K. J. Somaiya College of Engineering, Mumbai-77
(Autonomous College Affiliated to University of Mumbai)

Annual Report

Orion Racing India
(2018-2019)

K. J. Somaiya College of Engineering, Mumbai-77
(Autonomous College Affiliated to University of Mumbai)
Name of the organization/chapter/project: Orion Racing India
List of Members/Details of Committee- 2018-2019

Sr. No.	Name of the Faculty advisor/ in-charge	Department	Portfolio
1	Dr. Manoj Janardan Pawar	Mechanical Engineering	Adviser

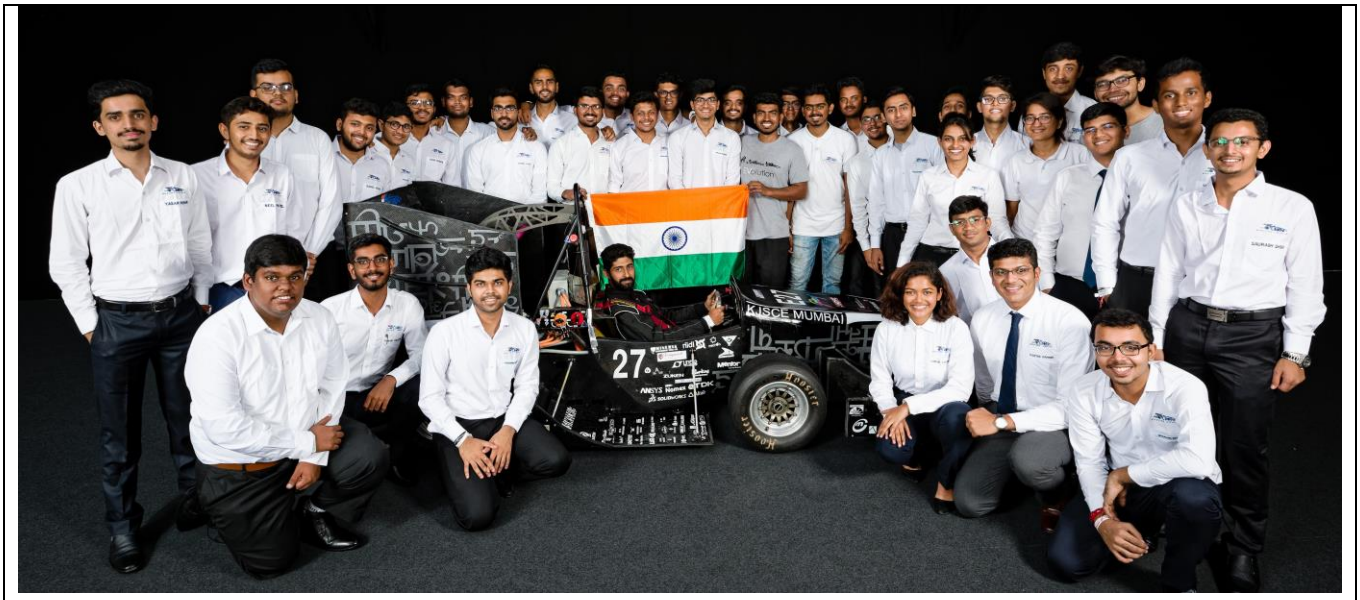
Sr. No.	Name of Student	Department	Year	Portfolio
1	Shreya Rajmane	Mechanical	LY	Team Captain
2	Manabendra Das	Mechanical	LY	Technical Coordinator
3	Ponlingam Ponrathnam	Electronics	LY	Team Member
4	Sanjana Dhulla	Electronics	LY	Team Member
5	Jitun Mishra	Electronics	LY	Team Member
6	Rushabh Oswal	Electronics	LY	Team Member
7	Ankit Jain	Mechanical	LY	Team Member
8	Akash Kokate	Mechanical	LY	Team Member
9	Atharva Kulkarni	Mechanical	LY	Team Member
10	Basraj Kattimani	Mechanical	LY	Team Member
11	Bhavik Shah	Mechanical	LY	Team Member
12	Chaitanya Rathod	Mechanical	LY	Team Member
13	Dhanesh Pamnani	Mechanical	LY	Team Member
14	Jay Kapadia	Mechanical	LY	Team Member
15	Kartik Gandhi	Mechanical	LY	Team Member
16	Ketki Sanghai	Mechanical	LY	Team Member
17	Lalatendu Bal	Mechanical	LY	Team Member
18	Milind Haria	Mechanical	LY	Team Member
19	Nikit Bid	Mechanical	LY	Team Member
20	Parth Kothari	Mechanical	LY	Team Member
21	Ronak Panchal	Mechanical	LY	Team Member
22	Saumil Kamdar	Mechanical	LY	Team Member
23	Shubham Raorane	Mechanical	LY	Team Member
24	Vedansh More	Mechanical	LY	Team Member

