

CyBOK Mapping Framework for NCSC Certified Degrees Guidance Document for UK Higher Education

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INTRODUCTION

This document provides a framework for use by degree programmes that are applying for certification as part the new NCSC Certified Master's Degrees specification based on the Cyber Security Body of Knowledge (CyBOK). The framework is based on the NCSC certification requirements (as noted in the **call for certified degrees documents**) and CyBOK's knowledge areas. The framework is aimed as a guideline for higher education institutions regarding their applications towards offering a NCSC Certified Master's programme.

The framework should, therefore, not be treated as a definitive mechanism or a guarantee for a successful certification. It provides a step-by-step mechanism for applicants undertaking the mapping of their programmes to the certification requirements. Applicants are best placed to decide on the final mappings and the certification panel's decisions are based on broader criteria than those covered in this mapping framework.

For the sake of brevity, the following acronyms are used to refer to the Knowledge Areas: Knowledge areas are shown in **red**. The acronyms are expanded below:

Acronym	Knowledge Area
AAA	Authentication, Authorisation & Accountability
AB	Adversarial Behaviours
C	Cryptography
CI	CyBOK Introduction
CPS	Cyber-Physical Systems Security
DSS	Distributed Systems Security
F	Forensics
FMS	Formal Methods for Security
HF	Human Factors
HS	Hardware Security
LR	Law & Regulation
MAT	Malware & Attack Technology
NS	Network Security
OSV	Operating Systems & Virtualisation
PLT	Physical Layer & Telecommunications Security
POR	Privacy & Online Rights
RMG	Risk Management & Governance
SOIM	Security Operations & Incident Management
SS	Software Security
SSL	Secure Software Lifecycle
WAM	Web & Mobile Security

Note :- CyBOK Introduction (CI) Knowledge Area sits outside the five broad categories therefore the CyBOK mapping framework just uses it as its own category, and Formal Method for Security (FMS) is a new Knowledge Area and has not been assigned a broad category yet.

1 PURPOSE OF THE DOCUMENT

The purpose of this document is to support applicants in mapping the contents of particular course modules or teaching units onto the NCSC certification requirements with a specific aim to provide a tabular representation that aids in completion of Table 3.3 in the certification application. The document provides a step-by-step process complemented by additional resources to utilise in each step. Several examples have been developed to illustrate the mapping process. The exemplar modules have been taken from reputed Universities around the world and are available on the CyBOK website.

To help explain the mapping process, this document draws upon the following materials:

1. **An alphabetical version of the CyBOK’s knowledge areas indicative material from the NCSC certification document.**
2. **CyBOK Mapping Reference 1.1.**
3. **CyBOK Knowledge Trees; and**
4. **Tabular representation of CyBOK’s broad categories, knowledge areas and their descriptions.**

Note :- All the documents can be downloaded as a single zip file from the website as well as individually.

2 CYBOK MAPPING STRUCTURE GUIDE

The following materials are provided to support the mapping process.

2.1 An alphabetical version of the CyBOK’s knowledge areas indicative material from the NCSC certification document

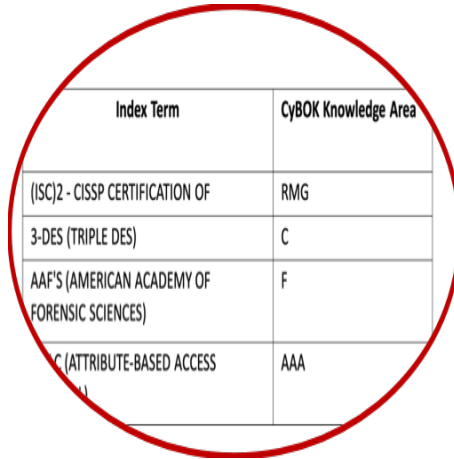
It is a matrix representation of indicative materials in an alphabetical manner from NCSC certification document.

