Summary

Unit 3 Networks Current

Subject	Year	Start date	Duration
Computer Science	IB1	Week 3, February	6 weeks 10 hours

Course Part

Inquiry & Purpose

Transfer goals

This unit develops student's knowledge of networking architecture, data transmission and wireless networking. Students will discover the working aspects of networks and how data is transmitted over a network in different structures. Students will be able to distinguish the differences between different type of networks and security methods. Students will uncover the differences between wired and wireless networks. Students will go further and learn about how data transmitted using packet switching. Lastly students will get involved in identifying VPN technology and evaluate the use of VPN.

Curriculum

Aims

Provide opportunities for study and creativity within a global context that will stimulate and challenge students developing the skills necessary for independent and lifelong learning

Enable students to apply and use a body of knowledge, methods and techniques that characterize computer science

Develop logical and critical thinking as well as experimental, investigative and problem-solving skills

Develop and apply the students' information and communication technology skills in the study of computer science to communicate information confidently and effectively

Develop an appreciation of the possibilities and limitations associated with continued developments in IT systems and computer science

Encourage an understanding of the relationships between scientific disciplines and the overarching nature of the scientific method

Syllabus Content

Core

Topic 3 - Networks

3.1 Networks

Network fundamentals

3.1.1 Identify different types of networks.

3.1.2 Outline the importance of standards in the construction of networks.

3.1.3 Describe how communication over networks is broken down into different layers.

3.1.4 Identify the technologies required to provide a VPN.

3.1.5 Evaluate the use of a VPN.

Data transmission

3.1.6 Define the terms: protocol, data packet.

3.1.7 Explain why protocols are necessary.

3.1.8 Explain why the speed of data transmission across a network can vary.

3.1.9 Explain why compression of data is often necessary when transmitting across a network.

3.1.10 Outline the characteristics of different transmission media.

3.1.11 Explain how data is transmitted by packet switching.

Wireless networking

3.1.12 Outline the advantages and disadvantages of wireless networks.

3.1.13 Describe the hardware and software components of a wireless network.

3.1.14 Describe the characteristics of wireless networks.

3.1.15 Describe the different methods of network security.

3.1.16 Evaluate the advantages and disadvantages of each method of network security.

Content

Define local area network (LAN), wide area network (WAN), server and client.
Explain basic network topologies.
Explain the hardware required in networking.
Define the terms “standard protocol”, “data integrity” and “data security” in the context of data transmission across a network.
Describe suitable methods to ensure data integrity in the transmission of data.
Describe suitable methods to ensure data security.
Discuss the need for speed in data transmission, and how speed can be enhanced.
Discuss networking applications and the implications of networking for organizations, including internal communications, electronic mail, e-commerce, conferencing and distributed processing.
Outline the functions of a web browser and search engine including displaying an HTML page, following hyperlinks and searching on key words.

Connections

Metacognition

Students will be expected to understand **networking architecture, data transmission and wireless networking**

during this topic. Students need to use their knowledge of different networking **architecture** to answer questions based on a given scenario. Students need to use their knowledge of data transmission to packets of information is routed in a network. Students need to be able to describe the methods of network security and identify security measures for a given scenario. Furthermore, students are expected to describe the characteristics of wireless networks

ATL Skills

Approaches to Learning


Thinking


Communication


Self-management

Developing IB Learners

Learner Profile


Inquirers


Knowledgeable


Thinkers


Communicators


Risk-takers (Courageous)


Reflective

Assessment

Formative assessment

During this unit student's progress will be monitored dialogue and one to one discussions. Students will also conduct group and class discussions. A variety of assessment strategies will be used to ensure all types of learner are catered for and to provide an engaging interaction. Students will also demonstrate learning by working in groups to prepare and present a slide show of a topic they are interested in within this unit, this will allow students to complete further research. All the formal summative evaluations will be marked according to IB criteria that ranges from grade 1 (very poor) to grade 7 (excellent performance).

Students assessment will include the following:

- Mini quizzes with automated feedback will be provided to ensure key skills/ concepts are reinforced.
- Project based learning will ensure students complete further research. These will include, oral presentations, podcasts, blog entries, leaflets, posters, discussion forums.
- Short question and answers based on paper 1 relevant to the topic covered.
- Students to prepare Starter/Activities to promote and engage other students in class
- Homework will be assigned as extension to learning objectives to ensure students complete further research outside of class.

Summative assessment

- End of Unit Assessment will be carried out. This will provide students a final unit grade and opportunity to reflect on any improvements they need to make within this unit.

Learning Experiences

Prior learning experiences

Define local area network (LAN), wide area network (WAN), server and client.
Explain basic network topologies.
Explain the hardware required in networking.
Define the terms "standard protocol", "data integrity" and "data security" in the context of data transmission across a network.
Describe suitable methods to ensure data integrity in the transmission of data.
Describe suitable methods to ensure data security.
Discuss the need for speed in data transmission, and how speed can be enhanced.
Discuss networking applications and the implications of networking for organizations, including internal communications, electronic mail, e-commerce, conferencing and distributed processing.
Outline the functions of a web browser and search engine including displaying an HTML page, following hyperlinks and searching on key words.