

## Welcome to the SUPERPOWERED Grant Season (for 2023)



ALL potential grant holders will be required to attend an online MS TEAMS interview to present their robotics plans for 2023.

BEFORE any equipment can be couriered, FIRST SA requires:

- A signed MOU
- PROOF of insurance on ALL FIRST equipment.

ALL grant holder sites must be represented in at least 2 of the weekly grant holder information sessions, every month.

### Contents

Introduction .....	2
How to start robotics at your school .....	2
Robotics Competitions in South Africa .....	3
I-SET Robotics Engagement .....	4
I-SET Robotics Live Online Learning (Educators of Grade 0-10) .....	4
I-SET Robotics MOOCs (M1, M2, M3, M4) (Educators of Grade 4-10) .....	4
I-SET Robotics Short Learning Programmes (Educators of Grade 4-10) .....	4
Grant Application Links .....	5
Terms and Conditions .....	6
Implementation Requirements .....	7
FIRST SA Website .....	7
GRANT: Challenge Single Team (up to 10 learners/team, regional participation) .....	8
GRANT: Challenge Class Pack (5, 3 or 2 teams, school event) .....	8
GRANT: Explore Class Pack (7, 4 or 3 teams, school event) .....	9
GRANT: Discover Class Pack (10, 6, or 4 teams, school event) .....	9
Appendix A: Glossary .....	10
Appendix B: I-SET Robotics Live Online Learning .....	10

## Introduction

Educators, students, and visionary community leaders are embracing the robotics and equipping opportunities. These opportunities include (but are not limited to) the I-SET Robotics Live Online Learning sessions, the I-SET Robotics Massive Open Online Courses (MOOCs) and I-SET Robotics Short Learning Programmes. To extend these opportunities for robotics engagement, FIRST SA is presenting several grant opportunities. However, we are all very aware of the budgetary constraints of visionary schools, who wish to start robotics at their school or community centre to develop robotics teams of learners. These opportunities provide an opportunity to loan robotics equipment to trained educators or leaders, and to ensure that a greater number of learners are afforded the opportunity to build and program robots. Thus, the purpose of this document is to create awareness of the grant opportunities offered by FIRST SA for the SA Robotics community. These grants have been sponsored by LEGO Foundation and FIRST. This document presents the plans and opportunities to start and develop robotics at schools in South Africa for learners Grade R to Grade 10. Note that FIRST Tech Challenge (FTC) and FIRST Robotics Challenge (FRC) for learners Grade 8-12 are not included in this specific grant initiative.

FIRST has three programmes. Each programme has a TEAM MEETING GUIDE (TMG) for the educator that explains what is presented in each robotic session. Each learner (for Discover Programme) and each team (for Explore and Challenge Programmes) gets an ENGINEERING NOTEBOOK (EN) in which the team must document the learning progress. For Discover the books are printed, for Explore and Challenge the book will be in e-format. The number of sessions is programme specific.

Grades	Minimum Robotics Kit Required per team	Competitions for teams	Number of sessions required	Number of learners per team (recommended)
R	Steam Park Set (two teams share a set)	<i>FIRST</i> LEGO League Discover	10	4
1 to 3	WeDo or Spike Essential Kit Tablet with WeDo 2.0 or Spike Essential Software installed	<i>FIRST</i> LEGO League Explore	12	4-7
4 to 10	EV3 OR Spike Prime (Core & Expansion kit) Laptop with software installed	<i>FIRST</i> LEGO League Challenge	12	6-10

### How to start robotics at your school

To start robotics at a school, a dedicated team of educators is required to champion robotics at the school (who will also participate in the I-SET Robotics equipping events), a 3 YEAR school plan for the development of robotics at the school, an envisioned school robotics budget, and the identification of fund raising initiatives. Robotics can be presented as part of the curriculum (during school hours) or as an extra-mural activity after school. There are three separate age-appropriate robotics programmes. In an ideal world, a learner would have an opportunity to participate in all three FIRST robotics programmes.