No	Indicative Material	Topic	CyBOK Knowledge Area
A			
1	admin virtual machines	Secure Virtualisation	Operating System and Virtualization
2	AES	Schemes	Cryptography
3	agent capabilities	Adversarial threat agents	Adversarial Behaviours
	agent types	Adversarial threat agents	Adversarial Behaviours

Figure 1: An alphabetical version of the CyBOK’s Knowledge Areas Indicative Material

2.2 CyBOK Mapping Reference 1.1

Reference guide as to where common cyber security terms exist within CyBOK. We've taken 5087 common cyber security terms and shown in which CyBOK knowledge areas they might be found.



Index Term	CyBOK Knowledge Area
(ISC)2 - CISSP CERTIFICATION OF	RMG
3-DES (TRIPLE DES)	C
AAF'S (AMERICAN ACADEMY OF FORENSIC SCIENCES)	F
C (ATTRIBUTE-BASED ACCESS	AAA

Figure 2: CyBOK Mapping Reference 1.1

2.3 CyBOK Knowledge Trees

CyBOK Knowledge Trees are flowchart like tree structure where the root node denotes a CyBOK Knowledge area, each internal node denotes a topic with its sub-nodes representing indicative material.



Figure 3: CyBOK Knowledge Tree

2.4 Tabular representation of CyBOK’s broad categories, knowledge areas and their description

It is a matrix representation of CyBOK’s broad categories, knowledge areas along with their description. It will give you a basic idea about which knowledge area falls in which category and describes the core elements of each CyBOK knowledge area.

1- Human, Organizational, and Regulatory Aspects	
Risk Management and Governance	Security management systems and organizational security controls, including standards, best practices, and approaches to risk assessment and mitigation.
2 Law and Regulation	International and national statutory and regulatory requirements, compliance obligations, and security ethics, including data protection and developing doctrines on cyber warfare.
Human Factors	Usable security, social and behavioral factors impacting security, security culture awareness as well as the impact of controls on user behaviors.

Figure 4: Tabular representation of CyBOK’s Broad Categories, Knowledge Areas and their description

3 PROCESS OF THE MAPPING

The mapping process constitutes three phases:

