



# Incorporating the National Cyber League into Course Curriculum

**A Working Document for Faculty Coaches (High Schools and Colleges)**

*This document is being collaboratively developed with the goal of creating a Step-by-Step Guide for NCL Coaches to use NCL in their classwork. All NCL coaches are invited to contribute their ideas, questions, best practices, and additional resources they may have already developed.*

For general information on NCL, visit [nationalcyberleague.org](http://nationalcyberleague.org).  
For registration and details, visit [cyberskyline.com/events/ncl](http://cyberskyline.com/events/ncl).  
Questions: Contact [ncl@cyberskyline.com](mailto:ncl@cyberskyline.com).

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## 1. Benefits

- “Over 17k students participate in the NCL each year. Why not give them credit for their efforts?”
- “Numerous instructors already have successfully incorporated the NCL into their classes (high school through college, including 2 and 4-year universities). Why?”
  - There are over twenty hands-on labs that include step-by-step instructions
    - The categories of challenges align with the NICE framework and CompTIA Sec+, Network+, CySA+ certifications
  - The NCL includes three separate competitions which reinforce the skills taught in your security class
- The NCL competition is an invaluable resource used to re-emphasize content covered in a computer security class. Additionally, it allows students to grow their skills commensurate with the time and effort put in.

## 2. Classes NCL can be incorporated into

- Undergraduate and Graduate classes at all levels
  - Examples of courses that apply:
    - Cybersecurity courses
    - Network Security
    - Introduction to Networking
    - Computer Science

## 3. Labs

- NCL Gym challenges
  - Assign as labs
  - Each challenge contains a PDF with step-by-step instructions

## 4. Environment

- No special computing environment is required to compete in the NCL. The NCL is an entirely online competition hosted by [Cyber Skyline](#).
- To maximize student success, students should have access to a [Kali Linux](#) instance. This can be achieved by running Kali as a virtual machine via VMWare or Virtual Box.
  - Other options
    - [Cyber Range offers](#) a virtual environment
    - [On Works](#) offers free desktop hosting (time limited and non-persistent)

## 5. Assistance with labs and environment

- Class schedule provided during “lab time”
- Instructors have had success in matching up advanced security class students with intro students
- Discord/Slack/MS Teams for the class to ask questions
- Ideally, cover one NCL category per week for nine weeks (there are nine categories)
  - You may need to double up on a couple in order to cover all categories prior to the Practice Game
  - A sample schedule is included in the [NCL Resources Guide](#)
- During the week of the Practice Game, may need to refrain from assigning any other lab work
- For the week leading up to the Individual Game, it is suggested to go as light as possible on lab **work**

## 6. Categories - difficulty rating

- Each of the nine categories offers easy, medium, and hard challenges.
  - Easy challenges are intended to be solvable by a beginner that understands the topic conceptually, but has no hands-on experience
  - Medium challenges are intended to be solvable by someone who is taking or has taken a college-level course in the topic
  - Hard challenges are intended to be solvable by someone with deep experience with the topic. These challenges

- typically cover more specialized concepts and require independent learning and research in order to solve
- It is important to convey to your students that it is not necessary to know all nine categories in order to play and score in the games.
- Beginners can ease in with:
  - Open Source Intelligence (OSINT) - a lot of Google searching
  - Log Analysis
  - Cryptography
- Medium-level
  - Password Cracking?
  - Network Traffic Analysis
  - Web Application Exploitation?
  - Scanning?
- Advanced
  - Enumeration & Exploitation
  - Forensics

## 7. Grading

- Grade NCL Gym challenges based on completion
  - You can add quizzes based on the NCL Practice Gym
- Export NCL scores/gym completion as csv
- Practice Game and Individual grading suggestions:
  - Assign a grade based on the class average
    - Assign a grade of 85% if the student meets the class average
    - Some instructors have found that their class has about the same average across most of the seasons. Therefore, they announced to the class what the anticipated average is. If the average needs adjusting, they only adjust the students' grades up
  - Assign a grade based on what you taught in the class
    - For Practice Game, suggest looking through the challenges in each category and setting a reasonable point target for each category, giving a separate grade for each category
    - For Individual Competition browse the challenges and set a total point target that is reasonable for students (based on what they should know), and

- let students reach that target using any combination of challenges that they want
- use the Team Game as a make-up for students who missed the Individual Game or Practice Game, or just as a fun option for students who want to do it.
  - Create a Discussion Board assignment and grade the students' write-up of the challenge(s), rather than how they scored. Please make sure that this is not shared externally, just internal to your students.
  - Team game
    - This could be extra credit.
      - Some feedback from students indicated they felt they were spending too much time on NCL and needed time to catch back up on other classwork
  - Scaffolding from in-class labs to NCL Individual Game
    - NCL Prep Labs - Use custom in-class labs based on previous NCL challenges (Multiple labs - about 10% of overall grade)
    - NCL Gymnasium - About 4% of overall grade. Sliding scale based on points scored.
    - NCL Practice Game - About 4% of overall grade. Sliding scale based on points scored.
    - NCL Individual Game - Points awarded based on the number of points scored.
      - 1100 out of 3000 points = 100%
      - 1000 out of 3000 points = 95%
      - 900 out of 3000 points = 90%
      - 800 out of 3000 points = 80%
      - etc.

## 8. Rules/Ethics

- Ensure radio silence during the competition
- Overall, stress that NCL does a very good job of catching collaborators
- Check [NCL FAQ](#)

## 9. Funding options

- The California State University system sets aside “learning fee” money that faculty can request.
  - The learning fee money can be used to pay for all students
- Charge a Lab Fee for the course. This fee is used to pay for the NCL Competition.
- Local corporation donates the funds for our students to compete

## 10. Tools

- NCL Canvas course shell
  - Visit <https://lor.instructure.com/search>
  - Search for “Introduction to the National Cyber League”
    - You can view the course content without any setup, but you can also import the course shell into one of your own courses.
    - A tutorial is available here:  
<https://www.loom.com/share/1c7b48c57b224ae0b006e61164944f79>