The events to start robotics at a school include:

- **Identify the educators** and commence with the robotics training.
- **Identify the learners** (classes) who may be included in the school robotics team (if a single team) or the class (if a class pack is implemented).
- **Logistics** are specified including the class times, venue (class) and time (at least 90 minutes per week). A schedule can be set up, guided by the educator training materials.
- **Arrival of equipment.** If purchased, items need to be ordered (from FIRST SA and Hands On Technology) and delivered. If the equipment is on-loan as part of a grant, then the equipment can be collected by the grant holder or couriered to the grant holder.
- **Progress and capacity development** of the learners (documented in progress reports) for 2023 and plan for next stage of robotics at the school.

### Robotics Competitions in South Africa

There are several robotics competitions in South Africa. Each competition has a unique format and requirements. Grant holder teams can either host a celebration event at the school or participate in a regional event. The current collection of FIRST Lego League competitions **per Grade** includes (that are part of the grant):

- FIRST LEGO LEAGUE Challenge (Regional or Celebration Event). Grades 4-10
- FIRST LEGO LEAGUE Explore (Regional or Celebration Event). Grades 1-3
- FIRST LEGO LEAGUE Discover (Celebration Event). Grades R-1

Other options for robotics competitions:

- Virtual GEAR (Online). From Grade 4 and an Open Category.
- World Robotics Olympiad (WRO). For Grades 4-6, 7-9, and 10-12.
- Robothon at Science Faire. Grades 4-7 (junior), and 8-9 (senior).
- Conquesta Robotics Quiz (Grades 4-9)

For **FIRST LEGO League**, there are two options:

- The single team option (usually robotics is an extra-mural activity at the school/centre). The school/centre only has a single team, the team will compete in an annual regional and may qualify for a national FIRST LEGO League robotics competition. Event may be hosted remotely.
- The class pack option (the intention is that robotics is an in-class activity at school/centre). The class is divided into teams, these teams compete in a celebration event at the school/centre. Events are hosted at school/centre with remote judging.

Note that the focus of this document is the *FIRST* LEGO League Robotics Competition, as the grants offered by this competition are detailed. However, all robotics competitions in SA are part of the ASTEMI Science Olympiads and Competitions and are detailed in the ASTEMI Brochure on the ASTEMI website. <https://www.astemi.co.za/wp-content/uploads/2019/04/ASTEMI-Brochure.pdf>

## I-SET Robotics Engagement

The community engagement opportunities include the following:

- I-SET Robotics Live Online Learning Sessions that are hosted on MS teams.
- I-SET Robotics MOOC training available on the UNISA MOOC portal.
- I-SET Robotics Short Learning Programmes for Certification.
- Robotics coach and mentor support group is available on WhatsApp.

### I-SET Robotics Live Online Learning (Educators of Grade 0-10)

- An I-SET Robotics Live Online Learning Schedule published monthly. The links are in the schedule. For information contact [I-SET@unisa.ac.za](mailto:I-SET@unisa.ac.za)
- Sessions include but are not limited to MOOC Discussions, *FIRST* LEGO League Robotics Challenge, *FIRST* LEGO League Robotics Explore, *FIRST* LEGO League Robotics Discover, Chemistry, Physics, Student Developer Group, programming, engineering.

### I-SET Robotics MOOCs (M1, M2, M3, M4) (Educators of Grade 4-10)

Each I-SET Robotics MOOC has 4 units. The units are presented as part of the I-SET Robotics Live Online Learning Sessions, thus M1 is presented in the Basics Session, M2 is presented in the Next Session, M3 is presented in the Strategy session, and M4 is presented in the Advanced session. The FREE MOOCs start annually and remain open until 30 November. The MOOCs focus on the practical implementation of robotics. See joinable sites on MOOC portal: <https://mooc.unisa.ac.za/portal>

