Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2026

# Computer Science

## Coursework Project Brief

## Higher and Ordinary Levels

Time: 12 weeks

90 marks

# 1. Information for candidates, teachers and school authority

The assessment of Leaving Certificate Computer Science comprises of two components:

1. Final examination
2. Coursework project

The coursework project is worth 90 marks, which is 30% of the overall marks for Leaving Certificate Computer Science. The remaining 210 marks (70%) are for the final written examination.

Coursework must be completed in full and strict compliance with the procedures and conditions outlined in this coursework brief and in the State Examinations Commission (SEC) Coursework Rules and Procedures.

The coursework must be carried out and submitted to the class teacher and will then be submitted to the SEC (see Section 17 of the SEC Coursework Rules and Procedures).

**The authentication process**

The authentication process is put in place by the SEC to ensure the integrity of the examination process and to ensure fairness and inter-candidate equity. The candidate, class teacher and school authority all have a responsibility to ensure that the ongoing preparation of coursework and that the work ultimately submitted to the SEC is the candidates' own individual authentic work. The SEC Coursework Rules and Procedures contains comprehensive information on the authentication process that must be read and adhered to. This brief contains the subject specific information and requirements for the completion of the Computer Science Coursework Project. It is fully expected that candidates will carry out research and investigation as part of their coursework. To fully comply with these SEC Coursework Rules and Procedures, candidates must reference and acknowledge their research sources, including any use of AI, as outlined in Appendices 1 and 2 of the SEC Coursework Rules and Procedures. To include material that is not created by the candidate and not properly referenced will be considered plagiarism. This is considered to be cheating. This is a breach of regulations and will be investigated by the SEC - see Section 18 of the SEC Coursework Rules and Procedures. It is the responsibility of the candidate, the class teacher, and the school authority to ensure that the work being presented to the SEC is the candidate's individual authentic work.

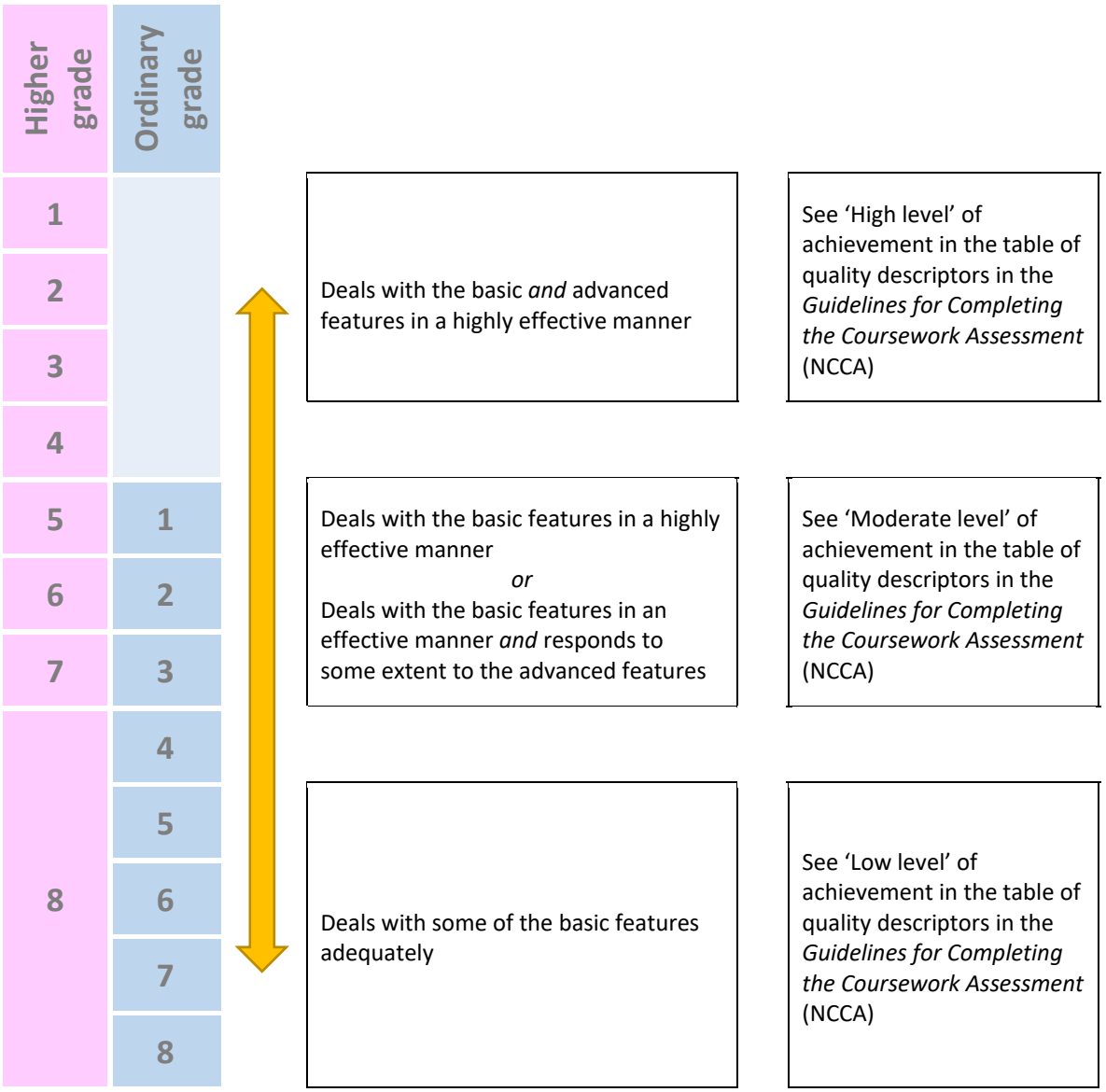
The project will be carried out over a period of twelve school weeks, beginning on **Monday, 1 December 2025**. The coursework must be completed by **Thursday, 19 March 2026**. The report must be presented in the form of a website comprising of one or more webpages.

