DEFENDERS

Defending VET Students within Cybersecurity Innovation

MODULE 5: INCIDENT RESPONSE AND MANAGEMENT

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NIKOLA KAREV State High School & VET Centre Strumica

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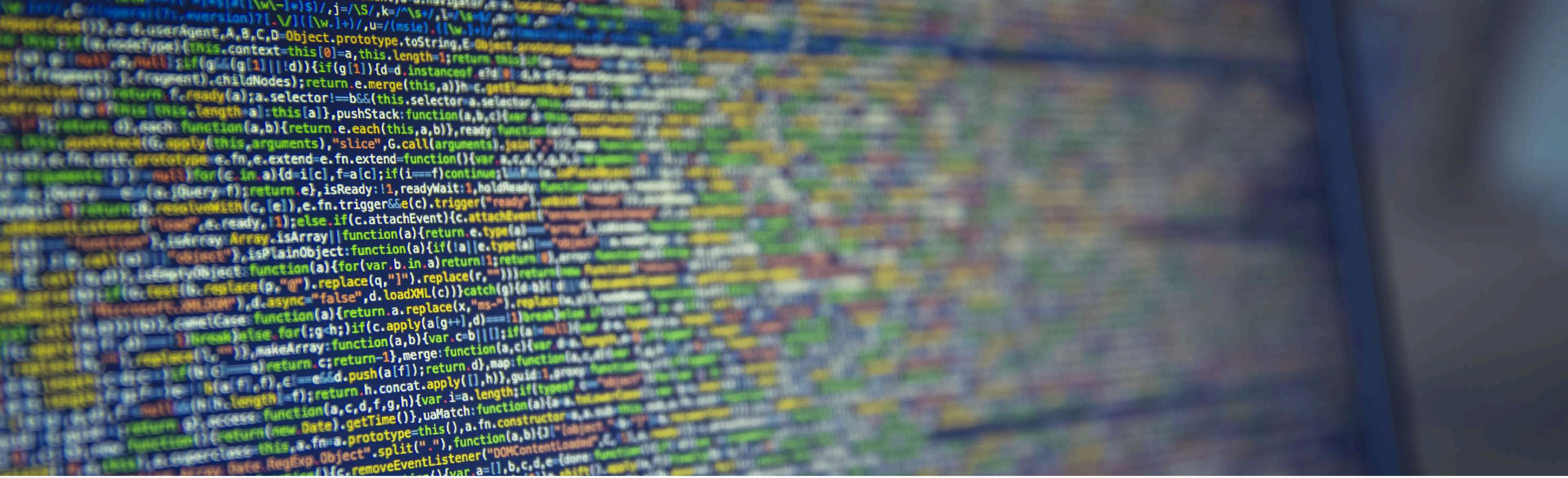


