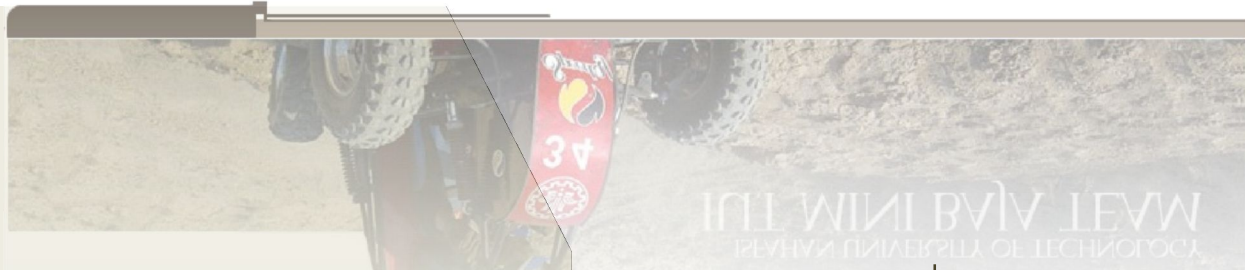


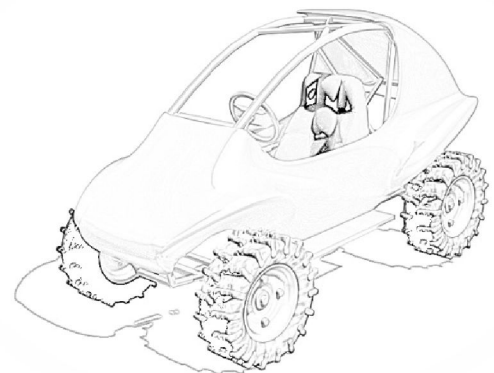


Off-Road Vehicle Team
IUT Automotive Group
Isfahan University of Technology



SAE Mini Baja Competitions	page1
IUT Automotive Group	page3
IUT Mini Baja Team	page4
2010 Off-Road Vehicle	page5
2010 Vehicle Design	page6
2010 Vehicle Project	page7
Sponsor	page8
Contacts	page8

- *Designing, Manufacturing and Racing Mini Baja Off-Road Vehicle*
- *2010 Baja SAE International Competition*



IT'S THE FIRST PROFESSIONAL MINI BAJA OFF-ROAD VEHICLE IN IRAN



SAE MINI BAJA COMPETITIONS

SAE *International*



The SAE Mini Baja competitions originated at the University of South Carolina in 1976, under the direction of Dr. John F. Stevens. Since that time, the Baja SAE Series has grown to become a premier engineering design series for university teams.

The object of the competition is to simulate real-world engineering design projects and their related challenges. Each team is competing to have its design accepted for manufacture by a fictitious firm. The students must function as a team to design, build, test, promote and compete with a vehicle within the limits of the rules. They must also generate financial support for their project and manage their educational priorities.

Each team's goal is to design and build a prototype of a rugged, single seat, off-road recreational vehicle intended for sale to the non-professional weekend off-road enthusiast. The vehicle must be safe, easily transported, easily maintained and fun to drive. It should be able to negotiate rough terrain in all types of weather without damage.

The Mini Baja competition is an excellent learning experience that requires the students to push their creative and engineering ability to the limit. The project provides students with significant challenges that require complete commitment and determination to overcome. These competitions consist of three days static events and dynamic events. The static events clearly explain the engineering and design process that was used in developing each system of the team's Baja SAE vehicle and the dynamic events determine how the Baja SAE vehicles perform under a variety of conditions.



Each competition consists of design judging and a thorough safety and technical inspection. The cars are then put through rigorous tests for acceleration, hill climbing ability, maneuverability, suspension/traction and pulling ability. Finally, every competition culminates in a four-hour endurance race. A winning car must not only be fast, robust and maneuverable, but also comfortable, low in cost, and easy to manufacture, service and maintain.





IUT AUTOMOTIVE GROUP

IUT automotive group is an independent student group that formed with some undergraduate students of IUT with the help of some faculty advisors of mechanics department of university in 2003. The goal of the group was to have an actual experience of a team work in the case of an automotive project to face with industrial designing and manufacturing challenges. Later the group grew to a wide-ranging student teams in fields of automotive teams, aerospace team and fuel cells team. Up to now the automotive group is the most active automotive team in Iran.

Hiva,

*The First Formula Student
Car in IRAN*

*Participated in 2007&2009
Class-C Formula SAE held in
England*

*3rd in Design and 5th overall
in 2007 and the 1st in 2009*

2007 Sponsors



2009 sponsors



*Super mileage,
The First Super mileage
Car in IRAN*

*Participated in 2008 Shell
Echo Marathon held in
France*

2008 Sponsors



SAIPA Co.

2009 Sponsors



SHELL Co.