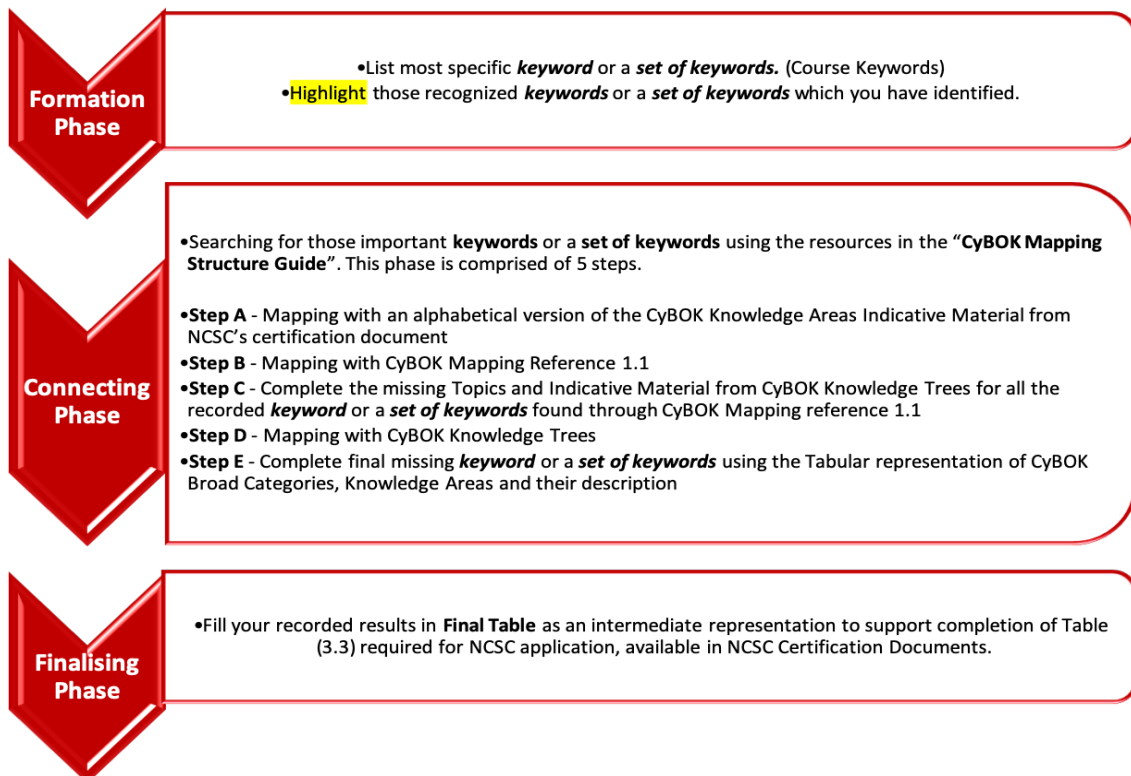


Figure 5: Phases of Mapping Process

3.1 Formation Phase:

List the most **specific keyword** or a **set of keywords** associated with the given module. Don't worry about redundancy of the keywords. The objective is to find out the largest possible list. Your list may contain a **single word** or **short phrase** or a **set of specific keywords**. Highlight those **keywords** or a **set of keywords** which you have identified.

3.2 Connecting Phase:

Searching for those highlighted **keywords** or a **set of keywords** using the resources in the "**CyBOK Mapping Structure Guide**". This phase is comprised of 5 steps (**Steps A to E**).

Note :- Please note that where a set of keywords closely map to the Indicative Material in the NCSC certification, these are to be recorded accordingly in Table 3.3 in the certification document. Where they do not directly map but demonstrate coverage of a topic, then additional rows can be added to Table 3.3 in the application. Consequently, (**Steps A to E**) show a clear mapping of keywords to the Indicative Material (where appropriate) and also where the mapping is more broadly to the Topic (hence showing coverage). Programme directors are best placed to decide these mappings but the Final Table should provide a basis for decisions as to where additional rows may be needed within Table 3.3 and where the existing Indicative Material in the call document suffices to demonstrate coverage of a topic.

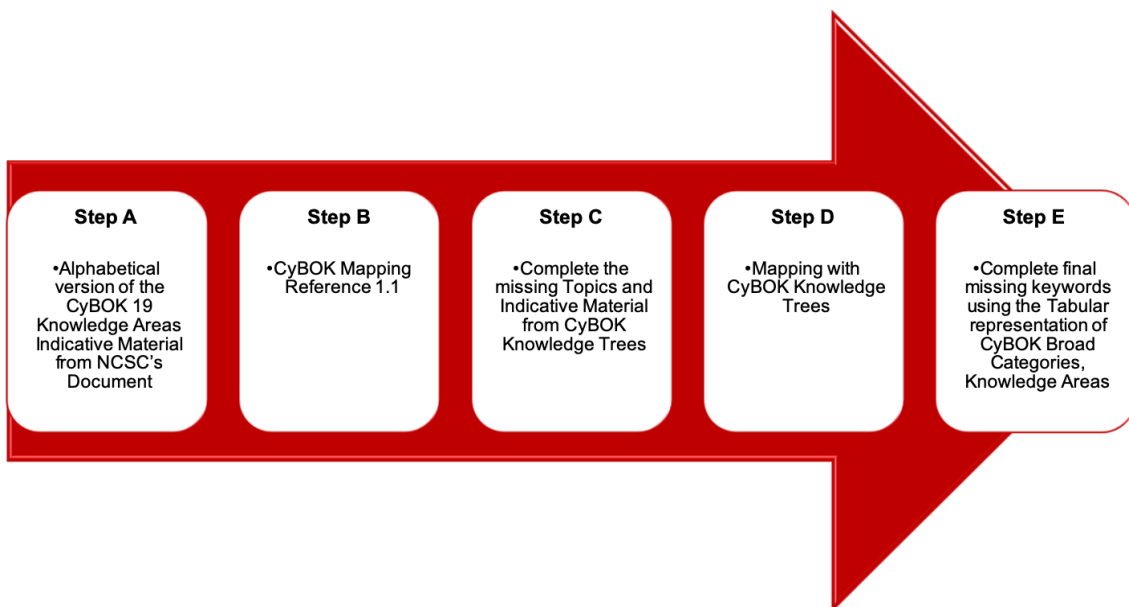


Figure 6: Steps A to E in Connecting Phase

Step A: – Mapping with an alphabetical version of the CyBOK's knowledge areas indicative material from NCSC's certification document: –

