minum dan Sanitasi Daerah Rawan Bencana (Water Supply and Sanitation Infrastructure in Disaster-Prone Areas)**

**Lecturers:  
Dr. Eng. Denny Helard  
Dr. Puti Sri Komala  
Dr. Eng. Slamet Raharjo**

**MASTER STUDY PROGRAM OF ENVIRONMENTAL ENGINEERING  
FACULTY OF ENGINEERING  
UNIVERSITAS ANDALAS  
2020**

	<b>SYLLABUS SEMESTER</b>	No.Dok : .....
	<b>(TLI 564 Water Supply and Sanitation Infrastructure in Disaster-Prone Areas)</b>	Revisi : .....
		Tanggal : June 2020 Halaman:
Completed by:  Dr. Eng. Slamet Raharjo, ST., M.Eng. NIP 197509112005011003	Checked by:  Reri Afrianita, MT NIP. 197704172006042002	Approved by:  Dr.Eng Zulkarnaini NIP 198004212009121003
Lecturer	Head of QC	Head of Master Study Program
<p><b>1. Lecture Information</b></p> <p>Study Program Name : Environmental Sanitation Infrastructure  Lecture Name : Water Supply and Sanitation Infrastructure in Disaster-Prone Areas  Lecture Code : TLI 564  Category : Required Study Program  Unit : 3 units</p>		

Year	: Year 1
Semester	: 1 (one)
Prasyarat	: -
Status (required/elective)	: Required
Lecturers	: Dr. Eng. Denny Helard Dr. Puti Sri Komala Dr. Eng. Slamet Raharjo

## **2. Description of Lecture**

The aim of this module is to provide guidance and tools to prepare for deployment to emergency responses in a WASH (Wash, Sanitation, and Hygiene) role, with a focus on sanitation. It will ensure an understanding of the interdisciplinary humanitarian action.

## **3. Learning Achievement of Study Program**

- Mastering the theory of engineering science, design engineering, methods and the latest techniques needed for the analysis and design of environmental management efforts;
- Mastering the contextual and current interdisciplinary approach related to the design of integrated environmental management systems.
- Able to solve engineering and technological problems and design systems, processes and components in environmental management efforts including management of drinking water, wastewater, solid waste, settlement drainage, liquid, solid and gas waste control systems, air pollution control and occupational health and safety (OHS) by utilizing other fields of science (if needed) and taking into account economic, health and public safety, cultural, social and environmental factors;

## **4. Learning Achievement of Lecture**

1. Describe the history of humanitarian aid, key elements of the legal context and key sectors of humanitarian assistance, and apply humanitarian principles and work within the framework and coordination of humanitarian assistance;
2. Describe the stages of humanitarian aid and recognise the main actors of the international relief system and their respective mandates;
3. Explain the key environmental sanitation needs and approaches common in emergency situations;
4. Compare the suitability of different technical options depending on the phase of emergency and variety of practical settings, adjusting to time and resources available;
5. To implement a specific sanitation solution;
6. Plan, implement and monitor a sanitation response to a disaster situation;
7. Integrate and apply the theory in a case scenario

## **5. Description of Lesson Plan**

Week	Indicator of Learning Achievements of Subjects	Topics	Method of Learning	Course Time	Assignment and Evaluation	Reference
1	<ul style="list-style-type: none"> <li>To be able to explain about the key elements of the term humanitarianism, key events that have impacted humanitarian action, the main humanitarian principles, examples of the possible negative impact humanitarian aid</li> </ul>	Humanitarianism; History of humanitarian action; Humanitarian principles & dilemma's; Principle of 'doing no harm',	Lecture and discussion	2x50 minutes	Work individual and/ in groups	
2	<ul style="list-style-type: none"> <li>To be able to overview of the international legal framework (Refugee law, International Humanitarian Law-IHL, International Disaster Relief Law-IDRL), code of conduct and guiding principles of humanitarian action;</li> </ul>	The legal framework; International Relief System; Key actors in humanitarian relief; code of conduct and guiding principles of humanitarian action	Lecture and discussion	2x50 minutes	Work individual and/ in groups	
3	<ul style="list-style-type: none"> <li>To be able to explain standards applied by relief agencies and global cluster, Sphere, WASH cluster</li> </ul>	Humanitarian contexts; Humanitarian reform and standards; Cluster approach	Lecture and discussion	2x50 minutes	Work individual and/ in groups	
4	<ul style="list-style-type: none"> <li>To be able to explain disaster cycle, risk reduction/ response/ recovery/ development, emergency response phases.</li> <li>To be able to overview of relief organizations, their mandates, their commitments and priorities in emergencies.</li> </ul>	Emergency response phases and relief organizations and mandates; type disaster, risk analysis and disaster vulnerability.	Lecture and discussion	2x50 minutes	Work individual and/ in groups	
5		Post-Disaster Waste Management in Developing Countries	Lecture and discussion	2x50 minutes	Work individual and/ in groups	
6	<ul style="list-style-type: none"> <li>To be able to explain about WASH (Wash, Sanitation, and Hygiene) and SPHERE.</li> </ul>	Introduction to the WASH cluster; SPHERE handbook; Standar Minimum (WASH)	Lecture and discussion	2x50 minutes	Work individual and/ in groups	

