

The Panel Review is a document that outlines the details of your project's proposed solution at the beginning of the semester. Once completed, it is submitted to your Capstone Leader for review and approval. The Panel Review is **not graded** and does not contribute toward your degree. Instead, it serves as official confirmation that your Capstone Leader has approved your project idea once they sign the document.

ال **Panel Review** هي ورقة بتوضح تفاصيل ال **proposed solution** بتاعة مشروعك في بداية الترم. بعد ما تخلصها، بتقدمها لل **Capstone Leader** عشان يراجعها ويوافق عليها. ال **Panel Review** مش عليه درجات ومش بيساهم في الحصول على الدرجة العلمية بتاعتك. بدل كده، هو بمثابة تأكيد رسمي إن ال **Capstone Leader** وافق على فكرة مشروعك، وده بيتم بمجرد ما يوقع على الورقة.

Getting your idea approved as early as possible is especially important in **Grades 11 and 12**. Once you have a project idea, you should submit your Panel Review promptly. If another team has a similar or identical idea and receives approval before you, your Panel Review may be rejected.

إنك تاخذ موفقة لفكرتك في أسرع وقت ممكن مهم جدًا، خصوصًا في **Grade 11** و **Grade 12**. أول ما يكون عندك فكرة للمشروع، المفروض تقدم ال **Panel Review** في أسرع وقت. لأن لو Team تاني عنده فكرة مشابهة أو مطابقة لفكرتك وخذت ال approval قبلك، ممكن ال **Panel Review** بتاعتك تترفض.

Since the Panel Review is not graded, it does not have a rubric or a strict list of requirements. However, it follows a specific structure. In this guide, we will explain what to include in each section of the Panel Review to help you present your idea clearly and avoid having it rejected by the Capstone General Committee.

بما إن ال **Panel Review** مش عليه درجات، فمفیش **rubric** أو قائمة متطلبات صارمة لازم تحققها. لكن في نفس الوقت، ليه **structure محدد**. في ال guide دي، هنشرح إيه اللي المفروض تحطه في كل Section من ال Panel Review، عشان تعرف تقدم فكرتك بشكل واضح وتتجنب إنها تترفض من ال capstone general .

This guide will formally cover every section of the Panel Review in detail. However, in practice, since the Panel Review is not graded, Capstone teachers and leaders are generally more focused on understanding and approving your core idea than on ensuring that every rubric requirement is included.

As a result, you can usually omit some of the requirements mentioned in certain sections, as long as the **main idea of your project is communicated clearly and effectively**. That said, this guide will still include every detail and requirement for completeness, so you can refer to them whenever necessary.

ال guide دي هتشرح رسميًا كل Section من ال Panel Review بالتفصيل. لكن واقعيًا، بما إن ال Panel Review مش graded، ف **Capstone teachers** و **leaders** غالبًا بيكون تركيزهم الأساسي على إنهم يفهموا ويوافقوا على **الفكرة الأساسية للمشروع**، أكثر من إنهم يتأكدوا إن كل requirement موجود بالحرف. وعشان كده، غالبًا تقدرؤا تتخطوا بعض ال requirements المذكورة في Sections معينة، طالما الفكرة الأساسية للمشروع متوصلة بشكل واضح وفَعَال. ومع ذلك، ال guide دي هتحتوي على كل التفاصيل وال requirements كاملة عشان تبقى شاملة، وتقدرؤا ترجعوا لها وقت ما تحتاجوا، بس مش لازم تعملوا الشغل كله مطبوط بالحرف، في شوية راحة هنا.

And here is what it looks like:
Don't worry about the exact format at the moment, as it sometimes changes, and your capstone teachers will send you a template anyway when it's time.

ده شكل ال Panel Review:
متقلقش من ال format بالظبط دلوقتي، لأنه ممكن يتغير من وقت للتاني، وال Capstone teachers هيدّوكم template أصلاً لما ييجي وقت إنكم تشتغلوا عليه كدة.

Introduction:

In this section, you will introduce your project in a way that is similar to how you would present it on your poster.