Carrying out the project involves responding to a brief by producing a computational artefact and an accompanying report. The project will be submitted in digital form. Video footage and/or images of the artefact in operation should be incorporated into the report.

The same project brief applies to Higher and Ordinary level candidates. However, a final decision about which level is being taken does not have to be made when the project is being submitted.

The SEC will grade the project in line with the standards that apply to the level at which the candidate takes the final examination.

The project brief sets out some *basic requirements* and *advanced requirements* of the artefact. The way that the standards at the two levels are aligned with each other is illustrated on the left-hand side of the graphic below. This means that, for example, a project that would get a grade 2 at Ordinary level will automatically get a grade 6 at Higher level. It can also be seen that any project that would get a grade 4 or better at Higher level exceeds the highest standard of work expected at Ordinary level. Because of this, a project of this quality would automatically get full marks at Ordinary level. It should be noted that it is possible to achieve full marks at Ordinary level by attempting the basic features only.



## 2. The project brief

Forests are some of the most important ecosystems on our planet. They give us clean air, store huge amounts of carbon, protect biodiversity, and help regulate water and temperature. But forests are under threat from climate change, wildfires, and biodiversity loss. As trees face droughts, higher temperatures, and diseases, their ability to support wildlife and store carbon is reduced.

***Source:*** *https://commons.wikimedia.org/wiki/File:Pine_trees_in_Wicklow_Mountains.jpg*

Computer science provides tools to help us understand and respond to these challenges. By creating embedded systems, we can collect environmental data such as soil moisture, light, or temperature, and simulate real-world processes like canopy cover, drought cycles, or wildfire risk. We can also build computer-based models that test "what-if" scenarios, compare different outcomes, and make predictions about the future of forests, climate, biodiversity, and species populations. These insights help us to understand risks, anticipate future impacts, and explore possible solutions.

**The task**

For this project you are required to develop a functional embedded system that collects environmental data and simulates a real-world process related to the theme of forests and their influence on climate, biodiversity, water resources, species populations, carbon storage, wildfire risk, etc.

You will also develop a computer-based model that uses the collected data that can be combined with open-source data or simulated data (dataset created by you), to test "what-if" scenarios, carry out predictive analysis about future conditions, and compare outcomes. Finally, you will incorporate a feedback mechanism to make the system adaptive, allowing either your embedded system or your model to respond automatically to changing conditions.

**Basic requirements**

1. Embedded system design
   - Build a functional embedded system that uses at least one digital input and at least one analogue input.
   - The system must generate at least one primary output which can be either digital or analogue.
   - The system can be started or calibrated manually but should operate automatically once started.
2. Data collection
   - Use your embedded system to collect and store environmental data that relates to your chosen theme. The stored data will be used as part of your model in the advanced requirements.
3. Process simulation
   - Configure your embedded system to simulate a real-world process related to the theme, for example: canopy cover, drought cycles, biodiversity changes, population growth/decline, wildfire risk.
   - Run tests to show how the system responds using different inputs or changing environmental data.