MODULE ROADMAP

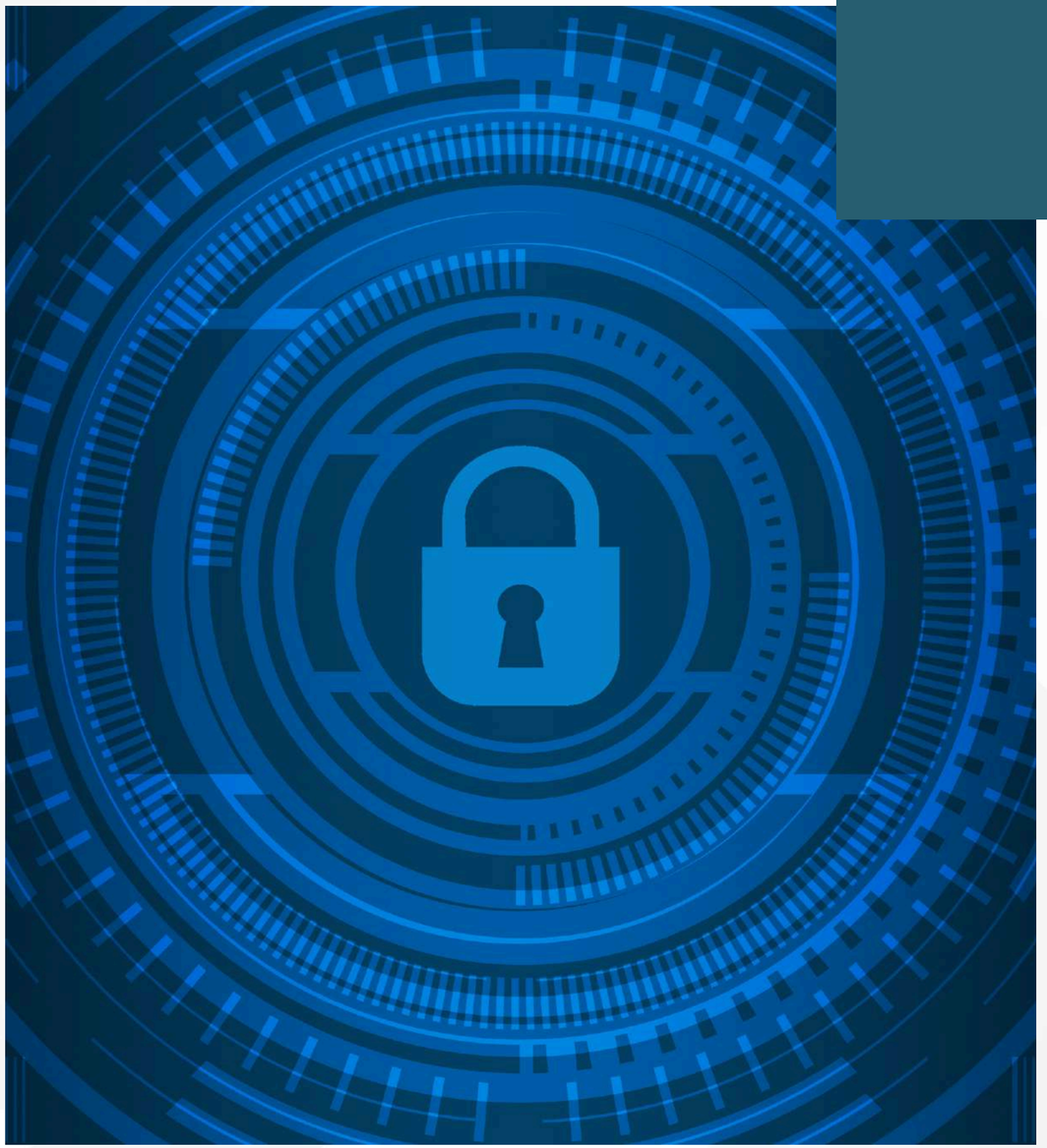
LEARNING PATH AND STRUCTURE

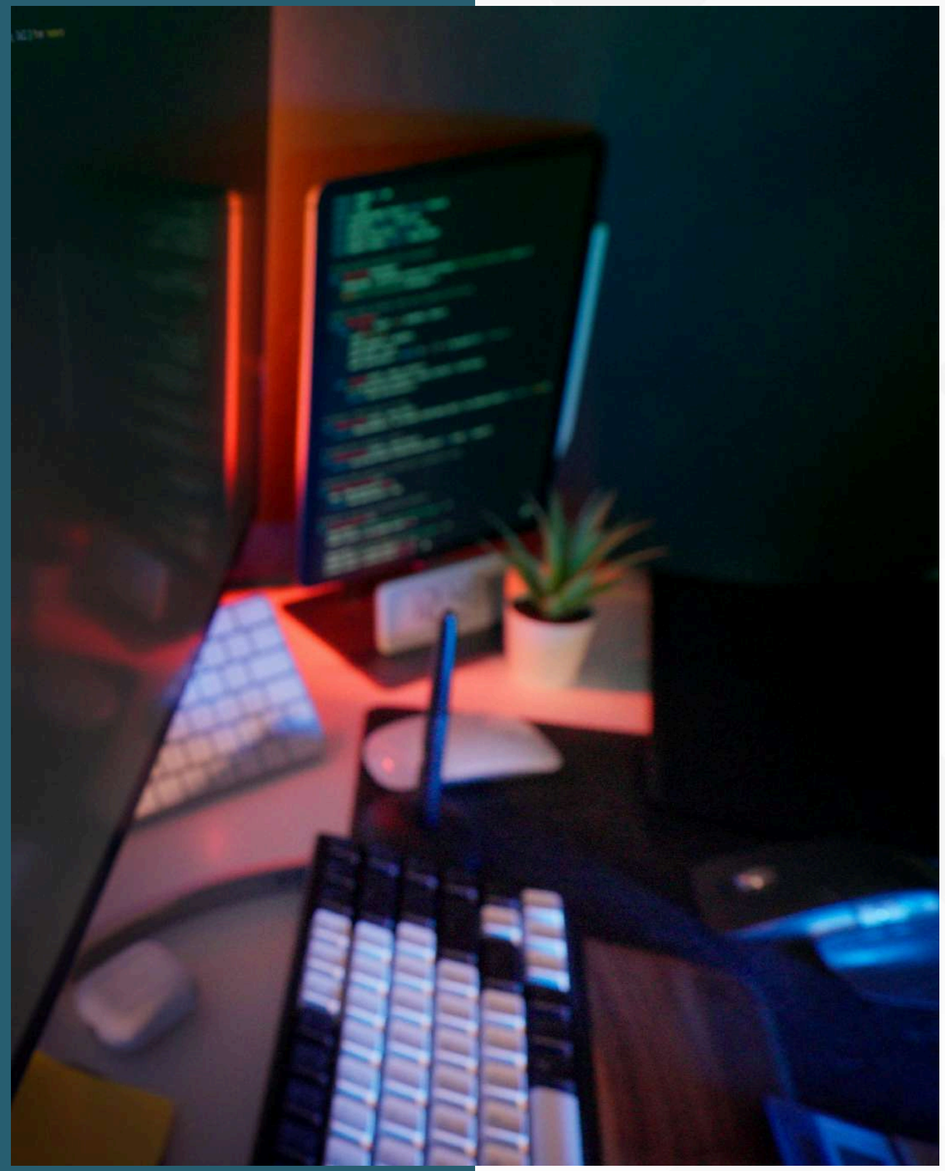
From understanding incidents to practicing escalation, containment, recovery and post-incident learning.

EXECUTIVE SUMMARY

What this module enables learners to do

- Recognise suspicious events and decide when escalation is required
- Apply a structured incident response lifecycle in VET environments
- Use triage, severity classification, playbooks and checklists
- Coordinate technical, managerial and communication actions
- Translate incidents into organisational learning and better cyber hygiene





INTRODUCTION

Why incident response matters in VET

- VET labs often imitate real workplaces and may contain real data
- Students, teachers and administrators all influence the attack surface
- The first minutes decide whether a problem stays local or becomes institutional
- Formal reporting prevents the “I fixed it quietly” trap
- The module builds practical response muscle memory