Start by identifying the **Grand Challenges** your project addresses. Then, connect these challenges to your **problem to be solved**, clearly explaining the specific issue your project aims to address.

Next, discuss the **prior solutions** you researched, including the **large-scale projects** you chose to study. Explain what you learned from these projects, such as which aspects worked well, which approaches were unsuccessful, and why. Finally, use these insights to transition into your **proposed solution**, explaining how your idea addresses the identified problem and builds upon what you learned from existing solutions.

الحتة دي هتكون شبة introduction ال poster شوية.

ابدأ بتحديد ال **Grand Challenges** اللي مشروعك بيتعامل معاها. بعد كده، اربط ال Challenges دي بال **problem to be solved**، وشرح بشكل واضح المشكلة المحددة اللي مشروعك بيبحاول يعالجها.

بعد كده، اتكلم عن ال **prior solutions** اللي بحثت فيها، بما فيهم ال **large-scale projects** اللي اخترت تدرسها. اشرح إيه اللي اتعلمته من المشاريع دي، زي إيه الجوانب اللي اشتغلت كويس، وإيه ال approaches اللي ما نجحتش، وليه. وفي الآخر، استخدم ال insights دي عشان تنتقل لل **solution** المقترح بتاعك، وشرح إزاي فكرتك بتتعامل مع المشكلة اللي حددتها، وإزاي بتبني على اللي اتعلمته من ال existing solutions.

Design requirements:

Just copy down the design/solution requirements you already wrote in your portfolio in chapter 2. If you haven't finished that section already, then go to the portfolio guide and learn how to write it down.

ببساطة، انسخ ال Design/Solution Requirements اللي كتبته بالفعل في ال Portfolio في Chapter 2 وحطها هنا و ريج دماغك. لو لسا معملتهاش افتح ال portfolio guide و روح اتعلم بتتعمل إزاي.

Time frame:

In most calendars, the prototype building process spans from week 5 to week 8, so just list it as that (it doesn't really matter anyways)

في أغلب ال calendars، عملية بناء ال Prototype بتكون ممتدة من Week 5 لحد Week 8 ، فببساطة اكتبها بالشكل ده. (مش فارقة أوي عامة)

Materials List:

List an item you used (or will use) in building your prototype, and its price, and write the total budget of the project at the end (You don't need to list everything, just as much as you can)

اكتب اسم أي item استخدمته أو هتستخدمه في بناء ال Prototype وسعره، وفي الآخر اكتب إجمالي ال budget بتاع المشروع. مش لازم تكتب كل ال materials، اكتب أكبر عدد تقدر عليه.

Safety precautions:

Just copy and paste the safety precautions you already listed in your materials and methods, and the following list should contain most things you should take in consideration:

ببساطة، ال copy-paste ال Safety Precautions اللي كتبته بالفعل في قسم Materials and Methods ، وال list اللي جاية المفروض تحتوي على معظم الحاجات اللي لازم تاخذها في الاعتبار:

- 1- All group members should wear coats, closed-toe shoes, gloves, and safety goggles to prevent harm from materials, or from tools such as saws & adhesives.
- 2- Work should be done in a well-ventilated room to minimize the inhaling of toxic gases or substances, such as spray adhesives.
- 3- Members should wear masks during the cutting of materials like wood or metal to avoid ingesting or inhaling of any harmful particles such as sawdust.
- 4- Members are supposed to use the right tools for their intended purposes, and cover them after use, to prevent injury.
- 5- Members use equipment under supervision.
- 6- Members should leave personal possessions outside working labs.
- 7- Members should be educated on all emergency protocols, such as the method of using fire extinguishers and their locations inside buildings, and many other safety measures taken in consideration
- 8- The construction of the prototype should only be conducted inside the Fabrication laboratory

Selected prototype:

Talk about the prototype, how it should work, what is the scientific base behind it, and how it achieves your intended results; think of this like a mini methods section, and then speak about how it represents your solution and fulfills your design/solution requirements.