**Advanced requirements**

1. Disaster risk modelling
   - Using Python, develop a computer model of a chosen disaster risk scenario related to forests, for example: wildfire, drought, pest outbreak, air quality, landslides, flooding.
   - Your model must use some data collected from your embedded system and can be combined with open-source data or simulated data.
2. What-if simulations
   - Explore how your forest disaster risk model behaves under different conditions by creating and testing two *"what-if"* scenario simulations. Each scenario should involve changing one or more key variables and observing the resulting changes in system behaviour or predicted risk.
     For example:
     - What if temperature increases (drought conditions)?
     - What if rainfall decreases (drought conditions)?
     - What if tree density increases (afforestation)?
     - What if the forest canopy is reduced (deforestation)?
     - What if a species population grows too large or too small (for example: too many predators in a particular species or too few pollinators)?
     - What if high temperatures and low soil moisture increase wildfire risk?
3. Adaptive system
   - Extend your system to include a feedback mechanism that enables it to adapt automatically to changing conditions, for example: triggering an alert when fire risk is high, watering a plant when soil moisture is too low, or adjusting predictions based on the most recent data. Note that the adaptive response can be either physical (extending the embedded system) or virtual (changing the model so that it adjusts automatically).

**References**

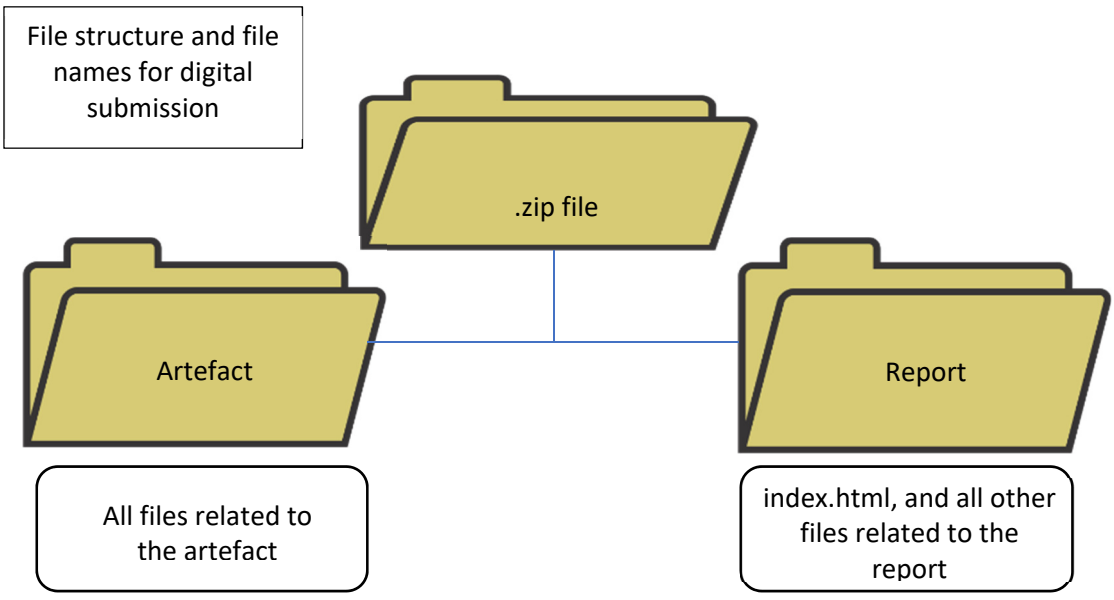
Below are some links to more detailed information relating to the context of the brief. The list is neither exclusive nor exhaustive and is supplied to assist you with your own ideas and research.