IUT MINI BAJA TEAM

- IUT Mini Baja team was the first Mini Baja team in Iran.
The 2004 team started to work on Mini Baja in summer 2003. The purpose was to participate in 2004 Canada Competition, but they lost it because of the project postponed. After all problems the car finished in summer 2004 and team was prepared to go to competitions. The 2004 team participated in South Africa Sasol Mini Baja competitions in November 2004 and became 17th team, won the Most Improved Team award and became 1st in cost report section. One year later formed another team. After near 10 month massive work, team became ready to go to the competitions, but the car was not transported on time and the team lost the competitions. Simultaneously team 2005 worked on some automotive industry projects and gains some valuable experiences.
- After 3year the team was refreshed and some students with a one year basic studies on Off-Road vehicle and the past Mini Baja cars gathered to form a professional Mini Baja team in a case of Off-Road vehicle designing and manufacturing team.



Engine: 10hp Briggs & Stratton
Frame: Available low carbon steel with yield strength of 420 Mpa tubes with 32 mm in diameter and 1.5 mm in thickness
Body: 2mm fiberglass
Drive Train: Comet CVT \3.94: 1 gear ratio gearbox\chain drives with a 2.67:1 ratio
Suspension: Independent a-arm suspension with motorcycle damper
Steering: Rack and pinion
Brakes: Hydraulic system with motor cycle caliper
Tires: ATV tires with 10" rim

Engine: 10hp Briggs & Stratton
Frame: St52 steel tube with 25mm diameter and 2mm thickness
Body: aluminum body
Drive Train: Comet CVT 700 series between 0.54:1 to 3.34:1 ratios and chain drives box
Suspension: Independent a-arm suspension with motorcycle damper
Steering: Direct steering
Brakes: Hydraulic system with motor cycle caliper
Tires: 23" in front and 22" in rear



2010 OFF-ROAD VEHICLE

The project is designing and manufacturing a mini off-road vehicle. The vehicle is compatible with Baja SAE standards and will participate in SAE International competitions. Team hope to register in 2010 Baja SAE competitions held in United States and decided to have a marvelous test of the vehicle on University Mountains and in LUT desert (the warmest desert in the world) after manufacturing phase finished.

2010 IUT MINI BAJA VEHICLE CONCEPT



Team gathered a full database and information of off-road cars and the past Mini Baja cars build by IUT team and other teams' cars in conceptual design phase and treat the experiences in designing phase. The goals of designing new vehicle are maximization acceleration, top speed, traction and durability of the vehicle and minimization chassis weight. Team uses the Catia software for sketch and assembles the parts of the car and SimDesigner, Ansys, Adams software for static and dynamic analysis. The new design of the power train allows the vehicle gains a suitable traction for pulling and hill climb tests and suspension design decreases impact effects result from bumps and drop-offs. Also in new car attempted to decrease the car mass and having a low center of gravity by frame structure changes and optimizations in vehicle parts design.



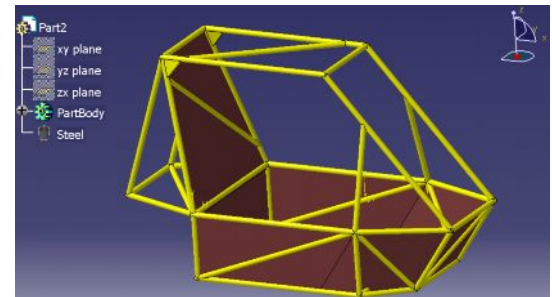
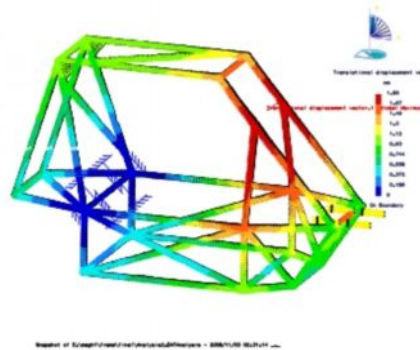
Top Speed: 65km/h
Pulling Load:
180 to 200kg
Incline: 45 slope in a
speed of 25 km/hr
Weight of vehicle:
220kg
Efficiency: 90%



2010 VEHICLE DESIGN

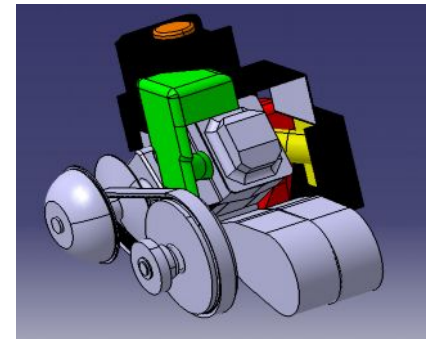
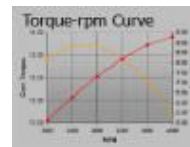
Chassis & Ergonomics

- Made by 4130 steel tube
- Tig Welded and heat treated
- Designed with Catia
- Crash Analyzed with Ansys-Is dyna and SimDesigner



