HIGHER EDUCATION PROGRAMMES

Academic Year 2025:	January - June
Summative Assessment 2:	Praxis S3 (HPXS301-1)
NQF Level, Credit:	6, 5
Weighting:	10%
Assessment Type:	Research Essay
Educator:	O. Dyantyi
Examiner:	L. Ngcobo
Due Date	6 June 2025
Total	20 Marks

Instructions

1. Summative Assessment 2 (SA2) must be uploaded in PDF format onto ColCampus on or before 6 June 2025 before 23:59hrs.
2. The essay must be a minimum of 700 (seven hundred) words and should not exceed 850 (eight hundred and fifty) words.
3. The essay structure must be as follows:
   - Cover Page:

    - Name
    - Surname
    - Student Number
    - Name of your Support Centre (i.e. Boston, Braamfontein)
- Introduction: Tells the reader what the essay is about.
- Body / Main Content: Is based on research and relates to the essay question or topic that has been set.
- Conclusion: Is a summary of what has been covered in the essay, it may also include suggestions / recommendations.
- Reference list: (not included in the word count): the Harvard Referencing Method must be adhered to with regards to in-text citations and the reference list. Please make sure you have read and adhere to the *NWU Referencing Guide*, available in the HE Library module on ColCampus, as well as *The Beginners Guide to Plagiarism*, available in the HE Student Information module, also on ColCampus.

4. The essay must be typed, using the following format settings only:
    - Font: Arial
    - Font Size: 12
    - Line Spacing: 1.5

5. **The following must be adhered to:**

- ***You have been provided with cademic sources (see below), these source are compulsory and must be consulted and referenced when answering the research question.***

Compulsory sources to peruse:

Gadde, H., 2021. Secure Data Migration in Multi-Cloud Systems Using AI and Blockchain. International Journal of Advanced Engineering Technologies and Innovations, 1(2), pp.128-156. Retrieved from: https://d1wqtxts1xzle7.cloudfront.net/119017263/128_156_ijaeti_2021-libre.pdf?1729402754=&response-content-disposition=inline%3B+filename%3DSecure_Data_Migration_in_Multi_Cloud_Sys.pdf&Expires=1738219588&Signature=VEVCBbd7wmzTCQ6VglGq7np09SbPUvKAchajsdkaOEPf697dbalERRePLYilS~~h2lxl9KgLU6nx~Ov4BLOjm0dFDxMjfJRDUqTPVeqhZ6XTCGQFQ9-11E9a3P8-G203NAoLIjEWOsr22A5byjpb~haY5Ih57LDwrP5mv8OE8vwaMrIuBzHYKER4vO5G8oHmFscZKED4IhPORmqogls-QOf8QTLBXFR1Yym6~WiZtxAmJ-

SRJmTZxNeKs82RxveHzC~O2yZcwo4JpRekMmnC26LHLOxHnL2kNNr4aiZ35Ofm9hwl3AGqpOrm~v9R4O91mzfegwjdfHOxvtU6WrwhtA__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA [Accessed 25 November 2024].

Kushwah, V.S. and Saxena, A., 2013. A security approach for data migration in cloud computing. International Journal of Scientific and Research Publications, 3(5), pp.1-8. Retrieved from: https://www.researchgate.net/profile/Virendra-Kushwah/publication/236658752_A_Security_approach_for_Data_Migration_in_Cloud_Computing/links/00b7d518bd18762b30000000/A-Security-approach-for-Data-Migration-in-Cloud-Computing.pdf [Accessed 03 September 2024].

Alsirhani, A., Ezz, M. and Mostafa, A.M., 2022. Advanced Authentication Mechanisms for Identity and Access Management in Cloud Computing. Computer Systems Science & Engineering, 43(3). Retrieved from: https://cdn.techscience.cn/ueditor/files/csse/TSP_CSSE-43-3/TSP_CSSE_24854/TSP_CSSE_24854.pdf [Accessed 03 September 2024].

6. You must make use of the Harvard Method of Referencing. Refer to the examples of referencing below:

Book, single author:

Holt, D.H. 2017. Management principles and practices. Sydney: Prentice-Hall.