- https://www.gov.ie/en/department-of-agriculture-food-and-the-marine/campaigns/forestry-in-ireland/
- https://assets.gov.ie/static/documents/irelands-forest-strategy-2023-2030.pdf
- https://www.npws.ie/
- https://teagasc.ie/news--events/daily/new-farm-forests-are-backing-biodiversity/
- https://www.coillte.ie/
- https://www.forestryfocus.ie/
- https://www.coford.ie/media/coford/content/COFORDSTRATEGYFULLFINALREPORTJAN2022240122.pdf
- https://climate.ec.europa.eu/climate-change/causes-climate-change_en
- https://www.climatecouncil.org.au/deforestation/
- https://climate.mit.edu/explainers/forests-and-climate-change
- https://arnowa.com/smart-forest-monitoring/
- https://www.raspberrypi.com/news/raspberry-pi-in-the-natural-world/
- https://microbit.org/news/2020-07-06/make-a-microbit-weather-station/
- https://www.semanticscholar.org/paper/Chainsaw-Sound-and-Vibration-Detector-System-for-Prasetyo-Mutiara/55ce406208b485ca1107d64eeb41857d2c31f177
- https://www.dryad.net/post/different-uses-of-wireless-sensors-for-wildfire-monitoring
- https://www.wwfguianas.org/our_work22/forest/early_warning_system/
- https://www.un-spider.org/global-early-warning-system-wildland-fires-global-ews
- https://www.bosch.com/stories/early-forest-fire-detection-sensors/
- https://www.ucd.ie/agfood/newsandevents/news/irishsoilmoisturemonitoringnetworkismon/
- https://infoamazonia.org/en/2022/02/15/prodes-and-deter-systems-against-deforestation-amazon/

## 3. Creating your coursework project

It is the responsibility of you, the candidate, to create and manage your coursework project.

1. Your coursework project that is submitted for assessment must comprise of the following two components:
   - The digital components of the computational artefact, including all relevant programs in the prescribed languages.
   - A coursework report, submitted on a website (html file), of no more than 2500 words, including a video presentation of no longer than 5 minutes. The video should be no more than 1GB in size. Individuals should not be identifiable in the video but you may include a voiceover in order to explain the features of your artefact. The video must not be hosted online and must be accessible within the folder structure described below.
     Penalties may apply where the overall word count or video length or size is exceeded.
2. Some of the research and investigation that you carry out for the project and describe in section two of your report, 'Investigation', can be completed outside of class time. However, the actual writing of the report and all of the work on the artefact itself must be done in class under the supervision of your teacher so that they can authenticate your work.
3. Your coursework project must be saved in a single zipped file (.zip). The project will be submitted through the online Schools Portal, with details, including the naming convention for the zip file, included in a circular that was issued to your school.
4. You will not be submitting the physical embedded system. It is essential that your video demonstrates fully how your artefact works.
5. The .zip file, when extracted, should be a folder that contains exactly two subfolders, as in the diagram below.




   a. One of these sub-folders should be called "Report" and should contain all of the files relating to the report. It should be possible to access the complete report by opening a file named "index.html" at the top level within the "Report" folder. That is, all of the

content of the report should either be in this file itself or be accessible via links from within this file to local files. Any subsidiary files, such as additional html files, css stylesheets, image files, and so on, must also be in the "Report" folder, either at the same level as index.html or within a further suitable folder structure.

b. The other sub-folder should be called "Artefact" and should contain the essential digital components of your artefact. The file structure of your artefact should be made clear. For example, if there is a main, supervising program, from which other programs are imported or called, this program should be clearly named in the sub-folder and referenced in the description in the coursework report.

6. The website must **not** be an online website (e.g. Google Site, Wix, etc.). It must be saved as an accessible HTML file in the folder structure described in this section. Failure to present your website in this way will result in you forfeiting marks.

7. It is **your** responsibility to ensure that all electronic materials submitted are free from viruses, so that examiners can open all required files for assessment, and all code supplied can be evaluated.

8. All data and information in the artefact should be anonymised and comply with GDPR. If an artefact uses programming languages other than Python and JavaScript, these files can also be included in this sub-folder. In such cases, you cannot assume that the examiner will be familiar with the programming language concerned, so the responsibility for demonstrating its accuracy rests with you.

9. It is your responsibility to ensure that all of the required files are contained in the zipped file prior to submission of the work. You may lose marks if required files are omitted. Marks may be lost for not conforming to the filing structure outlined above, and for not using a clearly labelled file structure for the artefact. A **backup copy** of the submitted files must be retained in your school until the assessment process is complete.

10. You must finalise the authentication process to confirm that the coursework project report and recorded material being submitted is your own individual authentic work by signing the SEC Authentication Form P.2. This will be provided by your class teacher. Your class teacher and school principal will also sign this form to confirm that you adhered to the authentication process.

**IMPORTANT**
It is essential that you double check that your artefact and report can be accessed by the examiner or you will not be credited for the work you have done. If a particular element of your project, such as the video, artefact files or report, is not included you may forfeit marks. Similarly, if your report or any of your files are stored in an online repository such as Google Drive or One Drive it will not be accessible for marking.

