COURSE OUTLINE

CST104

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Course Code: Title	CST104: PC HARDWARE AND NETWORKING
Program Number: Name	2090: COMPUTER PROGRAMMER
Department:	COMPUTER STUDIES
Semester/Term:	18W
Course Description:	This course provides an overview of computer hardware and networking. The hardware components of a typical computer system will be studied as well as the system level software such as the operating system and device drivers. The essentials of networking will be studied and the student will build a network both wired and wireless and share resources across it. Experiments with network communication encryption will be performed. Topics in Microcontroller computing will be studied as well as Network communication applications. Topics in mobile and cloud computing will also be covered time permitting.
Total Credits:	4
Hours/Week:	5
Total Hours:	75
Prerequisites:	CSO104
Vocational Learning Outcomes (VLO's): **Please refer to program web page for a complete listing of program outcomes where applicable.**	**2090 - COMPUTER PROGRAMMER** #4. Apply knowledge of networking concepts to develop, deploy, and maintain program code.
Essential Employability Skills (EES):	#3. Execute mathematical operations accurately. #4. Apply a systematic approach to solve problems. #5. Use a variety of thinking skills to anticipate and solve problems. #6. Locate, select, organize, and document information using appropriate technology and information systems. #7. Analyze, evaluate, and apply relevant information from a variety of sources.
Course Evaluation:	Passing Grade: 50%, D
Other Course Evaluation & Assessment Requirements:	Grade Definition Grade Point Equivalent

A+ 90 - 100% 4.00
A 80 - 89%
B 70 - 79% 3.00
C 60 - 69% 2.00
D 50 - 59% 1.00
F (Fail) 49% and below 0.00

CR (Credit) Credit for diploma requirements has been awarded.
S Satisfactory achievement in field /clinical placement or non-graded subject area.
U Unsatisfactory achievement in field/clinical placement or non-graded subject area.
X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.
NR Grade not reported to Registrar`s office.
W Student has withdrawn from the course without academic penalty.

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Assignments	50%
Tests	50%

Course Outcomes and Learning Objectives:

Course Outcome 1.

Identify and describe the basic function of all major components found inside a typical computer.

Learning Objectives 1.

Identify and describe the uses of various PC cases and power supplies
Describe the nature of electricity and power including ohms law.
State the purpose and characteristics of a PC power supply.
Identify PC ports and cables
Identify various input/output devices and motherboard components
Explain a subsystem such as RAID and identify its objectives
Install and configure a typical Windows operating system using appropriate media

Course Outcome 2.

Connect and configure various peripheral devices

Learning Objectives 2.

Describe the nature of various types of devices such as printers, scanners, cameras, mobile devices.
Identify the various interface types used with these devices such as USB, Fire Wire Bluetooth, WIFI, RS232.
Configure the devices and their interfaces

Course Outcome 3.

Connect and configure mobile devices

Learning Objectives 3.

Describe the nature of a typical mobile device such as a smartphone or tablet.
Configure the device to function in a networked environment

Course Outcome 4.

Describe networks in general and begin building a telecommunications vocabulary.

Learning Objectives 4.

List and describe the elements common to all networks.
define and distinguish LAN, WAN, CAN, MAN
List and describe the 7 layers of the OSI model and
Compare them to the 4 layers of the TCP/IP model
Identify various protocols at each layer and describe their purpose
Identify the method of addressing at various layers and the associated protocol data units
Describe physical topologies (bus,ring,star etc.), and associated media access control methods
(logical topology)
Differentiate simplex, full/half duplex
Differentiate multi-access vs point-to-point links

Course Outcome 5.

Describe the operation of protocols and devices at the OSI Data link layer and explain how they
support communications

Learning Objectives 5.