### I-SET Robotics Short Learning Programmes (Educators of Grade 4-10)

I-SET Robotics also presents Short Learning Programmes (SLPs). Registrations open in December for semester 1 (starts January) and June for Semester 2 (starts July). SLPs include a registration fee, assignments, and an examination. The registration form is online. There are currently 4 SLPs available:

- Practical: I-SET Robotics: Components and Pedagogy (CSR0B1E)
- Practical: I-SET Robotics: Problem Solving, Data and Debugging (CSR0B2E) (Assumes CSR0B1E)
- Theory: I-SET Robotics: Robotics Fundamentals (theoretical with examples) (SCIRF01)
- Theory: I-SET Robotics: Robotics in the Future (application) (SCIFF01)

## Grant Application Links

- **RETURNING GRANTHOLDERS.** If you do have 2022 Cargo Connect SEASON, then you are required to share your robotics strategic and development plans for 2023. This needs to be documented and shared with the FIRST Grant Programme Managers BEFORE the end of 2022. Note that new MOUs are required if the plans include the loan of any robotics equipment for another year. Grant holders may re-iterate previous season themes. Unfortunately, FIRST SA will not be issuing SUPERPOWERED sets to any returning grant holders. SUPERPOWERED sets for all programmes (Challenge, Explore and Discover) may be purchased from FIRST SA and used to host SUPERPOWERED Celebration events (January -June 2023).
- **NEW GRANTHOLDERS.** If you did **NOT** previously apply for grant equipment, then please use the link: <https://forms.gle/XbP1HGRDWWRDs6pd8>

All qualifying grant holders are required to attend the weekly information sessions that are hosted every month. There is a SINGLE link for all sessions that will be shared with qualifying grant holders.

The *FIRST* LEGO League Class Pack grants provide for an opportunity for a class to participate in a robotics competition at their school annually. It is recommended that a class have at least two trained educators (ideally, each team in the class should have a coach).

- *FIRST* LEGO League Discover Class Pack. The class of learners are divided into teams of 4 learners. The teams follow the 10-session programme as per the TMG. Each learner is given an EN and a box of six-bricks to take home. Each team uses a Discover Box. Two teams share a Steam Park. At the end of the 10-session programme, all the teams participate in a Celebration Event organized by the school/centre, so that the learners can proudly present their project to parents and peers. The grant requires that the programme be presented to multiple classes in succession. **The Steam Park and Discover boxes are re-used.** Additional books and 6-bricks are be distributed (as requested by site). A class of 16 learners is divided into 4 teams, 24 learners into 6 teams, and 40 learners into 10 teams.
- *FIRST* LEGO League Explore Class Pack. The class of learners are divided into teams of 4 - 6 learners. The teams follow the 12-session programme as per the TMG. Each team is given an EN. Each team uses an Explore Box, a WeDo (or Spike Essential) kit and a tablet with the WeDo (or Spike Essential) software installed. At the end of the 12-session programme, the teams participate in a Celebration Event organized by the school/centre, so that the

learners can proudly present their project to parents and peers. The grant requires that the programme be presented to multiple classes in succession.

**The Explore Box, the kit and the tablet are re-used.** A class of 30 learners is divided into 7 teams, 15 learners is divided into 4 teams and 12 learners is divided into 3 teams.

- *FIRST* LEGO League Challenge Class Pack. The class of learners are divided into teams of between 6 and 10 learners. The teams follow the 12-session programme as per the TMG. Each team is given an EN. Each team uses an EV3 (or Spike Prime) kit and a laptop with the EV3 (or Spike Prime) software installed. The teams share challenge sets and robotics tables. At the end of the 12-session programme, the teams participate in a Celebration Event organized by the school/centre, so that the learners can proudly present their research project and the robot runs to parents, peers and judges. The grant requires that the programme be presented to multiple classes in succession. **The challenge sets, the tables, the EV3 (or Spike Prime) kits and the laptops are re-used.** A class of learners may be divided into 5, 3 or 2 teams.

The awarding of the grants will be leaning towards schools where no robotics exists BUT must have a plan to implement robotics. For challenge, the coaches already or nearly completed MOOC M1 and M2, and ideally already participating in the I-SET coach mentor community. The districts of all provinces of South Africa need to be considered. The grant allocations are only for ONE year and are reviewed annually.

## Terms and Conditions

- Grants are allocated to schools (SGB are legally responsible), centres (directors are legally responsible) or NGOs (directors are legally responsible).
- All equipment remains the property of FIRST SA and must be returned complete and in the same condition as received.
- The **SCHOOL/CENTRE** is responsible for safe keep and **insurance** of all signed for equipment. Lost, damaged, or stolen items need to be replaced. **EVIDENCE OF INSURANCE COVERAGE IS REQUIRED.**
- The **CONTACT** is responsible for the registration of the team(s) on the firstsa.org website.
- The **CONTACT** is responsible for the milestone progress reports submitted to programme coordinator.
- Communication between **CONTACT** and FIRST SA must be regular (i.e. The contact must attend the weekly meetings).

### Implementation Requirements

- All equipment may be collected or couriered to address supplied.
- After TWO implementations, the grant has been completed and all targets are met. If the equipment is no longer required, all equipment must be returned to FIRST SA at own expense. On presentation of the robotics implementation plan, a re-allocation may be negotiated.
- The session programme (as presented in the TMG) **MUST** be adhered to.
- Communication between **CONTACT** and FIRST SA must be **WEEKLY** (i.e. attendance of weekly meetings required and also submission of session progress reports on google form supplied.).

### FIRST SA Website

FIRST SA website maintains an updated list of all FAQ pertaining to competitions, events, and grants, as well as session recordings.

## GRANT: Challenge Single Team (up to 10 learners/team, regional participation)

FIRST LEGO League Robotics <b>CHALLENGE TEAMS</b>	
<b>Pre-requirements</b>	Name of coaches Proof of coach participation/registration of M1/M2 or SLP Plan for robotics at school Coach participation in I-SET Robotics Live Online Learning Robotics coach and mentor support group is available on WhatsApp
<b>Grant equipment on loan from FIRST SA</b>	1 Spike Prime OR 1 EV3 Robotics kit
<b>YOUR OWN EXPENSES</b>	1 <u>Team registration including challenge kit</u> 1 <u>FIRST LEGO League Robotics table</u> 1 <u>laptop</u> with required software (free) installed All loan equipment must be returned at own expense.
<b>Grant holder requirements</b>	Teams must be registered on the <a href="https://firstsa.org">FIRST South Africa – Robotics Programs for School Children (firstsa.org)</a> website. Milestone progress reports as per 12-session programme must be submitted on the supplied google form <b>at the end of the week.</b>
<b>Close out requirements</b>	Participation at regional competition If you choose to continue, then a next plan is required. If you choose not to continue, then all on loan equipment must be returned to FIRST SA (at own expense).

## GRANT: Challenge Class Pack (5, 3 or 2 teams, school event)

FIRST LEGO League Robotics <b>CHALLENGE TEAMS</b>	
<b>Pre-requirements</b>	Name of coaches. Proof of coach participation/registration of M1/M2 or SLP Plan for robotics at school. Coach participation in I-SET Robotics Live Online Learning. Robotics coach and mentor support group is available on WhatsApp.
<b>Grant equipment on loan from FIRST SA</b>	Per team: EV3 OR Spike Prime <u>kit</u> <u>Laptop</u> with EV3 or Spike Prime Software installed. Per site: <u>FIRST LEGO League Robotics SUPERPOWERED challenge set</u> <u>FIRST LEGO League Robotics table</u>
<b>Grant covers expenses</b>	Teams Class Pack <u>registration</u> Teams Class Pack Celebration <u>Medals</u> for all learners in registered teams.
<b>Grant holder requirements</b>	Teams must be registered on the <a href="https://firstsa.org">FIRST South Africa – Robotics Programs for School Children (firstsa.org)</a> website. Milestone progress reports as per 12-session programme must be submitted on the supplied google form <b>at the end of the week.</b> Celebration event invitation for FIRST SA (or representative).
<b>Close out requirements</b>	Participation at celebration event (all documentation to be submitted). If you choose to continue, then a next plan is required. If you choose not to continue, then all on loan equipment must be returned to FIRST SA (at own expense) at OWN EXPENSE!