OVERVIEW

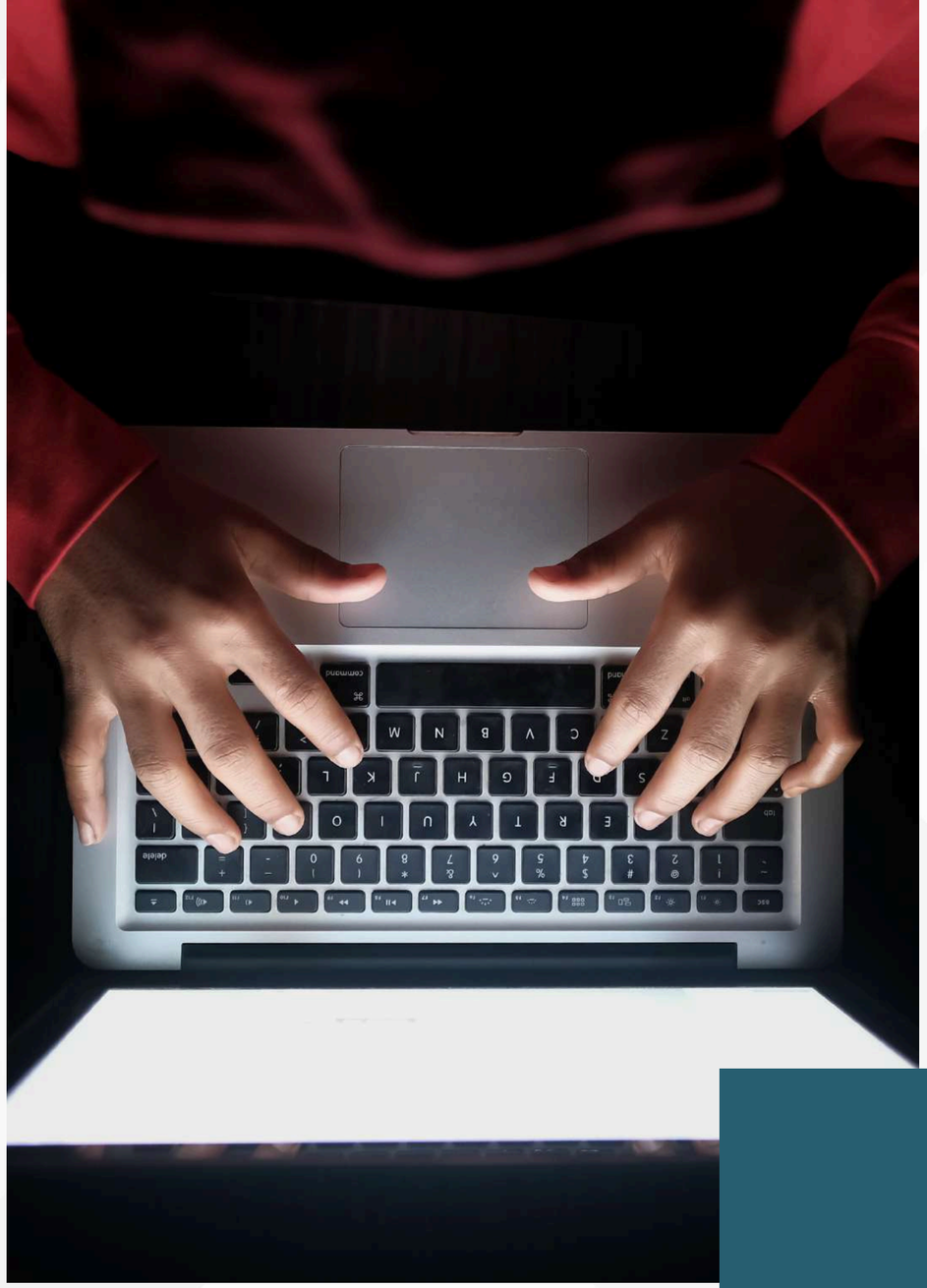
The incident response lifecycle

- NIST: preparation, detection and analysis, containment, eradication, recovery, post-incident activity
- SANS PICERL: preparation, identification, containment, eradication, recovery, lessons learned
- Modern NIST SP 800-61r3 links incidents with cyber risk management
- CSF 2.0 functions: Govern, Identify, Protect, Detect, Respond, Recover
- Response and recovery must be prepared before the crisis

IMPORTANCE OF THE TOPIC

Incidents are inevitable; chaos is optional

- A small phishing message can become credential theft, data leakage or ransomware
- Educational institutions face concentration risk through LMS, cloud and vendors
- Delayed detection increases legal, financial and reputational damage
- Good response protects learning continuity and trust
- Preparedness is cheaper than improvisation under pressure



LEARNING OBJECTIVES

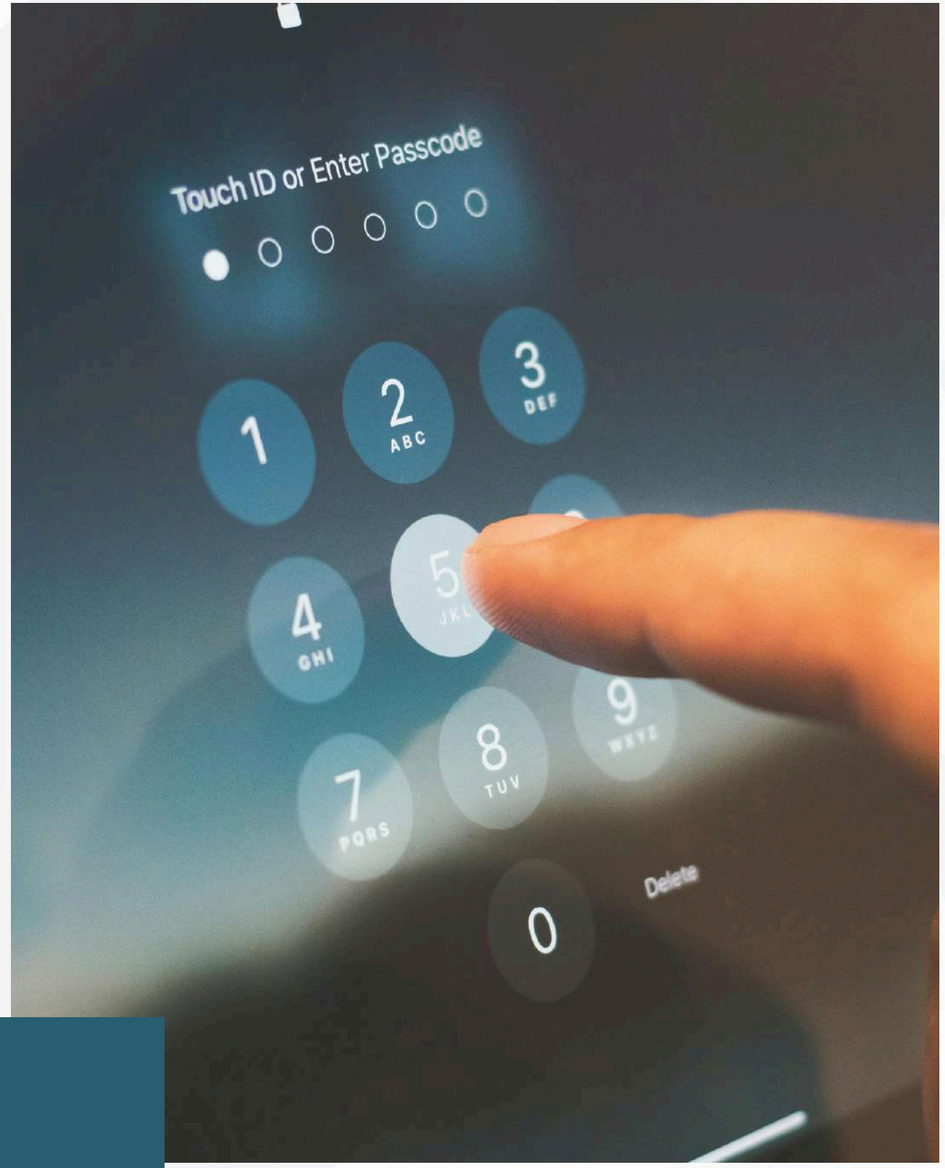
By the end of the module learners can...

- Distinguish event, alert, security incident and data breach
- Identify basic IoCs and collect useful initial evidence
- Classify severity using impact, urgency and confidence
- Use a playbook for phishing, ransomware or lost device incidents
- Support communication, recovery and post-incident review

KEY CONCEPTS AND DEFINITIONS

Shared vocabulary prevents operational confusion

- **IoC:** technical trace such as malicious IP, hash, domain or file path
- **Triage:** first prioritisation and routing of an alert or incident
- **Playbook:** repeatable response guide for a specific scenario
- **Event:** observable change in system or network behaviour
- **Alert:** signal generated by monitoring, user report or tool
- **Incident:** confirmed or suspected violation of security policy