Once completed, put the zipped project on a removable medium, bring it to a device that was not used when working on any part of the project. Disconnect that device from the internet. Unzip the project and check that the artefact and the report including all images, video(s), and other files are present and that all links between them are working correctly.

## 4. Coursework report – content and structure

The report should be presented as a website and should consist of the sections outlined below, each with a suggested maximum word count. Each section should be clearly identified using the headings provided.

The report should contain no more than 2500 words and the video should be no longer than 5 minutes. Failure to adhere to the word count or video length may result in you forfeiting marks.

Section 5, Mark allocation, provides a description of the breakdown of marks for each section.

### 1. Meeting the brief (max 400 words)

This is where you should include the video of your artefact in operation. The video should be used to demonstrate how your artefact meets the basic and/or advanced requirements of the brief. You should deal with each requirement you attempted in the video and demonstrate how you have achieved it.

You may wish to include a brief written description, with images, demonstrating how your artefact meets each of the requirements. You will not be penalised marks for not including any text if your video is sufficient in describing how you meet each of the requirements.

### 2. Investigation (approximately 400 words)

In this section of the report you should show evidence of your own research on the brief, including research on existing solutions, systems or ideas that are aligned to the brief. You should consider your research and explain what decisions you make regarding your project.

### 3. Plan and design (approximately 600 words)

This section of the report should contain a clear description of the design objectives of your project.

Your planning should show consideration of the following:

- Different project options and justification of design choices
- Stakeholders and end user needs
- The technologies that will be used
- System architecture/high-level flowchart showing components

### 4. Create (approximately 800 words)

This section should include a description of the key milestones of the development process.

You should describe the testing that took place throughout the development process.

You should explain one of the problems that you encountered during the implementation and describe how you overcame the problem.

You should describe, in detail, the model you have programmed as part of your coursework project. If you do not have a model, you should explain, in detail, the algorithm you designed for your embedded system.

## 5. Evaluation (approximately 300 words)

You should evaluate the final artefact that you designed and created.

You should suggest, with justification, how your artefact could be improved or iterated upon in the future.

## 6. References

You must reference and acknowledge all research sources used such as: publications including books, professional journals and government reports; online sources and other types of media; source code; and material from specialist organisations and relevant individuals. To include such material without properly referencing the source will be considered plagiarism. In addition, the copying from, or reproduction of, material from such sources may also be considered plagiarism.

## 7. Summary word count

You must include a summary of the word count of your report. This could be presented in the form of a table, as shown below, and should show the word count for each section as well as the overall word count.

| Section | Word Count |
|---|---|
| 1. Meeting the brief | |
| 2. Investigation | |
| 3. Plan and design | |
| 4. Create | |
| 5. Evaluation | |
| **Total:** | |

## 5. Mark allocation

| *Coursework (90 marks in total)* | |
|---|---|
| **The report** | ***Marks*** |
| • Quality of report website structure and layout.<br>• Evidence of adherence to the principles of good user interface design when creating the website.<br>• Adherence to the word count and video length (penalties may apply). | **5** |
| **1. Meeting the brief** | |
| • Meeting the basic requirements of the brief.<br>• Meeting the advanced requirements of the brief. | **27** |
| **2. Investigation** | |
| • Research on the brief, including research on existing solutions, systems or ideas that are aligned to the brief.<br>• Consideration of how your research informs decisions about your project. | **10** |
| **3. Plan and design** | |
| • A clear, detailed description of the design objectives of the project.<br>• Consideration of different options and justification of design choices.<br>• Consideration of stakeholders and end user's needs.<br>• The technologies that will be used.<br>• System architecture/high-level flowchart showing components. | **18** |
| **4. Create** | |
| • Describe the key milestones of the development process.<br>• Describe the testing that took place during the development process.<br>• Explain a problem that was encountered in the development of the project and how it was overcome.<br>• Describe the model or the embedded system algorithm that was programmed as part of the project. | **20** |
| **5. Evaluation** | |
| • An evaluation of your final artefact.<br>• Suggest how you would further improve/iterate this project. | **10** |
| **References and summary word count** | |
| • You must also include references and/or a bibliography.<br>• Include a summary of the word count of the report, including the total word count. | **0** |

Leaving Certificate – Higher and Ordinary Levels

# Computer Science, Coursework

Leaving Certificate Examination 2026
Twelve weeks