Sr. No.	Name of Student	Department	Year	Portfolio
25	Yagnesh Chothani	Mechanical	LY	Team Member
26	Mandar Sadvelkar	Mechanical	TY	Team Member
27	Shanay Shah	Mechanical	TY	Team Member
28	Neel Patel	Mechanical	TY	Team Member
29	Ravi Satasia	Mechanical	TY	Team Member
30	Ravi Mody	Mechanical	TY	Team Member
31	Tanmay Patel	Mechanical	TY	Team Member
32	Sahil Shah	Mechanical	TY	Team Member
33	Gautam Patel	Mechanical	TY	Team Member
34	Manish Rai	Mechanical	TY	Team Member
35	Yasar Khan	Mechanical	TY	Team Member
36	Harshil Parekh	EXTC	TY	Team Member
37	Nayan Chauhan	EXTC	TY	Team Member
38	Saurabh Shah	Electronics	TY	Team Member
39	Kaushal Mahuvarkar	Electronics	TY	Team Member
40	Dhruv Siddhapura	Mechanical	SY	Team Member
41	Rahul Yadav	Mechanical	SY	Team Member
42	Aliasgar Sanwarwala	Mechanical	SY	Team Member
43	Viral Shah	Mechanical	SY	Team Member
44	Shardul Kadam	Mechanical	SY	Team Member
45	Om Rambhia	Mechanical	SY	Team Member
46	Tanmay Khanolkar	Electronics	SY	Team Member
47	Anubhav Bose	Electronics	SY	Team Member
48	Arpan Biswas	Electronics	SY	Team Member
49	Dhairya Kamdar	Electronics	SY	Team Member
50	Malay Chheda	Mechanical	SY	Team Member
51	Yash Nagda	Mechanical	SY	Team Member

Sr. No.	Name of Student	Department	Year	Portfolio
52	Samkit Shah	Mechanical	SY	Team Member
53	Kush Furia	Mechanical	SY	Team Member
54	Karan Bhatia	Mechanical	SY	Team Member
55	Hrishikesh Damania	Mechanical	SY	Team Member
56	Arman Velani	Mechanical	SY	Team Member
57	Gaurav Parekh	Mechanical	SY	Team Member
58	Harsh Shah	Mechanical	SY	Team Member
59	Sahil Shah	Mechanical	SY	Team Member
60	Manav Shah	Mechanical	SY	Team Member
61	Soumil Shah	Mechanical	SY	Team Member
62	Jeet Parekh	Mechanical	SY	Team Member
63	Parth Dedhia	Mechanical	FY	Team Member
64	Sarthak Shah	Mechanical	FY	Team Member
65	Dharm Shah	Mechanical	FY	Team Member
66	Shubham Ghadigaonkar	Mechanical	FY	Team Member
67	Mann Daga	Mechanical	FY	Team Member
68	Vaibhav Parekhh	Mechanical	FY	Team Member
69	Bhushan Pawaskar	Mechanical	FY	Team Member
70	Saud Shaikh	Mechanical	FY	Team Member
71	Rahil Kanti	Mechanical	FY	Team Member
72	Prajwal Bhagat	EXTC	FY	Team Member
73	Ronak Singh	EXTC	FY	Team Member
74	Rudra Jog	Mechanical	FY	Team Member
75	Aaditya Rajghor	Electronics	FY	Team Member
76	Siddhesh Mahajan	Mechanical	FY	Team Member
77	Shubham Joshi	Mechanical	FY	Team Member
78	Prathamesh Kodre	Mechanical	FY	Team Member

Sr. No.	Name of Student	Department	Year	Portfolio
79	Narayan Nagwani	Mechanical	FY	Team Member
80	Samyak Zankzari	EXTC	FY	Team Member
81	Dhruv Bhanushali	Electronics	FY	Team Member
82	Arnav Gadre	Electronics	FY	Team Member
83	Dhvanil Dave	Electronics	FY	Team Member
84	Jay Domadia	EXTC	FY	Team Member
85	Abhijeet Dwivedi	EXTC	FY	Team Member

Photo of members/committee – 2018-2019



Orion Racing India Team - 2018-19

Details of events/activities held during academic year 2018-2019

Sr. No. of Event / Activity	Day/Date	Year	Month	Time	Venue	Description of Activity
1.	5 – 11 August	2019	August	--	Hockenheim, Germany	**Competition: FORMULA STUDENT GERMANY 2019:** Participation in Formula Student Germany.

Reports of event/activity

Sr. No. of Event / Activity	Day/Date	Year	Month	Time	Venue	Description of Activity
1.	5 – 11 August	2019	August	--	Hockenheim, Germany	**Competition: FORMULA STUDENT GERMANY 2019:** Participation in Formula Student Germany.