اتكلم عن ال **Prototype**، وإزاي المفروض يشتغل، وإيه ال **scientific basis** اللي قائم عليه، وإزاي بيحقق النتائج اللي إنت مستهدفها. اعتبر الجزء ده كأنه **mini Methods section** بعد كده، وضح إزاي ال **Prototype** بيمثل الحل بتاعكم، وإزاي بيحقق ال **Design/Solution Requirements** بتاعتكم.

Prototype Design:

This is the last section, and you just need to include a visual illustration of the prototype's design, which could be a hand drawing, a 3D design picture, or a 2D diagram picture. (It's ok if your final prototype design is different from the original illustration, so don't worry too much)

ده آخر Section ، وكل اللي محتاج تعمله فيه إنك تحط **visual illustration** لتصميم ال **Prototype** ممكن تكون رسم إيد، صورة **3D design**، أو صورة **2D diagram**. ومفيش مشكلة لو تصميم ال final prototype طلع مختلف عن ال original illustration، فمتقلقش أوي من الموضوع ده.

And that's all. In general, don't worry too much about the panel review; it isn't that important. Now, here are two full examples of a filled-out panel review that was approved by a capstone leader.

وبس، كده خلصنا. عموماً، متقلقش أوي من ال **Panel Review**، لأنه مش أهم حاجة في الدنيا. ودلوقتي، ده مثال كامل لـ **Panel Review** متعبي واتوافق عليه من **Capstone Leader** .



Ministry of education
Central STEM unit

CAPSTONE PROTOTYPE PRELIMINARY REVIEW



Team number	17306		
Students' names	Aly Aly	Aly Aly	Aly Aly

Introduction (The summary of the selected solution) (How does this represent a solution for the certain challenge) (Contains other solutions you benefited from)	Design requirements (All stated design requirements should be testable and will be tested)	Time frame (to build the prototype and implement the tests)	Materials list with prices (Calculate the total budget)		Safety precautions (should be taken in consideration)
This project focuses on improving air-quality monitoring in factories, warehouses, and other enclosed workplaces, improving health and industrial fields. Workers in these spaces may be exposed to changes in gases, temperature, and humidity, while traditional monitoring systems mainly show current conditions instead of detecting unusual changes early. The problem is the lack of intelligent systems that can monitor workplace air conditions, detect abnormal gas changes, and provide early warnings. Existing monitoring systems showed the importance of continuous data collection and real-time monitoring. Based on these ideas, our solution is an AI-based industrial monitoring system that collects data from factories and warehouses, predicts changes in CH₄ and CO₂ levels, detects unusual conditions, and provides warnings and recommended actions. This can help improve workplace safety and working conditions for employees while supporting safer industrial facilities and better products.	1- Transparency: The solution should be able to display changes in system outputs or states as a function of changing input using the prototype or other methods. 2- Software and hardware integration: The prototype must use Information and Communication Technology (ICT), IoT, and AI platforms, and contain hardware components. 3- Accuracy: The AI model must be consistent and have an accuracy of at least 80 percent. 4- Multi-Parameter Monitoring: The solution must have at least 4 different measurable design requirements, including response time and system accuracy.	Week 5 To Week 8	MQ-135 Sensor	60 EGP	- All group members should wear coats, closed-toe shoes, gloves, and safety goggles to prevent harm from materials or from tools such as saws & adhesives. - Members use equipment under supervision. - All work associated with the project must be carried out in the Fabrication lab.
			DHT-22 Sensor	200 EGP	
			Esp-32 Microcontroller	250 EGP	
			2 x Ultrasonic Sensor	2 x 30 = 60 EGP	
			2 x Servo motor 360°	600 EGP	
			Plastic/Acrylic housing	Reused + Recycled	
			BreadBoard:	30 EGP	
Total Cost:	1200 EGP				
Selected Prototype (Describe how it should work, and how does it represent the selected solution)			Prototype design		
The prototype is a portable monitoring system designed for factories and warehouses. It uses several sensors to monitor air conditions and the size of the monitored space. - MQ-135: monitors changes in air quality and gases such as CH₄ and CO₂. - DHT-22: measures temperature and humidity. - Two HC-SR04 sensors: measure distances to estimate the dimensions and volume of the space. - Two servo motors: move the ultrasonic sensors to scan the space. - ESP32: collects the sensor data and connects the sensors to the digital system. The collected data is used by the AI system to predict gas changes and detect unusual conditions. By combining sensors with AI, the prototype can provide continuous monitoring and early warnings inside factories and warehouses, helping maintain safer working conditions for employees, and product quality.					