CONTEXT AND BACKGROUND

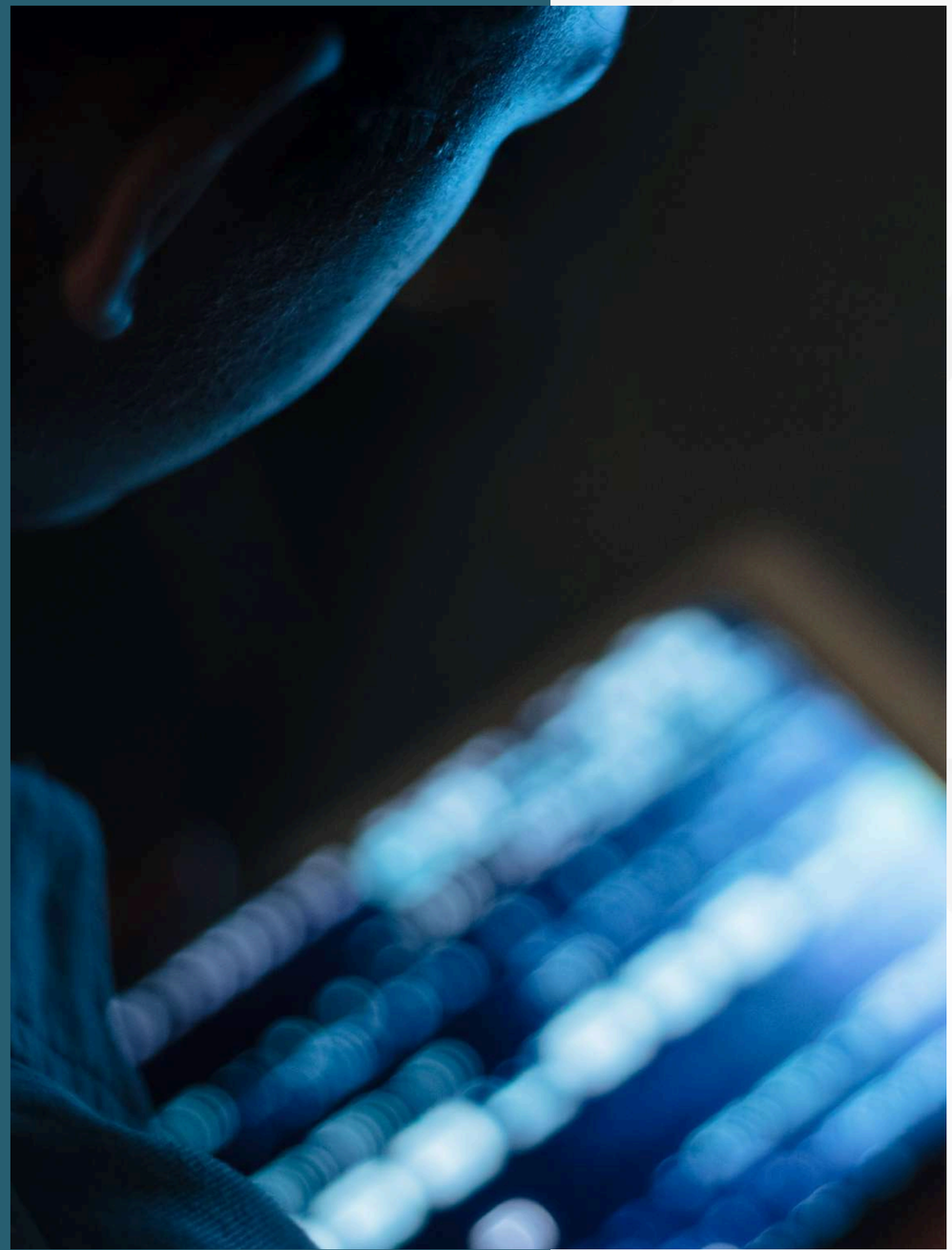
VET-specific risk landscape

- LMS platforms, e-mail, student records and lab devices are critical assets
- Simulated industrial networks may be connected to real infrastructure
- Shared computers and removable media increase exposure
- Informal reporting can be fast, but weakens documentation
- Third-party tools extend both capability and risk

MAIN THEMES

The backbone of the module

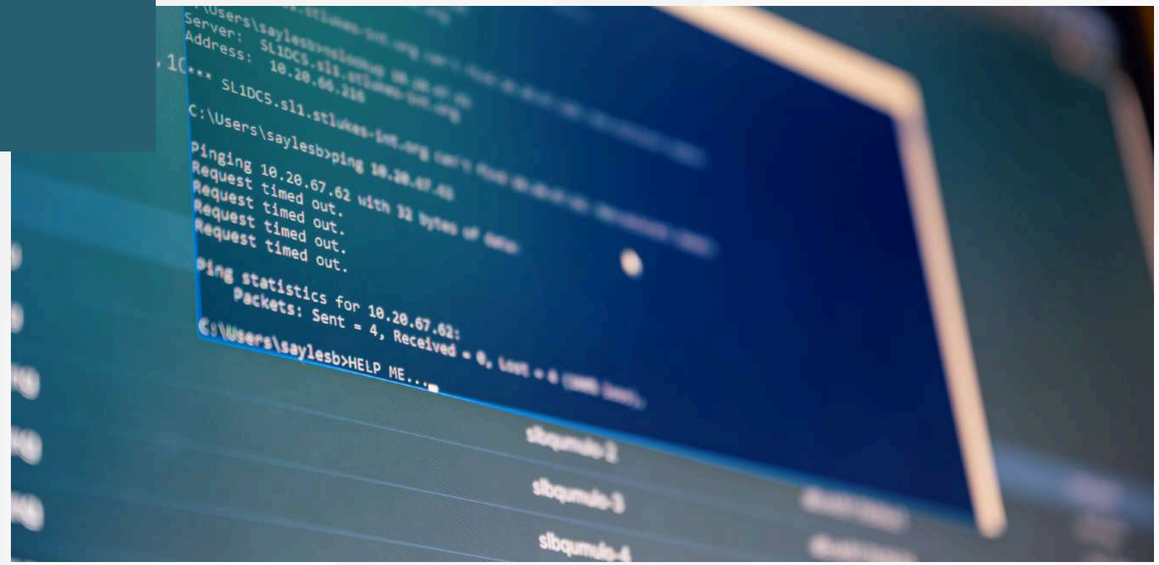
- Readiness: roles, contact lists, logging, backups and exercises
- Detection: signals, IoCs, reports, anomaly recognition
- Decision-making: severity, escalation and containment trade-offs
- Continuity: recovery priorities and safe restoration
- Learning: post-incident review, updated controls and training

