# **Higher Nationals**

# **Assignment Brief – BTEC (RQF)**

**Higher National Diploma in Computing**

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| **Student Name /ID Number** | **Aaron Mascarenhas** |
| **Unit Number and Title** | **Unit 2 - Networking** |
| **Academic Year** | **2018- 2019** |
| **Unit Assessor** | **Dr Sam Al-Jajjoka** |
| **Assignment Title** | **Assignment 1 - Examine networking principles and their protocols** |
| **Issue Date** | **21.01.2019** |
| **IV Name** | **Omar Mufti** |
| **Draft submission date** | **04.02.2019** |
| **Final submission date** | **18.02.2019** |
| **Re-submission date (if required)** |  |

**Plagiarism**

Plagiarism is a particular form of cheating. Plagiarism must be avoided at all costs and students who break the rules, however innocently, may be penalised. It is your responsibility to ensure that you understand correct referencing practices. As a university level student, you are expected to use appropriate references throughout and keep carefully detailed notes of all your sources of materials for material you have used in your work, including any material downloaded from the Internet. Please consult the relevant unit lecturer or your course tutor if you need any further advice.

**Student Declaration**

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| **Student declaration**  I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice.  Student signature: Aaron Date: 21/01/2019 |

**Learning Outcomes and Assessment Criteria**

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|  | Grading Criteria | Met | Grading Criteria | Met | Grading Criteria | Met |  |
| **LO1** | P1 |  | M1 |  |  |  |  |
| **LO1** | P2 |  |  |  |  |  |  |
|  |  |  |  |  | D1 |  |  |
| **LO2** | P3 |  | M2 |  |  |  |  |
| **LO2** | P4 |  |  |  |  |  |  |
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| **Assessor Feedback:**  \*Please note that constructive and useful feedback should allow students to understand:   1. Strengths of performance 2. Limitations of performance 3. Any improvements needed in future assessments   Feedback should be against the learning outcomes and assessment criteria to help students understand how these inform the process of judging the overall grade.  Feedback should give full guidance to the students on how they have met the learning outcomes and assessment criteria. | | | | |
| **Grade:** | **Assessor Signature:** | | | **Date:** |
| **Resubmission Feedback:** | | | | |
| **Grade:** | | **Assessor Signature:** | **Date:** | | |

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| Submission Format: |
| The submission is in the form of an individual written report. This should be written in a concise, formal business style using single spacing and font size 12. You are required to make use of headings, paragraphs and subsections as appropriate, and all work must be supported with research and referenced using the Harvard referencing system. Please also provide a bibliography using the Harvard referencing system. The recommended word limit is 2,000–2,500 words, although you will not be penalised for exceeding the total word limit. |
| Unit Learning Outcomes: |
| LO1 Examine networking principles and their protocols.  LO2 Explain networking devices and operations. |
| Assignment Brief and Guidance: |
| Scenario A college has two main operational sites which are five miles apart. With expansion, a new site is being developed particularly to cater for the Computing and Technology courses. This new site is almost ten miles from the two existing main sites. When ready, it will have “state of the art” technology, offering courses in the new fields of computing, particularly networking, data communications, wireless technology, multimedia and games developments to name but a few courses.  It is expected that the new site as shown below, called the “**Technology Centre**” will cater for approximately **500** students in the first instance but will expand rapidly. In the **ground floor** there will be a lecturer theatre catering for approximately **400** computers, with facilities available for students to plug in their wireless laptops if needed, **in the first floor** there will be **4** classrooms equipped with **20** computers, in the second floor **3** rooms for staff and administration with a capacity of **20** computers in each room.  You are the network manager who has been called in to advise the college management on how to build a network for the new site and advise on future expansion plans. The network you propose for the new site will need to be connected to the other two sites of the college, and should cater for all the student curriculum needs, staff and support services requirements.  Use the knowledge you have developed in studying the **CCNA 1** (Cisco Certified Network Associates\_ Introduction to Networks) course and experience you gained in the class to answer all the following questions regarding networking principles, protocols and devices in relationship to the scenario.      **Task 1**  **A- Explain the benefits and constraints of the above network**  **B- Explain the following networking standards**:  e.g. OSI model, TCP/IP model; IEEE 802.x.  **C- Examine the System types that could be used in the above network:**  Peer-based, client-server, cloud, cluster, centralised.  **D- Explain briefly the following Topologies and which one is used in the above network :**  Logical e.g. Ethernet, Token Ring;  Physical e.g. star, ring, bus, mesh, tree, ring.  **E- Explain how the following Protocols are used to support the above network:**  Routed protocols e.g. IPv4, IPv6, FTP, HTTP, SMTP, SSL, VLSM.  **Task 1 provide evidence for [P1 & P2]**  **Task 2**  **Explain the following:**  **A- Networking devices:**  Servers; Hub, routers, switches, HIDS, access point (wireless/wired), Load balancer, VPN.  **B- Networking software:**  Client operating system, server operating system, Firewall.  **C- Workstation:**  Hardware e.g. network card, cabling; file permissions.  **D- Server type:**  Web, file, database, virtualisation.  **E- Server selection:**  Cost, purpose, operating system requirement.  **F-** **Expand** on **D & E** and justify the selection of servers, based on the above scenario regarding cost and performance optimisation.  **Task 2 provide evidence for [P3, P4 & M2]**  **Task 3**  When you configure the TCP/IP protocol on a Microsoft Windows computer, an IP address, subnet mask, and usually a default gateway are required in the TCP/IP configuration settings. Subnetting allows you to create multiple logical networks that exist within a single Class A, B, or C network. If you do not subnet, you are only able to use one network from your Class A, B, or C network, which is unrealistic.  You are given IP address **180.16.0.0**, subnet the network above and provide an IP addressing scheme (subnetting) for all the devices on the “**Technology Centre**” network in all the floors.  **Task 3 provide evidence for [M1]**  **Task 4**  In most cases, having the same subnet mask for all subnets ends up wasting address space wasted address space due to the fact that the same subnet mask is being used for all the subnets. Use the Variable Length Subnet Masks (**VLSM**) to address spaces efficiently and show in a table the wasted address spaces and Point-to-Point link networks (only two hosts on each) are used. Furthermore, explain the advantages of using the VLSM in the above network.  **Task 4 provide evidence for [D1]**  \**Please access HN Global for additional resources support and reading for this unit. For further guidance and support on report writing please refer to the Study Skills Unit on HN Global. Link to www.highernationals.com* |

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| **Learning Outcomes and Assessment Criteria** | | |
| Pass | Merit | Distinction |
| **LO1** Examine networking principles and their protocols | |  |
| **P1** Discuss the benefits and constraints of different network types and standards.  **P2** Explain the impact of network topology, communication and bandwidth requirements. | **M1** Compare common networking principles and how protocols enable the effectiveness of networked systems. | LO1 & 2  D1 Considering a given  scenario, identify the  topology protocol  selected for the efficient  utilisation of a  networking system. |
| **LO2** Explain networking devices and operations | |
| **P3** Discuss the operating principles of networking devices and server types.  **P4** Discuss the inter-dependence of workstation hardware with relevant networking software. | **M2** Explore a range of server types and justify the selection of a server, considering a given scenario regarding cost and performance optimisation. |