Explain the role of Data Link layer protocols in data transmission.
Describe how the Data Link layer prepares data for transmission on network media.
Identify the common logical network topologies and describe how the logical topology
determines the media access control method for that network.
Explain the purpose of encapsulating packets into frames
Describe the Layer 2 frame structure and identify generic fields.
Explain the role of the frame header and trailer fields, including addressing, type of protocol,
and Frame Check Sequence.
Describe the devices that operate at the data link layer including bridges, switches and the NIC.
differentiate broadcast domains and collision domains
compare various network standards (DMX, MIDI, CANBUS) and their characteristics at the
Data link layer

Course Outcome 6.

Describe the features of the Network layer protocols and services and explain the fundamental
concepts of routing

Learning Objectives 6.

Identify the role of the Network layer as it describes communication from one end device to

another end device.
Examine the most common Network layer protocol the Internet Protocol (IP), and its features for providing connectionless and best-effort service
Understand the principles used to guide the division, or grouping, of devices into networks.
Understand the hierarchical addressing of hosts and how this allows communication between networks.
Understand the fundamentals of routes, next-hop addresses, and packet forwarding to a destination network.
utilize switches and TRUNK ports to build VLANs and use a router to carry traffic between them

Course Outcome 7.

Calculate, and apply subnet masks and IP addresses to fulfill given requirements

Learning Objectives 7.

Explain the structure IP addressing and demonstrate the ability to convert between 8-bit binary and decimal numbers.
Given an IPv4 address, classify by type and describe how it is used in the network.
Explain how addresses are assigned to networks by ISPs and within networks by administrators.
Determine the network portion of the host address and explain the role of the subnet mask in dividing networks.
Given IPv4 addressing information and design criteria, calculate the appropriate addressing components.
Use common testing utilities to verify and test connectivity and operational status of the IP protocol stack on a device.

Course Outcome 8.

List the features of the Transport layer protocols and services

Learning Objectives 8.

Explain the need for the Transport layer.
Identify the role of the Transport layer as it provides the end-to-end transfer of data between applications.
Describe the role of two TCP/IP Transport layer protocols: TCP and UDP.
Explain the key functions of the Transport layer, including reliability, port addressing, and segmentation.
Identify when it is appropriate to use TCP or UDP and provide examples of applications that use each protocol.

Course Outcome 9.

Describe & utilize the Application Layer & its protocols.

Learning Objectives 9.

Describe how the functions of the three upper OSI model layers provide network services to end user applications.

Define how people use the Application Layer to communicate across the telecommunication network.
Identify the function of well-known TCP/IP applications, such as the World Wide Web and email, and their related services (HTTP, DNS, SMB, DHCP, SMTP, SNMP, and Telnet).
Explain how protocols ensure services running on one kind of device can send to and receive data from many different network devices.

Course Outcome 10.

Describe the nature of Encryption/Decryption and implement secure communications

Learning Objectives 10.

Describe the nature of cryptography
Describe a hash and where it is used in cryptography
Distinguish between secret key vs public/private key encryption
Send a secure message across a communications channel
Describe how a firewall is used to secure a network
Explore other topics in security such as digital signatures and VPNs.

Course Outcome 11.

Explore wireless communication

Learning Objectives 11.

Identify the media access method used by WIFI networks
Describe the various security mechanisms in wireless communications including those in Enterprise and personal systems
Configure wireless access to a typical wireless router including a PSK security mechanism

Course Outcome 12.

Describe the nature of cloud computing and the various methods used to implement it (time permitting)

Learning Objectives 12.

Describe the meaning of software as a service, platform as a service and Infrastructure as a service.
Given a particular computing requirement, recommend the appropriate solution
Work within a cloud environment such as Google Drive/apps or Microsoft Onedrive

Course Outcome 13.

Implement digital input/output and analog input using a Microcontroller.

Learning Objectives 13.

Read the status of Switches and other digital input devices using a microcontroller.
Control the state of output devices such as LEDs or motors using a microcontroller.
Measure the value of an analog input and transmit it to a host computer.

Date:	Monday, January 22, 2018
	Please refer to the course outline addendum on the Learning Management System for further information.