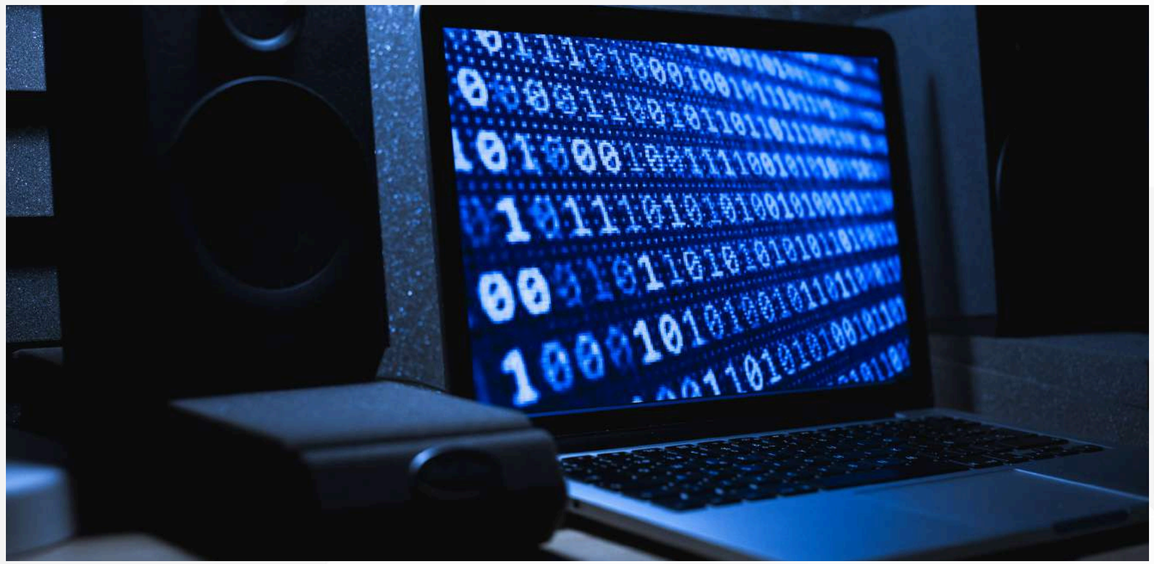


CORE PRINCIPLES

Rules that survive the pressure of an incident

- Do not destroy evidence while trying to fix the problem
- Contain first, understand progressively, recover safely
- Use least privilege and verified identities during response
- Communicate early, accurately and without speculation
- Document decisions, timestamps, systems and responsible persons
- Update the playbook after every serious exercise or incident

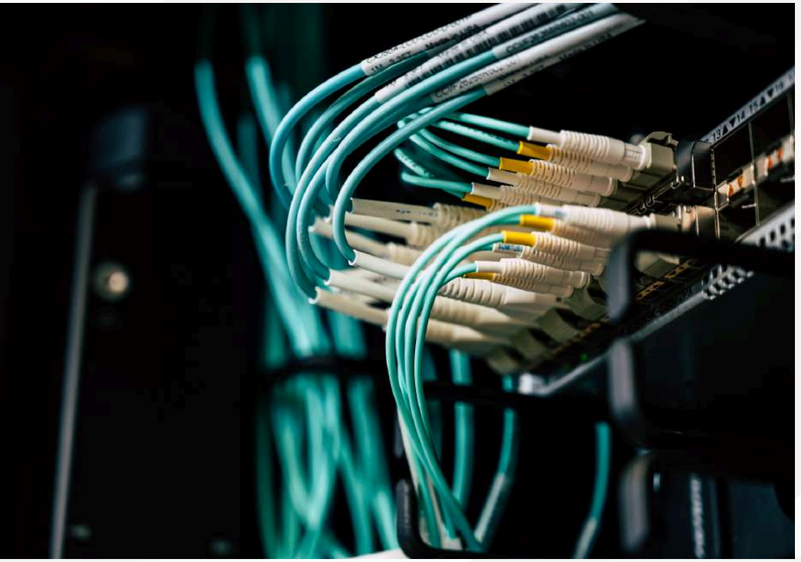


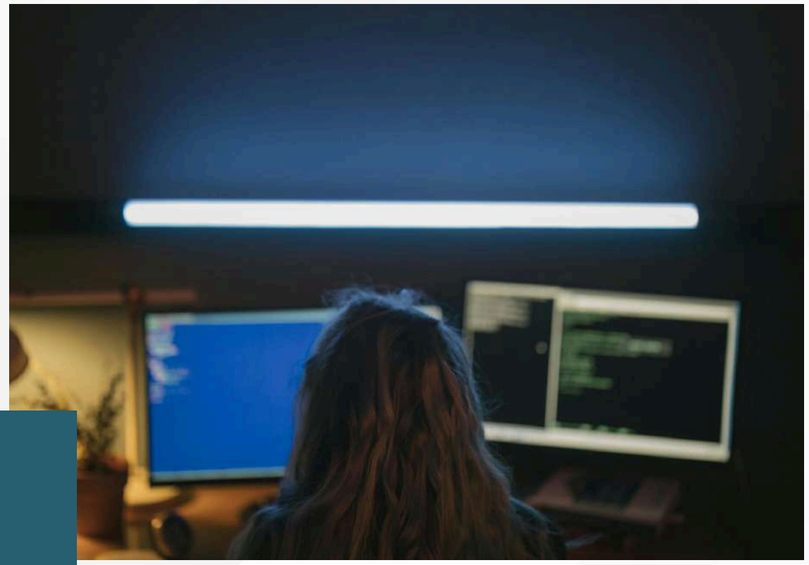


PHASE 1: PREPARATION

Build readiness before the alarm sounds

- Define CSIRT/CIRT roles: leader, technical lead, communications, legal/DPO, management
- Maintain asset inventory and critical service priorities
- Prepare out-of-band contact channels and emergency access rules
- Create playbooks for phishing, ransomware, lost device and cloud misconfiguration
- Test backups and practice tabletop exercises at least once per semester





CSIRT / CIRT TEAM MODEL

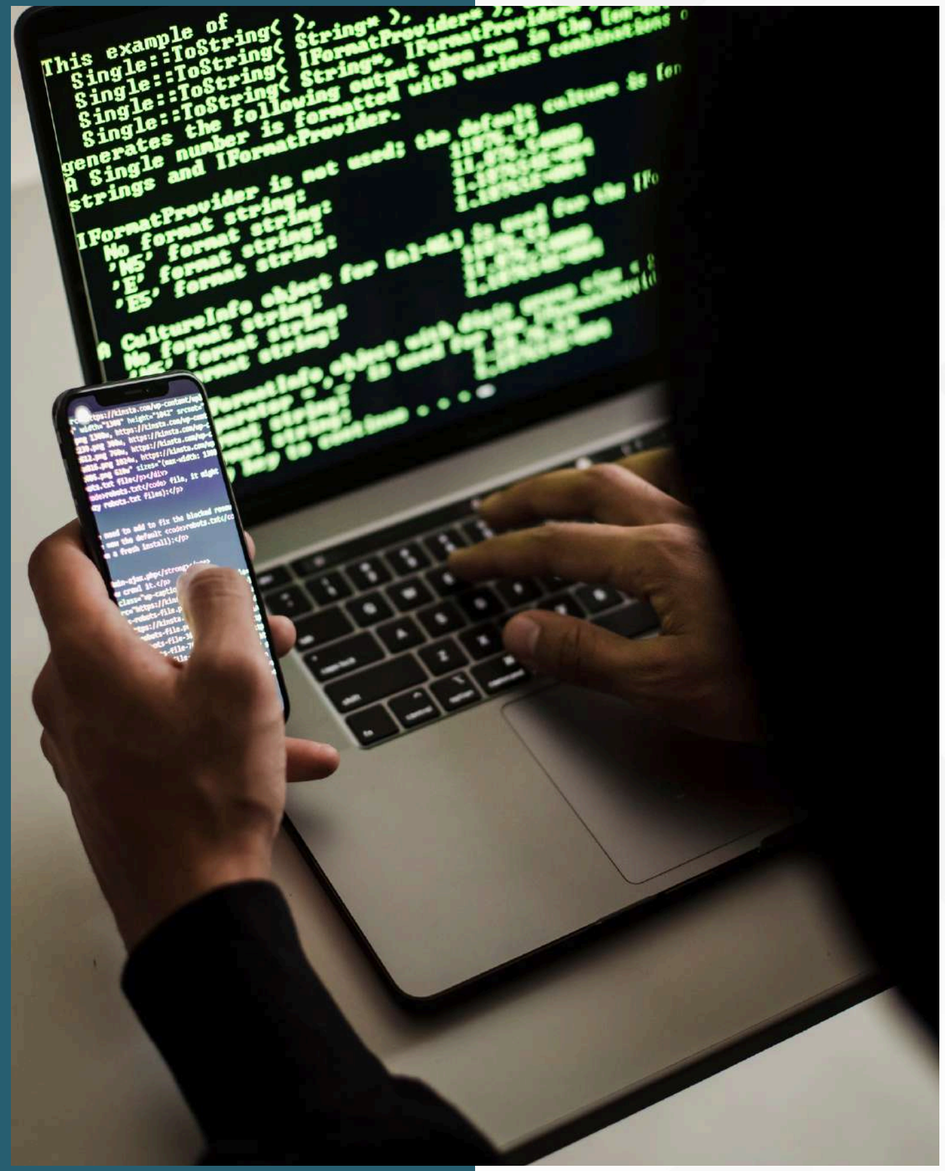
Incident response is a coordinated team sport