Book, 2 or 3 authors:

McCarthey, E.J., William, D.P. & Pascale, G.Q. 2017. Basic marketing, Cape Town: Juta.

Book, more than 3 authors:

Bond, W.R., Smith, J.T., Brown, K.L. & George, M. 2016. Management of small firms, Sydney: McGraw-Hill.

Book, no author:

Anon. 2009. A history of Greece 1994-now. Sydney: Irwin.

eBook:

Harris, C.A. 1917. How to write music: musical orthography, edited by M. Randall. New York, NY: H. W. Grey. http://gutenbert.org/files/37281/37281-h/37281-h.htm. Date of access: 31 August 2017.

Academic Journal article with one author:

Allan, J. 2017. Nurturing supportive learning environment in higher education through the teaching of study skills: to embed or not to embed? *International Journal of Teaching and Learning in Higher Education*, 19(2):64-76.

Academic Journal with 2 or more authors:

Glatt, M.M., Grindstone, C.H & Hult, C.J. 2019. The geographic expansion of Mexican immigration in the United States and its implications for local law enforcement. *Law Enforcement Executive Forum Journal*, 8(1):73-82.

Webpage, no author:

(use first few words of the page title) Improve indigenous housing now, government told. 2007. Available from: <http://www.architecture.com.au/i-cms?page=10220>. Date of Access, 8 February 2016.

Website:

Australian Securities Exchange. 2019. Market Information. Available from: <http://www.asx.com.au/professionals/market_information/index.htm> Accessed on 5 July 2019.

Web based image / table / figure:

The Lunar Interior. 2000. Available from:
http://www.planetscapes.com/solar/browse/moon/moonint.jpg 2 Accessed on 8 November 2016.

Blog:

Newton, A. 2007. Newcastle toolkit. 16 January 2007. Angela Newton: Blog. Available from: <https://elgg.leeds.ac.uk/libajn/weblog/> Accessed on 23 February 2014.

Facebook and Twitter:

Smith, P. 2012. Social networking group, (Facebook), 6 October. Available from: http://facebook.com Accessed on 29 October 2012.

Newspaper, print:

Wolhuter, T. 2011. How to read food labels. *Star*. 26, 2 Mar 2011.

Newspaper, electronic database:

Hans, B. 2011. Cosatu slams Swazi loan. *The mercury*, 15 August http://www.iol.co.za/mercury/cosatu-slams-swazi-loan-1.1117816 Date of access: 1 September. 2012.

7. Plagiarism occurs when a writer duplicates another writer's language or ideas, and then calls the work his or her own. Simply put, plagiarism is theft. This includes the 'copy and paste' of work from textbooks, study guides, journal articles. The Plagiarism Declaration, included in this brief, must be signed and attached to the front of your essay. Refer to the Plagiarism Information Sheet in your Course Outline for further information.

8. ***Academic sources:***

   Not all sources can be classified as an academic source. To judge whether a source is an academic source, take the following criteria into account:

   - The author should be identifiable
   - The source should be published by a credible publisher (In an Academic Textbook or Academic Journal)
   - A list of references should be provided

Wikipedia ***is not*** a credible academic source. There is no author identifiable, and editing an article on this site is very easy. Also, blog posts often provide valuable information, but this is not academically sound.

9. To obtain maximum results, please consult the rubric in this brief to ensure that you adhere to and meet all the criteria.

10. A **Copyleaks Report** will be issued via ColCampus once the assignment is submitted. Please ensure that you follow the correct steps when uploading your assignment, to ensure that the Copyleaks Report is correctly issued. If the incorrect document is uploaded, or if no Copyleaks Report is issued, or if the Copyleaks Report indicates that a 30% similarity rating has been exceeded, a mark of zero (0) will be awarded. Where a Copyleaks Cheat Detection Report is issued, your submission will automatically be treated as if you received a similarity rating in excess of 30% and a mark of zero (0) will be awarded.