Start your search with this document. If your Highlighted/Underlined **keywords** or a **set of keywords** are found in this part, then record these in the table (provided as an appendix to this document) and move on to the next **keywords** or a **set of keywords**. Repeat the process until the last **keywords** or a **set of keywords**. (**Move to step B**)

Step B: – Mapping with CyBOK Mapping Reference 1.1: –

Continue your search with this document. If your remaining (**Not Found**) **keywords** or a **set of keywords** are found in this part, then record these in the table (provided as an appendix to

this document) and move on to the next **keywords** or a **set of keywords**. Repeat the process until the last **keywords** or a **set of keywords**. (Move to step C)

Step C: – Complete the missing topics and indicative material from CyBOK Knowledge Trees for all the recorded keywords or a set of keywords found through CyBOK Mapping reference 1.1: –

Searching topics from CyBOK Knowledge Trees for all the recorded **keywords** or a **set of keywords** found through CyBOK Mapping reference 1.1 as it provides relevant CyBOK knowledge areas but not the topic and indicative material therefore, CyBOK Knowledge Trees are used. (Move to step D)

Step D:– Mapping with CyBOK Knowledge Trees: –

Continue your search with this document. If your remaining (**Not Found**) **keywords** or a **set of keywords** are found in this part, then record these in the table (provided as an appendix to this document) and move on to the next **keywords** or a **set of keywords**. Repeat the process until the last **keywords** or a **set of keywords**. (Move to step E)

Step E:– Complete final missing keywords using the Tabular representation of CyBOK broad Categories, knowledge areas and their description: –

If the **keywords** or a **set of keywords** are not found in any of the materials provided to support the mapping process then identify the most relevant knowledge area using this document and then record the relevant knowledge areas.

3.3 Finalising Phase:

This phase is a result of the mapping process; the results are transferred from the various tables to the **Final table**. This table supports completion of **Table (3.3)** in the application for NCSC certification. **Table (3.3)** is required as a part of the application for NCSC certification.

4 APPENDICES

Table 1 – Use to record keywords found in an alphabetical version of the CyBOK’s knowledge areas indicative material

S.No.	Broad Category	KA	Topic	Indicative Material	Keyword or a Set of Keywords	Mapping with an alphabetical version of the CyBOK knowledge areas indicative material

Table 2 – Use to record keywords found in CyBOK Mapping Reference 1. 1

S.No.	Broad Category	KA	Keyword or a Set of Keywords	Mapping with CyBOK Mapping Reference 1.1

Table 3 – Use to complete the missing topics and indicative material from CyBOK Knowledge Trees for all the recorded keyword or a set of keywords found through CyBOK Mapping reference 1.1

S.No.	Broad Category	KA	Topic	Indicative Material	Keyword or a set of Keywords	Mapping missing Topics and Indicative Material from CyBOK Knowledge Trees

Table 4 – Use to record keywords found in CyBOK Knowledge Trees

S.No.	Broad Category	KA	Topic	Indicative Material	Keyword or a set of Keywords	Mapping with CyBOK Knowledge Trees

Table 5 – Use to record keywords found in Tabular representation of CyBOK’s broad categories, knowledge areas and their description

S.No.	Broad Category	KA	Topic	Indicative Material	Keyword or a set of Keywords	Searching in Tabular representation of CyBOK broad categories, knowledge areas

Table 6 – Final Table - This table supports completion of Table (3.3) in the application for NCSC certification. Table (3.3) is required as a part of the application for NCSC certification.

Broad Category	KA	Topic	Indicative Material	Keyword/ Set of Keywords/Course Keywords

Note :- Tables are available as Excel, Word and as Pdf format.