



Savitribai Phule Shikshan Prasarak Mandal's
SKN SINHGAD COLLEGE OF ENGINEERING
(Approved by AICTE & Affiliated to PAH Solapur University, Solapur)
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SSMC-2025

(SINHGAD SOLAR X MARS CHAMPIONSHIP)

ADITYA 2k25
A SOLAR MANIA

Rule Book

Event Date- 13th March 2025



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SECTION 1

1.1 Introduction

1.1.1 About us

SKN Sinhgad College of Engineering, Pandharpur was established under the able and dynamic leadership Prof. M. N. Navale with an objective of providing quality education in the field of engineering, Management, Computer and school education, Kindergarten onwards.

All the institutes under the SKN Sinhgad College of Engineering are recognized by the concerned statutory authority and meticulously meets the norms and standards laid down by them.

SKN Sinhgad College of Engineering has handpicked eminent personalities from the field of education and industry as members of the management committee who are committed to provide necessary guidance on academic and professional fronts from time to time.

To serve the interest of the student's community as well as the corporate and industrial sectors SKN Sinhgad College of Engineering maintains a close liaison with the industry and other leading organizations. There are experts from different fields contributing their valuable experience to build the institution as a place of learning and discipline.

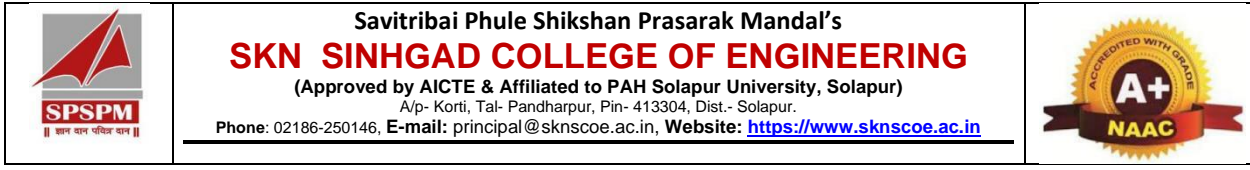
Entrusted by society to create a sustainable world and enhance the global quality of life, engineers serve competently, collaboratively, and ethically.

SECTION 2

2.1 Overview of Event

2.1.1 Team eligibility and Requirements

This competition is open to graduate and undergraduate students (from first year to final year) as well as diploma students, emphasizing an engineering design focus. A meaningful and inspiring name is essential. Each team must designate a captain and a vice-captain. Each team must have at least one team advisor from the same institute, university or industry. The advisor may be prohibited from operating or guiding within the central hub. Each team requires minimum of 8 members and maximum of 25 members from same institute. Each team member must bring his/her adhar card and college identity



proof at the time of final event. Team members operating the Rover must stay within the designated central Hub. Team members may not be allowed to follow the rover for giving feedback to operator. Only one team member is allowed to follow the rover as runner for the operations in case of emergency.

2.1.2 Technical Specifications

2.1.2.1 Rover Requirement

The rover is designed to operate independently, functioning as a self-sustained, off-grid mobile platform. It is capable of operating autonomously without relying on external power sources or infrastructure. The mass of the rover should not exceed 70 kg. While weighing at the time of inspection, the rover must fit within a 1.5 meter x 1.5 meter x 1.25 meter box. The penalty rate mentioned is 2% per kilogram over the weight limit. So, for every kilogram a team exceeds the 70 kg limit, they will incur a penalty of 2% of some value. The rover will employ power and propulsion systems suitable for space application. None of the power or propulsion systems may utilize ambient air for combustion or any chemical reaction to generate energy. The rover is required to include a 'Kill Switch- a red push button' that is easily visible and accessible from the exterior. The rover's operation shall rely on wireless communication without any discernible time delay. The operator may not have direct visual access to the rover or its location.

2.1.2.2 Drone requirement:

The drone will be operated remotely by an operator stationed at the Central Hub. Drones are not subject to weight and size restrictions. A spotter must retain visual line of sight at all times. The drone must maintain a flight altitude below 100 feet above ground level. Drones must be capable of operating in winds up to 50 k/h. This necessitates a minimum top speed of 60 k/h for safe operation.

SECTION 3

The teams have to compete in two rounds, Still round and the Vibrant round. Points are distinctively divided for the two rounds.

3.1 Still Round

All the teams must submit design reports as per the schedule. The design report must encompass a detailed design process, innovations (if any). The design report should include Gant Chart, and business plan (If planned). The cost report should include technical specifications and dimensions of all parts, systems, and sub-systems, along with supplier details. Mechanical and Electrical & Electronic Control system of the rover should be included in the report. Design consideration for Energy storage system, electric systems, safety features, Solar photovoltaic charging station system should include in the report. More focus must be on innovations in the rover. Corrections (if required) will be suggested by technical committee Aditya2k25. The rover will be assessed according to report submitted by judges.

Marking System for Still Round will be as bellow.

S.NO	CATEGORY	POINTS
1.	Design Evaluation	350
2.	Cost Report	150
3.	Innovation	300
4.	Presentation	200
5.	Total	1000

Note: - This Still round is just a qualifier round. The marks obtained in this round will not be considered in the final evaluation. The teams, who qualify this round, will be allowed to participate in the vibrant round. Those teams, who doesn't qualify this round will not be disqualified and will not be able to take part in the vibrant round.

3.2 Vibrant Round

3.2.1 Technical Assessment:

Technical Assessment is done to check whether the rover is able to participate safely and reliably in the event. T.A will also check for compliance with the Rule book.