Week	Indicator of Learning Achievements of Subjects	Topics	Method of Learning	Course Time	Assignment and Evaluation	Reference
		(Water and Sanitation Standards in Humanitarian Action) dan SPHERE				
7	<ul style="list-style-type: none"> <li>To be able to select vector control and surface water drainage</li> </ul>	Sanitation-related diseases in emergencies; Communicable disease control in emergencies; Pedoman dan aplikasi sanitasi air limbah di daerah bencana Sanitation System Template and Technology Selection.	Lecture and discussion	2x50 minutes	Work individual and/ in groups	
8	Mid-term Examination					
9	<ul style="list-style-type: none"> <li>To be able to select options for the provision safe excreta disposal</li> </ul>	Excreta management in emergencies; Technical options for excreta disposal in emergencies; Aplikasi ECOSAN	Lecture and discussion	2x50 minutes	Work individual and/ in groups	
10	<ul style="list-style-type: none"> <li>To be able to select optionsolid waste management in emergencies</li> </ul>	Solid waste management in emergencies	Lecture and discussion	2x50 minutes	Work individual and/ in groups	
11	<ul style="list-style-type: none"> <li>To be able to arrange a development of a sanitation plan for a specific situation including budgeting (contingency planning, acquisition, management, use of information for decision making, monitoring and reporting)</li> </ul>	Sanitation planning; Design criteria for water supply infrastructure planning; component analysis in water supply technology (simple/appropriate)	Lecture and discussion	2x50 minutes	Work individual and/ in groups	

Week	Indicator of Learning Achievements of Subjects	Topics	Method of Learning	Course Time	Assignment and Evaluation	Reference
12		City planning analysis for water supply infrastructure design; Water supply planning in emergencies.	Lecture and discussion	2x50 minutes	Work individual and/ in groups	
13		Contingency Planning of Disaster Waste Management (DWM) in Developing Countries.	Lecture and discussion	2x50 minutes	Work individual and/ in groups	
14, 15	<ul style="list-style-type: none"> <li>• To be able to understand complexity of sanitation plan, including understanding principle of Sanitation safety planning, key stakeholder analyses, environmental and cultural consideration</li> <li>• To be able to draft sanitation plan for an emergency setting, three different settings will be discussed</li> <li>• To be able to conduct evaluation on some case studies on different stakeholders in a humanitarian emergency context</li> <li>• To be able to explain an example about humanitarian organizations adapting their practices (and responses) to the local context (local resources, local practices, etc.)</li> <li>• To be able to explain applied approaches bringing theory into practice (good and bad experiences, lessons learnt)</li> </ul>	Evaluation on existing condition and development of sanitation plan for Sanitation-related diseases in emergencies, excreta management in emergencies, solid waste management in emergencies/Disaster Waste Management (DWM)	Lecture and discussion	4x50 minutes	Report of case study in local city	
16	Final Examination					

## 6. References

1. Robert Gensch (GTO), Amy Jennings (BORDA), Samuel Renggli (Eawag), Philippe Reymond (Eawag), “Compendium of Sanitation Technologies in Emergencies”, German WASH Network
2. The Sphere Handbook, Sphere 2018 Edition
3. Natural Disaster Mitigation in Drinking Water and Sewerage Systems, WHO, Washington D.C., 1998.
4. Risk Management of Water Supply and Sanitation Systems, Hlavinek, P., Popovska, C., Marsalek, J., Mahrikova, I., Kukharchyk, T., Springer, 2008.
5. The Challenge in Disaster Reduction for the Water and Sanitation Sector, PAHO, Washington D.C., 2006.
6. Handbook on Climate Change and Disaster Resilient Water, Sanitation and Hygiene Practices, WaterAid, 2012.
7. Disaster Waste Management (DWM) Guideline for Asia and the Pacific, Ministry of The Environment, Government of Japan
8. Disaster Waste Management Mechanism, A Practical Guide for Construction and Demolition Wastes in Indonesia, UNEP, 2008
9. Evaluation of Disaster Resilience on Waste Management in Developing Countries, Kyushu University International Repository, 2015
10. Other related scientific articles

## **7. Annex**

Scoring Instrument: Mid-term examination : 35%; Final Examination: 35%; Assignment: 30%