INFRASTRUCTURE ENGINEERING SEMESTER 1 - COURSE BASED

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INTRODUCTION

In this course students will learn about Infrastructure engineering basics.

The *Infrastructure Engineering Orientation* (IE-O) is the basic course for the ICT & Infrastructure profile in the first semester.

All students of first semester must follow this course for duration of 12 weeks. Every week has a new theory and a practical assignment. The topics of each week are sequentially connected and must be completed in order. Focus in this course is on introduction to computers and computer networks and information about hardware and software used in the different sized organisations.

Students will learn about computer architecture, introduced to different numeric systems and how to convert them, Operating systems and their relation to hardware, Version control system that is a common tool in software development, Network basics such as LANs and TCP/IP Network layers Model. They will learn how devices within a LAN communicate with each other and also they will learn about different protocols.

After this course students will achieve the orientation level means they can select ICT & Infrastructure for their study profile. And if so, they will study ICT & Infrastructure course for duration of 6 weeks to learn more in dept about this field.

LEARNING OUTCOMES

Orientation

- You create and show a (at least web) service that is functioning and reachable from within the network (LAN)
- You show basic understanding of client-server communication
- You can apply Hardware Virtualisation Techniques
- You take into account basic security settings of components
- You are able to create a simple network drawing

LEARNING TASKS

Orientation

students can explain what is Infrastructure engineering

students can identify different hardware components and explain their usage

students will know about different numeric system (B, SB, HX, D) and can convert them to each other

students will perform simple summation in Binary and can evaluate the result

students can explain the different types of memory and their usage;

students can convert and operate simple mathematics on Signed Binary.

students will know about operating system and its tasks

students will install and use Linux Operating system

students know what is a Version Control System

students will be capable of using GIT to collaborate on a project

students can explain the network layered model (TCP/IP) with their context of operation

students will be able to create LANs and setup to to be able to communicate

students will know about class-full and class-less IP addressing and can setup LANs

student can draw simple Network drawing

students know TCP and UDP protocols and can explain their differences

students are able to setup a virtual environment

students will be able to use a device as data source and store it's data via wireless

students will setup a web server and host a single page website

WEEKLY PLANNING

W	Topics	Deliverables	Method	
1	Introduction to infrastructure & Computer's architecture(Von Neumann architecture CPU, GPU and MB)	-	Information delivery : • Slide • Assignment	
2	Numeric systems (Decimal, Binary, Hexadecimal)	Written practical	Information delivery : • Slide • Assignment	
3	Memory and negative numbers	Written report APA style	Information delivery : • Slide • Assignment	
4	OS and Virtual machine (install Linux)	Linux installation	Flip-classroom • Inform students to come prepared	
5	Version Control System GIT	Repository arrangement on FHICT Git	Information delivery : • Slide • Assignment	
6	**Assessment (Assignment delivery with a mark P/U/S/G/O)**	**Assessment points: All last weeks deliverables**	**Canvas check**	
7	Network Layers (TCP/IP) and Network Devices	Written practical Netkit lab delivered on Git	Information delivery : • Slide • Practical Assignment	
8	Internet Protocol, Addressing, Subnet	Written practical Netkit lab delivered on Git	Information delivery : • Slide • Practical Assignment	
9	Routing, Maintenance and drawing of the infrastructure	Written practical Netkit lab delivered on Git	Information delivery : • Slide • Practical Assignment	
10	TCP and UPD protocols	Written practical Netkit lab delivered on Git	Information delivery : • Slide • Practical Assignment	
11	Client/Server concept and IoT	Written practical Netkit lab delivered on Git	Information delivery : • Slide • Practical Assignment	
12	**Assessment (Assignment delivery with a mark P/U/S/G/O)**	**Assessment points: All last weeks deliverables**	**Canvas check Git net lab check**	

WAY OF WORKING

Classes

In this course every week 3 sessions are planned, first one is Theory, the second one is Practical and third one is guided study.

In theory sessions students will be introduced to the new topic by the lecturer. For practical sessions, students work in pair groups together on the assignment of the week and have time to discuss it with the lecturer to receive feedback before the final submission. In guided study hours student will be working again on their assignment. Every assignment must be submitted to Canvas and/or git repository before the deadline.

Assessment

This course is divide into 2 phase of 6 weeks, Each phase has 5 weeks of supervised learning and submission of assignment with weekly deadlines and 1 week of assessment.

Note: Every weekly assignment will be marked using the letter system and students who are late with deliverables they can achieve maximum a Sufficient grade.

Phasing

Phase 1 Week 1-6	Phase 2 week 7 to 12
Introduction to infrastructure & Computer's architecture(Von Neumann architecture CPU, GPU and MB)	Network Layers (TCP/IP) and Network Device
Numeric systems (Decimal, Binary, Hexadecimal)	Internet Protocol, Addressing, Subnet
Memory and negative numbers	Routing, Maintenance and drawing of the infrastructure
OS and Virtual machine (install Linux)	TCP and UDP protocols
Version Control System GIT	Client/Server concept and IoT

Grading

Both phases will end with a formative indicator of student's progress that will be calculated based on the deliverables of the phase.

For every deliverables student will be marked :

- P (Poor)
- U (Unsatisfactory)
- S (Satisfactory) Delivery or fix on delivery after deadline
- G (Good) submit before deadline and complete.
- O (outstanding) submission before deadline with extra work.

The formative indicator mark of each phase will be calculated based on these deliverables mark.

Week	Phase	Description	Deliverables	Remark
6	Orientation phase 1	5 weekly assignments will be assessed and marked	Submission on Canvas	P/U/S/G/O
12	Orientation phase 2	5 weekly assignments will be assessed and marked on justification of choice	Submission on Canvas	P/U/S/G/O

Teaching materials

1- Olivier Bonaventure: Computer Networking : Principles, Protocols and Practice Netkit Tool, Wireshark,

Tools used in this course:

1- Linux operating system

2- Netkit

3- wireshark

4- git (version control system)

6- Hardware