There are no points for this round. Each team must qualify this round. The Technical Assessment will progress through several stages, each meticulously examining various aspects of the rover and Drone (if applicable). At each stage, specialists in the corresponding area will meticulously inspect the rover. Teams have to clear all the stages of the Technical Assessment. The stages in the technical Assessment will cover Safety, Weight and dimensional test, Solar and other electrical systems, charging unit, Battery and Cost Report and original bills. Only Two members along with operator are allowed per team during T.A. Team. It is team captain's responsibility to bring all the documentation during T.A.

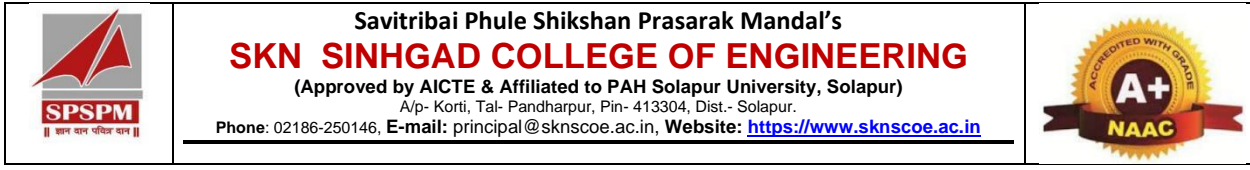
Two attempts will be given during this T.A. It is the inspector's decision whether to allow the team for third attempt or not. Technical inspector's decision will be final. After successfully passing the Technical Assessment (T.A.), no modifications to the rover will be permitted. Any rover found to have been modified will be disqualified.

3.2.2 Design Innovation round:

Our judges will thoroughly evaluate the team's design process and innovative concepts. They reserve the right to inquire about the design and any innovative features from any member of the teams.

3.2.3 Specimen Harvest Quest :

Teams will receive a comprehensive field briefing from judges prior to commencing the mission, which centers around the collection and storage of samples positioned on the ground. Following the briefing, teams will embark on the task of collecting these samples from the designated site and subsequently storing them at a location of their choosing.



Each sample is expected to weigh around 50g and may display a variety of colors, adding a layer of diversity to the collection process. The marking system will be structured around the colors of the collected samples, with teams being evaluated based on their ability to gather samples of distinct colors. This approach encourages teams to not only effectively gather the required samples but also to demonstrate attention to detail in selecting samples of different colors, thus showcasing their ability to navigate and fulfill the mission's objectives comprehensively.

3.2.4 Subterranean Quest:

Prior to commencing the mission, teams will undergo a comprehensive field briefing conducted by the judges. The primary objective will be to collect and securely store samples buried at a depth of approximately 10 cm across designated sites. These samples, each weighing approximately 5g, may encompass diverse materials ranging from rocks to plates or loose soil.

Teams will undertake the crucial task of procuring a subsurface sample from one of the assigned sites, ensuring it meets the requisite depth of 10 cm or greater. To assess performance, marks will be allocated based on the number of samples successfully collected within the designated time frame, thereby emphasizing efficiency and thoroughness in sample retrieval.

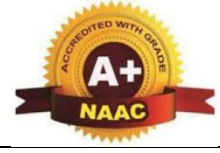
3.2.5 Dexterity Quest:

Rovers shall be tasked with executing a series of intricate maneuvers on a simulated equipment setup. The mission entails traversing a distance of up to 0.10 kilometers over terrain that is predominantly level, aiming to reach designated equipment locations. The equipment, ranging in height from 0.25 meters to 1.0 meter, will be strategically positioned on the ground.

Central to the equipment servicing mission is the delivery of a specific sample to a waiting lander, along with the execution of maintenance tasks on the lander itself. This multifaceted assignment encompasses various sub-tasks, all of which can be tackled in any sequence preferred by the teams:





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- a. Sample Container Retrieval: Rovers must adeptly retrieve a targeted sample container, designed with a handle of at least 10 centimeters in length and not exceeding 5 centimeters in diameter. The container's weight will be limited to less than 5 kilograms.
- b. Lander Drawer Interaction: Rovers will engage with the lander by opening a drawer, skillfully inserting the acquired sample into a designated slot within the drawer, and subsequently closing the drawer securely.
- c. Captive Screw Tightening: Teams will demonstrate precision and finesse as their rovers maneuver to tighten a captive screw, employing a 5/16" Allen (hex) head tool. Optionally, teams may choose to integrate the hex driver into their rover design, or utilize a provided screwdriver for this task.
- d. Mission Completion Activation: Upon successfully executing the assigned tasks, rovers will finalize the mission by activating a designated push button, signifying the completion of the equipment servicing endeavor.

Throughout this challenge, rovers will showcase their agility, accuracy, and adaptability in navigating the simulated terrain, interacting with equipment, and fulfilling the objectives of the mission.

Completion time for each task will be a key factor considered for scoring purposes. Teams will be evaluated not only on the successful execution of the assigned tasks but also on the efficiency with which they are completed. The time taken for each task will directly contribute to the overall assessment of team performance. Therefore, teams are encouraged to strategize and execute their maneuvers swiftly and accurately to maximize their scores.

 <p>SPSPM ॥ ज्ञानं कालं धरति यानं ॥</p>	<p align="center">Savitribai Phule Shikshan Prasarak Mandal's SKN SINHGAD COLLEGE OF ENGINEERING (Approved by AICTE & Affiliated to PAH Solapur University, Solapur) A/p- Korti, Tal- Pandharpur, Pin- 413304, Dist.- Solapur. Phone: 02186-250146, E-mail: principal@sknscoe.ac.in, Website: https://www.sknscoe.ac.in</p>	
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3.3 Points allocated for Vibrant round will be as follows.

S.NO	Technical specifications	POINTS
1.	Weight Test	100
2.	Innovation	200
3.	Specimen Harvest Quest	300
4.	Subterranean Quest	300
5.	Dexterity Quest	600
	Total	1500