Details of participation in the event/activity
(Fill wherever is applicable or information is available. At least total need to fill)

No of students / faculty	COMP	ETRX	EXTC	IT	MECH	Total no of participants
FY		**4**	**5**		**14**	**85**
SY		**4**			**19**	
TY		**2**	**2**		**10**	
LY		**4**			**21**	
No of Faculty						

Report of event/activity

Competition: FORMULA STUDENT GERMANY 2019

The academic calendar 2018-19 was divided into 3 major parts
1. Design Phase
2. Manufacturing Phase
3. Testing Phase

1. Design Phase (August - November):
The major goal for the 2018-2019 season was to design and manufacture Orion's first electric vehicle. With the advancements in the design of the E-powertrain presented at the Formula Bharat EV Design Challenge, we had to develop a working E-powertrain and incorporate it in the design of our next prototype Artemis.

When the team returned from the competition in July end, the first step was to decide the prime mover of our next vehicle. The design phase began in the first week of August with the decision of the Motor and the batteries. The team decided to go with the Emrax 228 HV motor and cells manufactured by Melasta. Keeping in mind the prolonged delay caused by the extended lead time in procuring the imported components, we placed the order for the major components in the month of August. In the next two months we designed the other components of the car and prepared a CAD model for the vehicle. After a lot of simulations and computational fluid dynamics analysis, we were quite confident about our design and we could head into the manufacturing phase. During these months, the previous car was displayed at the ASM meeting at CIDCO, Vashi. In this event, we won the second prize for the most innovative use of materials for our Carbon fibre monocoque chassis.

2. Manufacturing Phase (December - March)
The manufacturing phase went on till March.
During this time period, the team designed and manufactured a test rig (Tandem type dynamometer) to

test the motor and the battery pack before it could be tested on the car. The dynamometer was designed and developed by the students. The unique idea and design helped us to save a lot of time and money. We were able to save around 1.5 months of testing time because we could test our powertrain off the car before mounting it on the car.

The manufacturing phase consisted of all the team members preparing the drawing files and visiting the manufacturers to manufacture the final components which had to be assembled on the car. The chassis was manufactured with steel tubes. Our new method of manufacturing the chassis helped us reduce our errors in manufacturing significantly. We made a welding fixture using medium density fibre wood which was easier to manufacture as compared to our previous method of welding metal plates.

It was the first year when we implemented a Z-type anti roll bar which was manufactured by milling titanium grade 5 rod. This added on to the list of our aerospace grade materials which we use on the car.

The body works and aerodynamics package was manufactured using best in class technology of autoclave curing the carbon fibre prepregs.

This phase saw the car being displayed at the Alkem Annual budget meet in Goa. Our adjustable type Z-type anti roll bar was presented at the event conducted by Daimler and we won the second prize for our one of a kind designs.

3. Testing Phase (April - July)

The testing phase began with running the car in college. This was done to check the reliability of our new vehicle. Once this was done the performance-based testing and component validation was done at Powai Bus depot and Raymond's racetrack in Thane.

The car was transported to Germany and the testing team received the car 15 days before the competition to test it in the parking lot of a manufacturing facility owned by Cloos welding technologies. In these months, the team members also prepared for the static events such as the business plan, design report and the cost report. We were able to test the car for over 250 km before we headed for the competition.

Competition

Day 0: The car reached the competition site and the pits were set up. At the same time the other team members set up the camp site.

Day 1: The first day began with driver egress and Inspections. We made our first attempt for the mechanical as well as accumulator scrutineering.

Day 2: On the second day we made our first attempt for electrical scrutineering. Being a first-year electric team, they scrutineered our car with utmost care. They pointed out all the errors and we fixed each one of it. In the accumulator inspection we were advised to fuse each cell.

The static events were scheduled for this day. We presented the cost report, design report and the business plan presentation.

We were selected in the business plan finals (4 teams out of 40) to present the plan to all the participants. We became the first Indian team to reach the business plan finals at FSG.

Day 3: We arranged for 112 fuses and soldered to our custom Battery management system. It was too late for us to attempt the scrutineering.

Day 4: When we attempted for the scrutiny, many other errors were pointed but we were able to clear the accumulator check.

Day 5: We cleared the mechanical scrutiny, but the sticker would only be presented if we cleared electrical scrutiny. We struggled with getting that done and we were unable to finish it in time and hence we could not attempt any dynamic events.

Conclusion

The competition was a very good learning experience. It allowed the team members to interact with industrial experts and members of the other teams. We got several design suggestions and the team is now confident and prepared to present at the next competition – Formula Student Bharat 2020.

Details of prizes (wherever applicable fill all the entries)

Sr. No.	Name of the student	Department	Details of prize won	Remarks
1	Orion Racing India Team - 2018-19	COMP ETRX EXTC MECH	1. Business Plan - 4th place (70/75) 2. Cost Report - 16th place (85/100) 3. Overall Result - 22nd position	

Sample Photographs of the Event/Activity