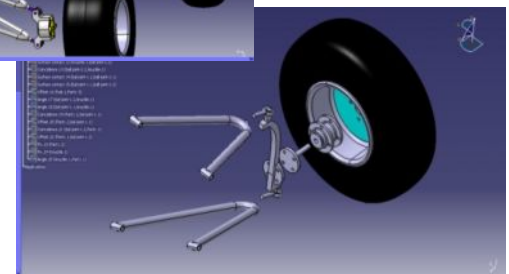
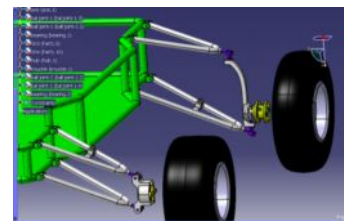
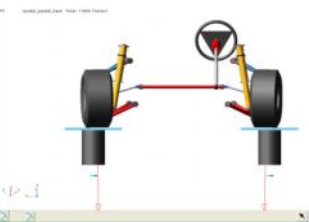
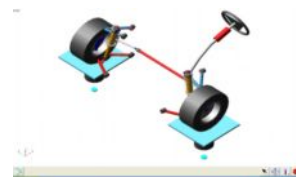
Power Train

- Intek OHV305 model20 10hp Briggs & Stratton Engine that determinate by SAE
- Comet CVT with a overall 6.26:1 ratio
- 2Stage Gearbox with aluminum case and 4140 steel shaft Designing and Building by team



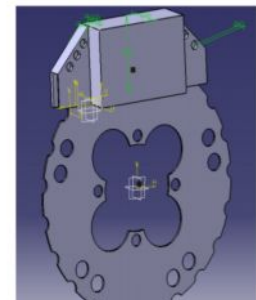
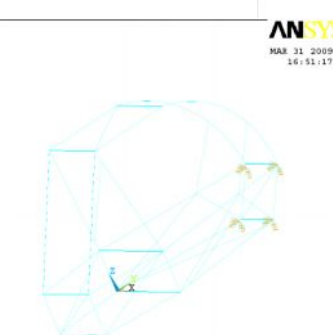
Suspension & Steering

- Four wheel independent suspension with a 10" travel in front and 8" in rear
- Dynamic motion analyze In SimDesigner and Adams
- Rack & Pinion Steering
- Dynamic analyze with Adams



Brakes & Tires

- Dual cylinder hydraulic brake system; 2 Caliper in front and 1 Caliper on rear axle, with 7" rotors in front and 8.1" rotor in rear
- 23" tire for Front and 22" tire for Rear



Woody Frame Structure for Ergonomic Tests



2009 VEHICLE PROJECT

• Project Gant Chart

	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Conceptual design														
Requirements														
Cost report														
Sponsor Action														
Final design														
Purchasing vehicle parts														
Redesign & Manufacturing														
Chassis														
Drive Train														
Suspension														
Steering														
Body														
Assemble														
Tests & driver training														
Hotel & Shipping requirements														
Sending SAE reports														
Competitions														
Exhibition and publicity actions														
Website & Documentation														

• Project Cost Report

Num	part	Cost (\$)
1	Chassis	800
2	Suspension(shocks, springs)	1,850
3	A arms, Knuckle, Spindle	450
4	Brakes	400
5	CVT	700
6	Axles, UV joints, Bearings	600
7	Gearbox	750
8	Steering	250
9	Hub and Tires	1,200
10	Electric and Safety parts	100
11	Engine	800

Vehicle Parts

All= 7.900

num	part	Cost (\$)
1	Vehicle Shipment	5,000
2	Team Transportation	7,000
3	Hotel Accommodations	2,500

Competitions

All= 14,500

All Costs

All= \$ 22,400 USD



SPONSORSHIP, CONTACTS

• Sponsors

By the sponsor's generous help and the supporting, engineering students will have a special occasion to work as a team in a real challenging engineering project and prepare for high technical skill activities in future.

IUT Mini Baja team is proud to display the name and logo of sponsors on the vehicle, team's website and other publications.

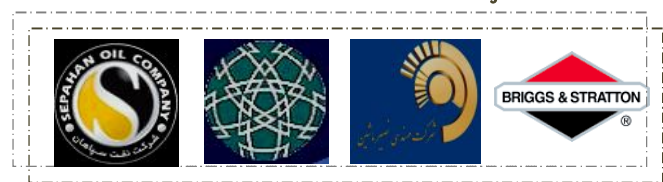
Sponsor is as essential to the success of the project as the students who design, build, drive, and maintain the vehicle.

Sponsors of Mini Baja teams gain exposure to a unique group of dedicated and disciplined college students and the world's institutes, universities and related companies that participate in SAE competitions.

Platinum SPONSOR for 2010 Mini Baja Car



Thanks to Past IUT Mini Baja SPONSORS



• Contacts

Website: www.iutminibaja.com

Num: [\(0098\)0311 3912625](tel:(0098)03113912625)

Weblog: www.blog.iutminibaja.com

Fax: [\(0098\)0311 3912625](tel:(0098)03113912625)

Mail: minibaja@me.iut.ac.ir

Postal Code: [83111-84156](tel:83111-84156)

Faculty Advisor: Dr.Esfahanian, Mohsen

Team leader: Gorzin, Morteza/
(0098)9127275403/m.gorzin@iutminibaja.com