- **Incident commander:** keeps decisions and timeline under control
- **Technical handlers:** analyse logs, isolate systems, preserve evidence
- **Institutional leadership:** approves disruption and external communication
- **DPO/legal:** evaluates personal data and regulatory obligations
- **Teachers/admin staff/students:** report early and avoid “silent repair”
- **Vendor/MSSP:** supports systems outside institutional control

PHASE 2: DETECTION AND ANALYSIS

From weak signals to validated incident

- Collect alerts from users, SIEM/EDR, LMS logs, e-mail gateways and helpdesk
- Look for IoCs: suspicious logins, unusual IPs, hashes, domains, processes and file changes
- Determine scope: affected accounts, devices, data, services and time window
- Validate whether the attacker is still active
- Preserve evidence: logs, e-mail headers, screenshots and ticket identifiers



TRIAGE AND SEVERITY CLASSIFICATION

Prioritise without panic

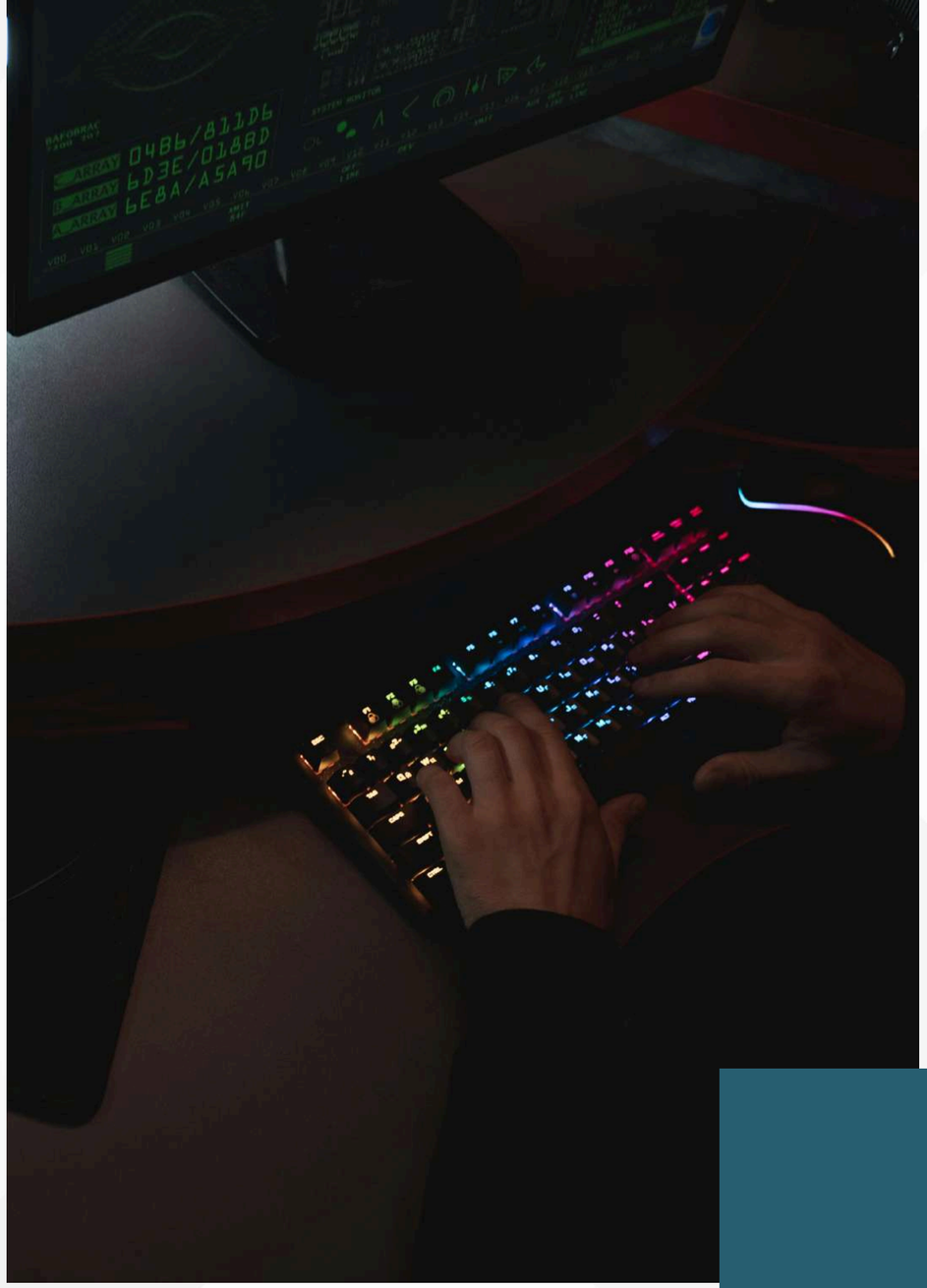
- Functional impact: which learning or administrative services are affected?
- Information impact: personal data, credentials, exam material or financial records?
- Recoverability: how hard is restoration and how reliable are backups?
- Confidence: confirmed incident, likely incident or weak signal?
- Escalate immediately when critical data, privileged accounts or ransomware are involved

Low **Medium** **High** **Critical**

PHASE 3: CONTAINMENT

Stop the bleeding while keeping evidence usable

- Short-term: isolate workstation, disable account, block domain or IP, revoke sessions
- Long-term: segment network, create clean parallel service, apply firewall rules
- Avoid mass deletion before evidence is captured
- Decide acceptable disruption: learning continuity versus risk of spread
- Coordinate with vendor if the affected service is outsourced