Panel (teachers' names):

Name			
signature			

Capstone leader signature:



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CAPSTONE PROTOTYPE PRELIMINARY REVIEW



Team number				
Students' names	Ahmed Ahmed	Ahmed Ahmed	Ahmed Ahmed	Ahmed Ahmed

Introduction (The summary of the selected solution) (How does this represent a solution for the certain challenge) (Contains other solutions you benefited from)	Design requirements(All stated design requirements should be testable and will be tested)	Time frame (to build the prototype and implementing the tests)	Materials list with prices (Calculate the total budget)		Safety precautions (should be taken in consideration)
This project repurposes discarded electronic components to create a device that measures light absorption in liquids, allowing users to observe how light intensity changes as it passes through a solution. By transforming e-waste such as LEDs, sensors, and circuits into a functional scientific tool, the project directly supports Egypt's Grand Challenges—reducing pollution, recycling waste, and improving the scientific and technological environment. The ability to measure light absorption has useful applications in laboratories, such as studying how light passes through different plant extracts in Biology labs and testing how clear or cloudy water and soil samples are in Geology labs. In developing this prototype, inspiration was taken from previous optical instruments and earlier student projects that reused electronic parts to study light behavior. These prior solutions guided the design, calibration, and reuse of components. Through this approach, the project demonstrates how recycled materials can drive scientific innovation, turning electronic waste into an opportunity for environmental protection and technological growth.	Students will build up a single scientific prototype instrument used in at least one type of laboratory, whether it's Biology, Chemistry, Earth Science, Physics, or Fabrication Labs. 2. If the chosen scientific instrument possesses only one measurable function, the student is required to present outcomes from two actual laboratory applications. Conversely, if the instrument has multiple measurable functions, at least one real laboratory application must be demonstrated. 3-The team should provide calculations for accuracy (not exceeding $\pm 5\%$) and precision, either compared to a functional device (or a known standard with relevant scientific references)	Week 5 To Week 8	LDR (light detecting resistor)	Reused	- All group members should wear coats, closed-toe shoes, gloves, and safety goggles to prevent harm from materials, or from tools such as saws & adhesives. - Members use equipment under supervision. - All work associated in the project must be carried out in
			Cuboid housing	Recycled	
			Arduino	Reused	
			LED	Reused	
			Voltage divider	Reused	
			Power supply	Reused	
			Wires	Reused	
Selected Prototype (Describe how should it work, and how does it represent the selected solution)		Prototype design			
The system functions by using light absorption as the measurable factor to analyze the properties of a liquid. The setup includes a light-emitting diode (LED), a container that holds the liquid sample, a light-dependent resistor (LDR), a voltage divider (V.D), an Arduino microcontroller, and a battery for power. When the LED emits light through the liquid in the container, the LDR detects how much of that light passes through. If the liquid absorbs more light, the LDR receives less intensity, causing its resistance to increase. This change in resistance alters the voltage output in the voltage divider circuit, which the Arduino reads as a change in signal value. The Arduino then interprets these readings and can display or record them as measurements of light absorption. By analyzing these readings, the device can determine how transparent or opaque a solution is—essentially measuring how much light the liquid absorbs. This makes it useful in laboratory applications such as testing water purity or tracking reaction progress, where changes in transparency indicate chemical or physical changes in the sample. This design represents the selected solution because it reuses components commonly found in discarded electronic devices—such as LEDs from indicators, LDRs from old light-sensing systems, and circuit parts from obsolete boards. Through recycling, these parts are combined into a new scientific instrument that measures light absorption, supporting Egypt's Grand Challenges by reducing e-waste, recycling materials for economic and environmental benefit, and enhancing the scientific and technological environment through innovation and sustainability.					

Panel (teachers' names):

Name			
signature			

Capstone leader signature: