

PROJECT

MANAGEMENT

SOAR blueprints

COURSE



COURSE OVERVIEW

This course teaches STEM Racing teams how to build a structured project management system that keeps engineering, enterprise and team operations moving towards the same goal. A STEM Racing project is much more than building a car. Teams must simultaneously manage deadlines, deliverables, people, finances, resources, suppliers, risks and competition requirements. The course focuses on practical project management rather than theory. By the end, teams will have created their own project management system and populated it with the information they need to manage their season.

You will learn how to:

- Define your project scope and deliverables
- Break a large project into manageable tasks
- Assign clear ownership and accountability
- Plan your timeline and identify critical deadlines
- Manage financial and physical resources
- Identify and control project risks
- Monitor planned versus actual progress
- Run structured project reviews and adapt your plan
- Continuously improve your team's project management system



THE SOAR COMMAND CENTER

Purpose: The SOAR Command Center is a free project-management tool designed specifically for STEM Racing teams.

Instead of keeping your project information across multiple spreadsheets, documents and group chats, the Command Center brings your key project-management systems into one place. Use it before, during and after your project.

PROJECT PLAN

Track tasks, owners, deadlines and status.

BUDGET

Compare planned and actual spending.

RESOURCES

Record preferred suppliers, equipment and backup options.

RISK REGISTER

Identify, classify and control potential risks.

TEAM

Organise roles, responsibilities and accountability.

SPRINT REVIEWS

Review progress and adapt your plan every 2–3 weeks.

REPORTS

Turn your project data into a clear progress report.

Before beginning:

Open the SOAR Command Center and load the demo data.

As you progress through the course, replace the demo information with your team's own project.



MODULE 1: WHAT DOES PROJECT MANAGEMENT MEAN IN STEM RACING?

Purpose:

Project management is the process of planning, organising and controlling the resources needed to achieve a defined objective.

In STEM Racing, this means coordinating everything required to take your team from initiation → development → manufacturing → competition.

A strong project manager isn't simply someone who tells people what to do.

They create a system that allows the entire team to understand:

What needs to happen.

Who needs to do it.

When it needs to happen.

What resources are required.

What could go wrong.

How we know whether we're on track.

THE TOP 5 AREAS TO CONTROL:

SCOPE — What are we delivering?

TIME — When must it be completed?

COST — What can we afford?

RESOURCES — What do we need?

RISK — What could disrupt the project?

Why this matters for your team:

STEM Racing combines multiple workstreams that depend on each other. A manufacturing delay can affect testing, which can affect engineering documentation, which can eventually affect portfolio and presentation preparation.

Project management connects the entire team.

TOOL CONNECTION:

Open the SOAR Command Center → Dashboard.

Look at the demo project's tasks, budget, resources and risks.

Your challenge: Identify three areas that could cause the project to fall behind.



MODULE 2-DEFINE YOUR PROJECT

Purpose:

Sustainability impact is created (or avoided) at dozens of small decision points across a season — most of which don't look like "sustainability decisions" on the surface until you name them.

Step 1: Define your objective

Ask:

What are we trying to achieve?

Your objective should describe the overall outcome of the project.

For example:

To complete all STEM Racing deliverables by the competition deadline while maintaining the required standards of quality, performance and presentation.

Step 2: Define your deliverables

List everything your team must produce.

For example:

- Manufactured car
- Engineering Portfolio
- Enterprise Portfolio
- Verbal Presentation
- Pit Display
- Uniforms
- Marketing Output
- Sponsorship Deliverables

Step 3: Define acceptance criteria

Ask:

How will we know that this deliverable is finished?

For example:

Car

Must comply with competition regulations, meet the required specifications and pass the team's quality checks.

Portfolio

Must contain all required sections, be reviewed internally and meet the team's quality standard.

Step 4: Identify constraints

What could restrict your project?

- School workload
- Competition deadlines
- Budget
- Team availability
- Equipment
- Suppliers
- Facilities
- Regulations

TOOL

CONNECTION:

Open SOAR Command Center

→ Project Plan.

Create your team's first list of deliverables and convert each one into a task.



MODULE 3: TURNING YOUR SCOPE INTO A PLAN

PROJECT SCHEDULING

Purpose:

Once you know what needs to be done, you need to determine when it needs to happen.
A project schedule transforms a long list of responsibilities into a sequence of manageable tasks.

Step 1: Break down the project

Instead of:

“Build the car.”

Break it into:

Research → Concept
Development → CAD →
Prototype → Testing → Iteration →
Final Design → Manufacturing →
Finishing → Quality Control
The same principle can be
applied to your enterprise work.

Step 2: Add deadlines

Every major
task should
have:
Start date
Deadline
Owner
Status

Step 3: Identify dependencies

Some tasks cannot begin until
another task has been completed.

For example:

Final CAD
↓
CNC Manufacturing
↓
Track Testing
↓
Iteration
↓
Final Car
If CAD is delayed, everything
downstream can be affected.

TOOL CONNECTION:

Use SOAR Command Center → Project Plan to create your team's schedule.

CHALLENGE:

Create at least 10 project tasks and
identify which ones are critical to your
final deadline.

Step 4: Identify your critical path

Ask:

Which tasks cannot be
delayed without affecting the
final competition deadline?
These tasks require
particularly close monitoring.



MODULE 4: MANAGING PEOPLE

OWNERSHIP + ACCOUNTABILITY

Purpose:

One of the most common causes of project delays is unclear responsibility.
If everyone is responsible for something, sometimes nobody is actually accountable for it.

RACI

Use the RACI framework to establish ownership.

R — RESPONSIBLE

Who actually completes the work?

A — ACCOUNTABLE

Who ensures that the work gets completed?

C — CONSULTED

Whose expertise should be considered?

I — INFORMED

Who needs to know about the progress?

TOOL CONNECTION:

Open SOAR Command Center → Team & RACI.

Add your team's roles and responsibilities.

Then use these roles when assigning tasks in your Project Plan.

CHALLENGE:

Take five important tasks from your project and identify the R, A, C and I for each.

EXAMPLE:

Task	Project Manager	Engineering	Enterprise	Marketing
Car Design	A	R	I	I
Sponsorship	A	I	R	C
Social Media	I	C	C	R
Portfolio	A	C	R	C

The rule:

Every major task should have one clear accountable person.
This creates ownership while reducing duplication, confusion and missed responsibilities.

AED



MODULE 5: MANAGING WHAT YOU HAVE

RESOURCES + BUDGET

Purpose:

Every STEM Racing project operates with limited resources.

Good resource management isn't simply about spending less.

It is about ensuring that:

The right resources are available at the right time without unnecessary cost or waste.

RESOURCE MANAGEMENT

Your resources can include:

PEOPLE

Team members, mentors and specialists.

MATERIALS

PLA, wood, bearings, decals, printing materials and consumables.

EQUIPMENT

3D printers, CNC machines, computers and testing equipment.

SUPPLIERS

Companies providing manufacturing, materials or services.

TIME

One of the team's most limited resources.

THE BACKUP PRINCIPLE

For every important resource, ask:

What happens if our first option becomes unavailable?

Create:

Preferred option & Backup option

This allows your team to make decisions quickly instead of starting the search again when something goes wrong.

BUDGET MANAGEMENT

Track:

PLANNED COST

What did we expect to spend?

ACTUAL COST

What did we actually spend?

VARIANCE

How different are the two?

Formula:

$\text{Variance} = \text{Planned Cost} - \text{Actual Cost}$

A positive variance means you spent less than planned.

A negative variance means you spent more than planned.

TOOL CONNECTION:

Use:

Command Center → Budget

and

Command Center → Resources

CHALLENGE:

Enter your team's expected project costs and identify at least three resources that need a backup option.



MODULE 6: EXPECT THE UNEXPECTED

RISK MANAGEMENT

Purpose:

A strong project manager doesn't wait for a problem to happen. They identify potential problems before they disrupt the project. SOAR uses a simple three-stage system:

IDENTIFY → CLASSIFY → CONTROL

01 — IDENTIFY

What could go wrong?

Examples:

- Supplier delays
- Equipment failure
- Team member absence
- Budget overrun
- Missed deadlines
- Car outside regulations
- Lost files

02 — CLASSIFY

How serious is the risk?

Consider:

LIKELIHOOD

How likely is it to happen?

IMPACT

How damaging would it be?
You can combine these into a:
RISK PRIORITY SCORE
 $RPS = \text{Likelihood} \times \text{Impact}$

03 — CONTROL

What can you do to prevent or reduce the risk?

Create:

- Preventative action
 - Contingency plan
 - Risk owner

TOOL CONNECTION:

Open:

Command Center → Risk Register

Create your first five risks.

CHALLENGE:

Identify the five most important risks to your project. Then classify each one and give every risk a control strategy.



MODULE 7: ARE WE ACTUALLY ON TRACK?



MONITORING & CONTROLLING

Purpose:
Planning your project is only the beginning. You need to continuously compare:

PLANNED VS ACTUAL

- Ask:
- Did we complete what we planned?
- Did we use the resources we expected?
- Are we within budget?
- Are deadlines being met?
- Have our risks changed?
- Do we need to change the plan?

THE PROJECT CONTROL LOOP PLAN

Establish what should happen.



EXECUTE

Complete the work.



MEASURE

Collect actual performance.



COMPARE

Identify differences between planned and actual.



ACT

Take corrective action.



UPDATE

Change the plan where necessary.



REPEAT

Continue monitoring.

WHAT SHOULD YOU TRACK? SCHEDULE

Ahead / On Track / Delayed

BUDGET

Planned / Actual / Variance

TASKS

Complete / In Progress / At Risk

RESOURCES

Confirmed / Pending / Backup Required

RISKS

Low / Medium / High

TOOL CONNECTION:

Open your SOAR Command Center Dashboard.

Use it during your team meetings to identify what needs attention

CHALLENGE:

Find one area where your actual performance differs from your original plan.

Then decide what action you will take.

MODULE 8: REVIEW.ADAPT.IMPROVE

AGILE SPRINT REVIEWS

Purpose: Your original plan will not always survive exactly as expected. That doesn't mean your planning failed.

Projects change.
Suppliers change.
Deadlines change.
Team availability changes.
Unexpected risks appear.
The important thing is how quickly your team responds.

SPRINT REVIEWS

Every 2–3 weeks, stop and review the project.

01 — WHAT DID WE COMPLETE?

Review finished tasks.

02 — WHAT DIDN'T WE COMPLETE?

Identify delays.

03 — WHY?

Find the root cause.

04 — WHAT HAS CHANGED?

Review deadlines, resources and risks.

05 — WHAT NEEDS TO CHANGE?

Adapt the project plan.

06 — WHO IS RESPONSIBLE?

Assign clear ownership.

07 — WHAT ARE OUR NEXT PRIORITIES?

Define the next sprint.

CONTINUOUS IMPROVEMENT

After every sprint, ask:
What can we do differently next time?
This creates a cycle of:
PLAN → EXECUTE → REVIEW → IMPROVE
rather than simply following the original plan regardless of what happens.

TOOL CONNECTION:

Open:
Command Center → Sprint Reviews

Record:

- Completed work
- Delayed work
- New risks
- Decisions
- Reassigned tasks
- Next priorities

CHALLENGE:

Run your team's first 15-minute sprint review using the Command Center.



SLIDE 12 – ASSESSMENT

IS YOUR PROJECT UNDER CONTROL?

UNDERSTANDING & PLANNING

- We have clearly defined our project objective.
- We know all major project deliverables.
- We have identified our constraints.
- We have defined acceptance criteria.

ORGANISATION

- Every major task has an owner.
- We have created a RACI system.
- Our stakeholders have been identified.
- Our team understands its responsibilities.

TIME & RESOURCES

- We have a project schedule.
- Major dependencies have been identified.
- We know our critical tasks.
- Important resources have backup options.

FINANCE

- We have created a project budget.
- We are tracking planned vs actual costs.
- We know how much money remains.
- Purchases are controlled.

RISK

- We have identified potential risks.
- Risks have been classified by likelihood and impact.
- High-priority risks have mitigation strategies.
- Every major risk has an owner.

MONITORING & IMPROVEMENT

- We compare planned vs actual progress.
- We monitor project performance regularly.
- We conduct sprint reviews every 2–3 weeks.
- We record decisions and corrective actions.
- We continuously improve our project-management system.



**A PROFESSIONAL
PROJECT
DOESN'T RUN ON
MEMORY.**

**IT RUNS ON
SYSTEMS.**

**PLAN IT.
TRACK IT.
CONTROL IT.
IMPROVE IT.**

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