PHASE 4: ERADICATION

Remove the root cause, not only the symptom

- Identify initial access vector: phishing, leaked credentials, vulnerable service or misconfiguration
- Remove malware, backdoors, rogue accounts and malicious forwarding rules
- Patch exploited vulnerabilities and harden exposed services
- Reset credentials and review privileged access
- Confirm that IoCs no longer appear in logs and endpoints

PHASE 5: RECOVERY

Return to service safely and visibly

- Restore from clean, validated backups only
- Prioritise services: identity, communication, LMS, student records, finance, labs
- Monitor for re-entry, persistence or abnormal traffic
- Communicate restoration steps and known limitations
- Document residual risk and temporary controls

PHASE 6: LESSONS LEARNED

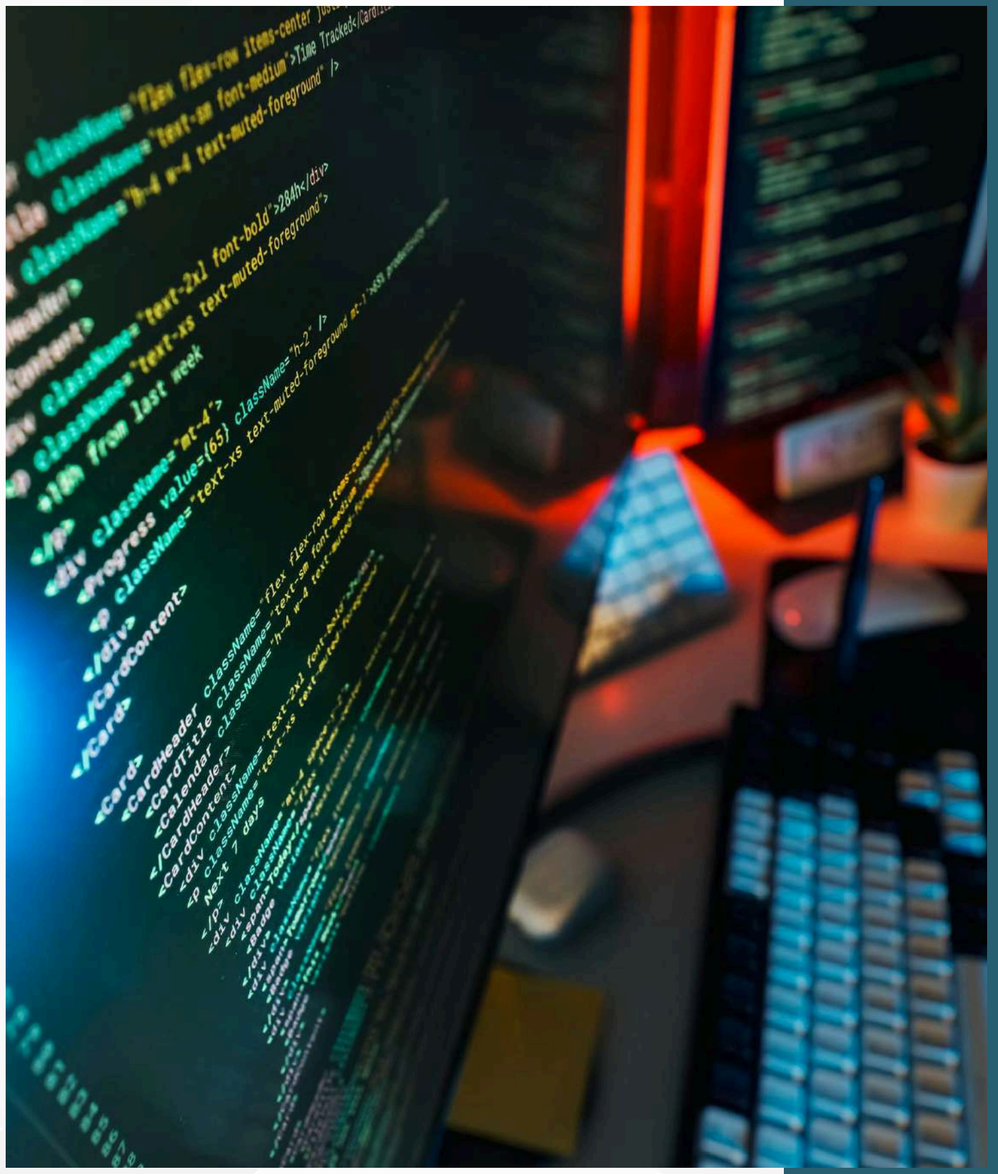
Close the loop before memory fades

- Hold post-incident review while facts are still fresh
- Reconstruct the timeline: detection, decisions, containment and recovery
- Identify gaps in tools, roles, training and communication
- Convert lessons into owners, deadlines and measurable improvements
- Share anonymised learning cases with students and staff

CHALLENGES AND RISKS

What usually breaks under pressure

- Unclear decision rights: nobody knows who can shut down a service
- Over-reliance on informal phone calls and undocumented fixes
- Poor visibility: missing logs, unsynchronised clocks or no endpoint telemetry
- Vendor opacity during cloud or LMS incidents
- Communication vacuum filled by rumours
- Backups that exist in theory but fail in restoration



OPPORTUNITIES AND BENEFITS

What good incident response creates

- Shorter downtime and less damage from attacks
- Better protection of learners, staff and partner data
- Stronger trust with employers, parents, regulators and funders
- Improved cyber hygiene across the whole institution
- Reusable learning scenarios for VET cybersecurity education
- Evidence-based investment decisions after incidents

PRACTICAL APPLICATIONS

Where learners apply the method

- **Student lab:** suspicious traffic from a simulated PLC network
- **LMS:** teacher account sends unexpected links to a class group
- **Administration:** lost laptop containing practice placement files
- **Cloud drive:** folder with assessment sheets accidentally shared publicly
- **E-mail:** finance office receives invoice redirection request
- **Workshop:** shared workstation displays ransomware note

TOOLS AND METHODS

From simple checklists to advanced platforms

- **Reporting form:** who, what, when, where, evidence attached
- **SIEM/EDR:** correlation, endpoint visibility and alert enrichment
- **Threat intelligence:** known malicious domains, IPs, hashes and TTPs
- **SOAR/playbooks:** structured automation for repetitive actions
- **Forensic readiness:** log retention, evidence chain and secure storage
- **Communication templates:** internal notice, management brief, user advisory

PLAYBOOK: PHISHING IN A VET INSTITUTION

A minimum viable response checklist

- Capture message, headers, URLs and recipient list
- Disable or reset compromised account; revoke sessions and MFA tokens if needed
- Block malicious domains, hashes and sender infrastructure
- Search for similar messages across mailboxes
- Warn affected users with clear instructions
- Review whether data or credentials were exposed

COMMUNICATION STRATEGY

Say enough, say it early, say it accurately

- Separate audiences: students, staff, leadership, partners, vendors and regulators
- Use plain language: what happened, what to do now, where to ask questions
- Avoid speculation, blame and unsupported technical claims
- Coordinate technical and legal messages before release
- Maintain a single source of truth and update it regularly