Question 1 **(20 Marks)**

Scenario:

As an IT security specialist, you've been hired by Innovatech Solutions, a leading global provider of cloud-based services, to bolster their cybersecurity strategy as they expand their operations into the cloud. Innovatech Solutions, known for its cutting-edge innovations in big data analytics and machine learning, is transitioning key components of its infrastructure to cloud environments to improve scalability, agility, and cost efficiency. However, the leadership team is deeply concerned about potential security risks associated with cloud migration, such as data breaches, unauthorized access, and cyberattacks.

During your initial review, you discovered that Innovatech Solutions' current security framework heavily relies on traditional security measures designed for on-premises data centers. These include legacy firewalls and antivirus solutions, which are inadequate for protecting cloud-based assets. Additionally, you notice that their current encryption practices are insufficient for securing communication channels in the cloud, particularly in environments requiring robust key management. The organization also lacks a clear strategy for securely exchanging encryption keys, which could lead to vulnerabilities in their encrypted communications. Moreover, employees have an evident knowledge gap regarding cloud security protocols, making the company more susceptible to human error and internal threats.

Your task is to develop a comprehensive cloud security strategy for Innovatech Solutions that addresses these challenges. This strategy must include selecting appropriate cloud deployment models, implementing advanced security tools to counteract cloud-specific threats, and educating staff on best practices in cloud security. Additionally, you must ensure that the company's encryption techniques are upgraded to incorporate symmetric and asymmetric cryptography, guiding key management and exchange processes. The ultimate goal is to enable Innovatech Solutions to confidently move forward with its cloud migration while minimizing security risks and ensuring compliance with industry standards.

Essay Question: Briefly explain the fundamental concepts of cybersecurity in cloud environments, focusing on key areas such as cloud migration, encryption, vulnerability assessment, identity and access management, social engineering, and cloud-specific threats like data breaches and unauthorized access. Discuss their significance in safeguarding Innovatech Solutions' digital assets as they expand into the cloud and suggest effective strategies to enhance their cybersecurity posture during this transition.

The following Learning Outcomes are assessed in this assessment:

- What is cloud computing?
- What are the characteristics, types, and deployment models of cloud computing?
- What are some of the most prominent cloud computing risks, threats, and attacks?
- What are some cloud security tools that help combat attackers?
- A user needs to communicate securely with five other users using symmetric key encryption. How many keys are required?

Marking Rubric

Criteria	**Description**	**Marks**
Cloud Migration and Deployment Models	Evaluate the understanding of cloud migration challenges, selection of appropriate deployment models (public, private, hybrid), and their significance in the context of Innovatech Solutions. (up to 3 marks)	14 marks
Encryption and Key Management	Assess the explanation of encryption techniques (symmetric and asymmetric), key management, and secure key exchange processes relevant to cloud environments. (up to 3 marks)	
Vulnerability Assessment and Mitigation	Review the identification and analysis of potential vulnerabilities in the cloud and the strategies for their mitigation. (up to 2 marks)	
Identity and Access Management (IAM)	Examine the understanding of IAM practices in cloud security, including role-based access control and multi-factor authentication. (up to 2 marks)	
Cloud-Specific Threats (e.g., Data Breaches, Unauthorized Access)	Analyze the discussion on cloud-specific threats, including data breaches and unauthorized access, and the measures to counteract these risks. (up to 2 marks)	
Social Engineering and Human Factors	Evaluate the consideration of social engineering threats and the importance of employee training in cloud security. (up to 2 marks)	
Structure and Clarity		
Introduction, Body, Conclusion	Assess the clarity and effectiveness of the essay's structure, including a well-defined introduction, body, and conclusion. (1 mark)	3 marks
Paragraph Structure	Evaluate the seamless progression of ideas and arguments throughout the essay. (1 mark)	
Logical Flow of Ideas	Review the logical organization and coherence of paragraphs. Logical Flow of Ideas (1 mark)	
Research and References		
Use of Scholarly Sources	Assess the incorporation of relevant and credible prescribed scholarly sources. (1 marks)	3 marks
Proper Citations and References (Harvard referencing)	Evaluate the accuracy and consistency of citations and references following the Harvard referencing style. (2 marks)	
Total		**[20 marks]**