## GRANT: Explore Class Pack (7, 4 or 3 teams, school event)

FIRST LEGO League Robotics <b>EXPLORE TEAMS</b>	
<b>Pre-requirements</b>	Name of coaches. Plan for robotics at school. Coach participation in I-SET Robotics Live Online Learning. Robotics coach and mentor support group is available on WhatsApp.
<b>Grant includes equipment on loan from FIRST SA</b>	Per team: WeDo or Spike Essential Set SUPERPOWERED Explore set Tablet with WeDo or Spike Essential software installed
<b>Grant covers expenses</b>	Teams Class Pack <u>registration</u> Teams Class Pack Celebration <u>Medals</u> for all learners in registered teams that participate in competition.
<b>Grant holder requirements</b>	Teams must be registered on the <a href="https://firstsa.org">FIRST South Africa – Robotics Programs for School Children (firstsa.org)</a> website. Milestone progress reports as per 12-session programme must be submitted on the supplied google form <b>by end of the week</b> . Celebration event invitation for FIRST SA (or representative).
<b>Close out requirements</b>	Participation at celebration event (all documentation to be submitted). If you choose to continue, then a next plan is required. If you choose not to continue, then all on loan equipment must be returned to FIRST SA (at own expense).

## GRANT: Discover Class Pack (10, 6, or 4 teams, school event)

FIRST LEGO League Robotics <b>DISCOVER TEAMS</b>	
<b>Pre-requirements</b>	Name of coaches. Plan for robotics at school. Coach participation in I-SET Robotics Live Online Learning – Discover Sessions. Robotics coach and mentor support group is available on WhatsApp.
<b>Grant equipment on loan from FIRST SA</b>	STEAM Parks (in container) (one to share between 2 teams) Per team: Discover/Inspire SUPERPOWERED box 4 six-bricks sets (one per learner)
<b>Grant covers expenses</b>	Team Class Pack registration (includes TMG and EN) Team Class Pack Celebration Certificates for all learners participating.
<b>Grant holder requirements</b>	Teams must be registered on the <a href="https://firstsa.org">FIRST South Africa – Robotics Programs for School Children (firstsa.org)</a> website. The progress reports as per 10-session programme must be submitted on the supplied google form <b>by end of the week</b> . Celebration event invitation for FIRST SA (or representative).
<b>Close out requirements</b>	Participation at celebration event (all documentation to be submitted). If you choose to continue, then a next plan is required. If you choose not to continue, then all on loan equipment must be returned to FIRST SA (at own expense).

## Appendix A: Glossary

EN	Engineering Notebook. Each challenge team, explore team or discover learner receives a book to complete as part of the 10 or 12-session programme. The sessions are detailed.
FLL	<i>FIRST</i> LEGO League Robotics competition consists of the three focus competitions, namely Discover, Explore and Challenge.
I-SET	Inspired towards Science, Engineering and Technology is a Community Engagement flagship project of the College of Science, Engineering and Technology (CSET) at UNISA. This is a project within the UNISA Science Engagement Centre, a national science centre of South Africa.
MOOC	Massive Open Online Course. The I-SET Robotics Programme presents robotics training on the UNISA MOOC portal. There are current 4 I-SET Robotics MOOCs (M1-M4).
SLP	Short Learning Programme. I-SET Robotics presents currently 4 SLPs. See I-SET Robotics Educator Support.
TMG	Team Meeting Guide. Each <b>educator</b> as team coach/mentor receives a book to use as a guide through the 10 or 12-session programme.

## Appendix B: I-SET Robotics Live Online Learning

Kindly email [I-SET@unisa.ac.za](mailto:I-SET@unisa.ac.za) for schedules for the all the months of 2023.