CASE EXAMPLE 1: LMS / CANVAS-TYPE BREACH

Third-party concentration risk

- Scenario: provider compromise affects many institutions at once
- Risk: stolen messages, credentials, student data or defaced login pages
- Immediate actions: vendor contact, SSO review, forced password reset where justified
- Containment: monitor abnormal logins and disable risky integrations
- Communication: explain uncertainty and give practical user steps
- Learning: map dependency on critical education platforms

CASE EXAMPLE 2: UNIVERSITY DATA BREACH

Credential misuse and delayed detection

- Scenario: legitimate account used to access large volumes of institutional data
- Risk: personal identifiers, health data, payroll or candidate records exposed
- Detection gap: activity looked normal until volume and pattern were analysed
- Response: account disablement, log analysis, data scoping, legal escalation
- Learning: privileged monitoring and anomaly detection are essential

CASE EXAMPLE 3: THIRD-PARTY VENDOR RISK

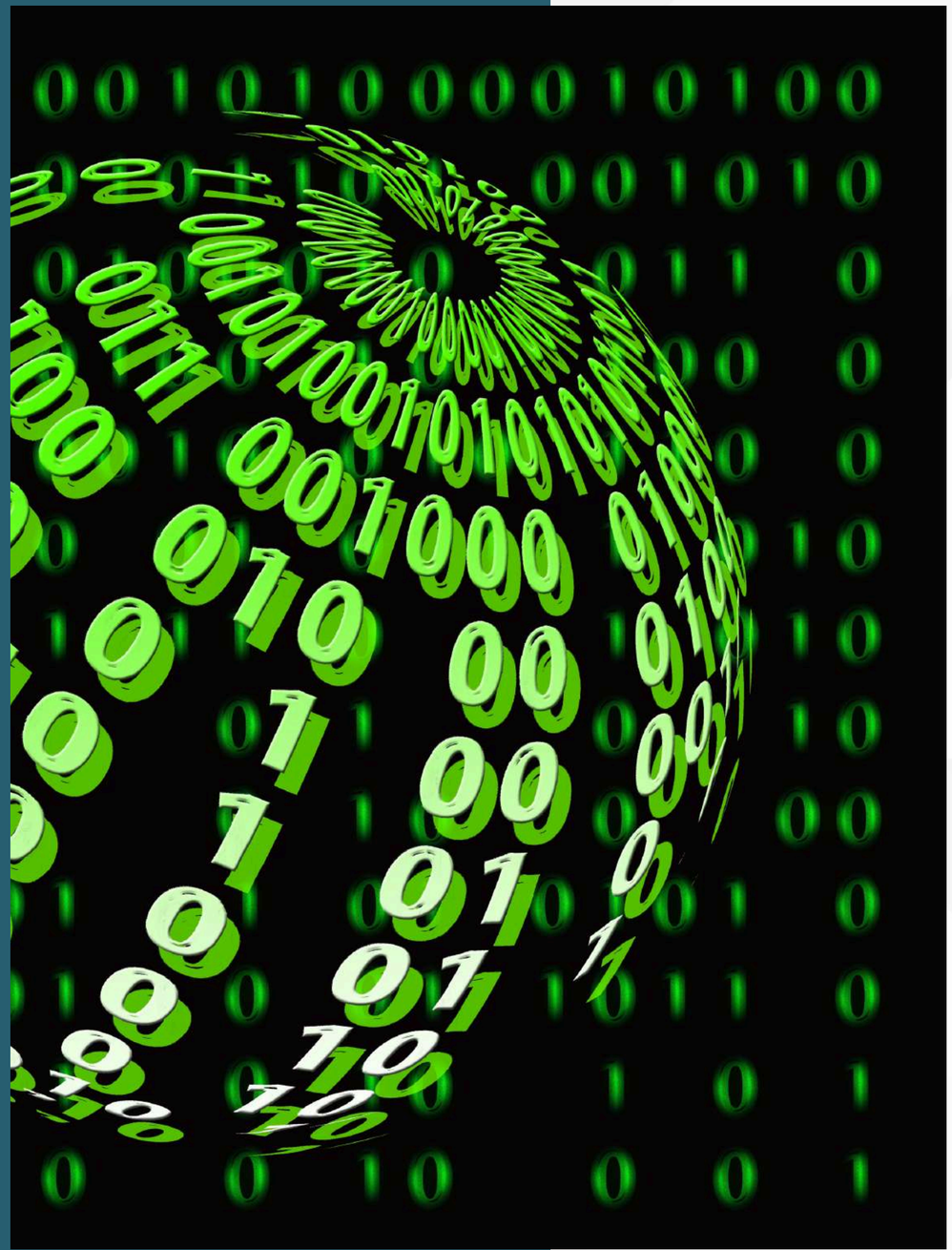
When the incident starts outside your walls

- Scenario: cloud attendance tool or practice-placement platform is breached
- Institution remains responsible for decisions affecting its community
- Check contract: notification time, evidence access and support obligations
- Prepare contingency: alternative attendance or assessment workflow
- Record decisions and keep users informed without overpromising

INTERACTIVE ACTIVITY: TABLETOP EXERCISE

“The practice coordinator account is compromised”

- Group roles: teacher, IT handler, DPO/legal, director, communications, vendor
- Round 1: decide actions in the first 15 minutes
- Round 2: decide actions in the first 4 hours
- Round 3: prepare a short message for students and staff
- Debrief: what was missing from the playbook?



REFLECTION POINTS

Questions for individual or group discussion

- Which system in your institution would cause the most disruption if unavailable?
- Who can approve isolation of an LMS, identity system or lab network?
- What evidence would you preserve before cleaning an infected device?
- How would you communicate when facts are incomplete?
- Which one cyber hygiene habit would reduce the most risk this week?

KEY TAKEAWAYS

The module in six sentences

- Incident response is part of risk management, not a side task for IT
- Preparation determines the quality of every later phase
- Triage converts noise into priorities
- Containment must balance speed, evidence and continuity
- Recovery is safe only when backups and integrity are tested
- Lessons learned turn pain into resilience

SUMMARY

What has been covered

- DEFENDERS structure and VET learning context
- NIST and SANS lifecycle models
- CSIRT/CIRT roles and escalation logic
- IoCs, triage and severity classification
- Containment, eradication, recovery and post-incident review
- Playbooks, checklists, communication and case-based learning

ASSESSMENT / REVIEW

Short knowledge check

1. Name the six SANS PICERL phases.
2. Give three examples of IoCs in a school or VET network.
3. What information belongs in the first incident report?
4. When should a compromised account be disabled?
5. Why can restoring from backup still be risky?
6. What should be updated after the post-incident review?

CONCLUSION

From awareness to disciplined action

- A resilient institution does not wait for perfect information
- Every learner and staff member can be a reliable early-warning sensor
- Playbooks reduce improvisation and support accountability
- Good cyber hygiene lowers both probability and impact
- The best incident response lesson is the one embedded before the next incident

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