

Curriculum For Transportation Design

Special project

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Acknowledgement

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Abstract

IDC teaches industrial Design where students take up projects focused on various areas like Product design, Game design, Automotive Design, Furniture design, lifestyle accessories etc. One of the area where there are tremendous design possibilities is Transportation design because of the ever increasing demand for better transportation by human beings. There is also a need for Eco friendly Transportation solutions in all areas of transport like personal, Public, Commercial transport etc. So IDC has planned to Start a Masters Programme in Transportation Design.

The task for this special project was to assist Prof.Munshi and Prof. Ramachandran in preparing the curriculum for transportation design.

To start with the project data collection was done which contained information regarding various design colleges which were providing design courses in Transportation and Automobile design.

This data was then analyzed and a report was prepared which contained the information about various design colleges, their courses, subjects taught

etc. Understanding the course structure of other disciplines a draft course structure for Transportation design was prepared according to the requirements of IDC.

To further improve the curriculum for transportation design and to get inputs or suggestions for our course a questioner was made which contained questions related to transportation design studies. This questioner will then be sent to Professors and designers from industry so that they can give in their valuable views and suggestions for our course.

Transportation Design

Transportation design is the profession involved in the development of the Transportation concept, its appearance, ergonomics of motor vehicles or more specifically road vehicles. This commonly refers to automobiles but also refers to motorcycles, trucks, buses, coaches, and vans.

Task of a Transportation Designer

The task a transportation designer is usually split into three main aspects. exterior design, interior design, color and trim design. Graphic design is also an aspect of automotive design, this is generally shared amongst the design team as the lead designer sees fit.

Design focuses not only on the isolated outer shape of automobile parts, but concentrates on the combination of form and function, starting from the vehicle package. The aesthetic value needs to correspond to ergonomic functionality and utility features as well.

Different branches within Transportation Design

Exterior design

The stylist responsible for the design of the exterior of the vehicle develops the proportions, shape, and surfaces of the vehicle. Exterior design is first done by a series of digital or manual drawings. Progressively more detailed drawings are executed and approved.

Clay or digital CAD models are done along with the drawings. The data from these models are then used to create a full sized mock-up of the final design. A clay model is still the most important tool to evaluate the design of a car and therefore used throughout the industry.

Interior design

The stylist responsible for the design of the vehicle interior develops the proportions, shape, placement, and surfaces for the instrument panel, seats, door trim panels, headliner, pillar trims, etc. Here the emphasis is on ergonomics and the comfort of the passengers. The procedure here is the same as with exterior design (sketch, digital model and clay model).

Color and trim design

The color and trim (or color and materials) designer is responsible for

the research, design, and development of all interior and exterior colors and materials used on a vehicle. These include paints, plastics, fabric designs, leather, grains, carpet, headliner, wood trim, and so on. Color, contrast, texture, and pattern must be carefully combined to give the vehicle a unique interior environment experience.

Designers work closely with the exterior and interior designers. Designers draw inspiration from other design disciplines such as: industrial design, fashion, home furnishing, and architecture. Specific research is done into global trends to design for projects two to three years in the future.

Graphic design

The design team also develop graphics for items such as: badges, decals, dials, switches, kick or tread strips, liveries.

List of some of the reputed design colleges offering Transportation Design courses.

UMEA Institute Of Design

College Of Creative Studies (CCS)

IED Torino

Royal College Of Arts (RCA)

Coventry School Of Art & Design

Domus Academy

National Institute of Design (NID)

This report contains information about the above listed colleges, courses offered and a brief introduction to their Transportation Design programme.



Umeå Institute of Design

Umeå University
Umeå
Sweden

Courses:

Masters Programme 2 years
Transportation Design
Advanced Product Design
Interaction Design

Bachelor Programme 3 years
Industrial design

Transportation Design Programme in Umeå - Two years

The Transportation Design Programme in Umeå is unique for its scope of interest, dealing with the whole transportation design field in co-operation with industry.

Students are educated to have an open mind on both conceptual ideas and detailed realistic design solutions. They are encouraged to have a balanced thinking process where form and function work together.

Focus is on creativity and realistic solutions. Students have the tools that are used in design studios around the World. Tools such as Alias, Maya, Photoshop, Solidworks. The education is based on the Scandinavian design tradition, which emphasizes on understanding the user and his or her needs.

Course Structure

The Programme gives the student competence to work with design and development of different types of vehicles, from bicycles and cars to public transportation means such as trains, buses and air crafts.

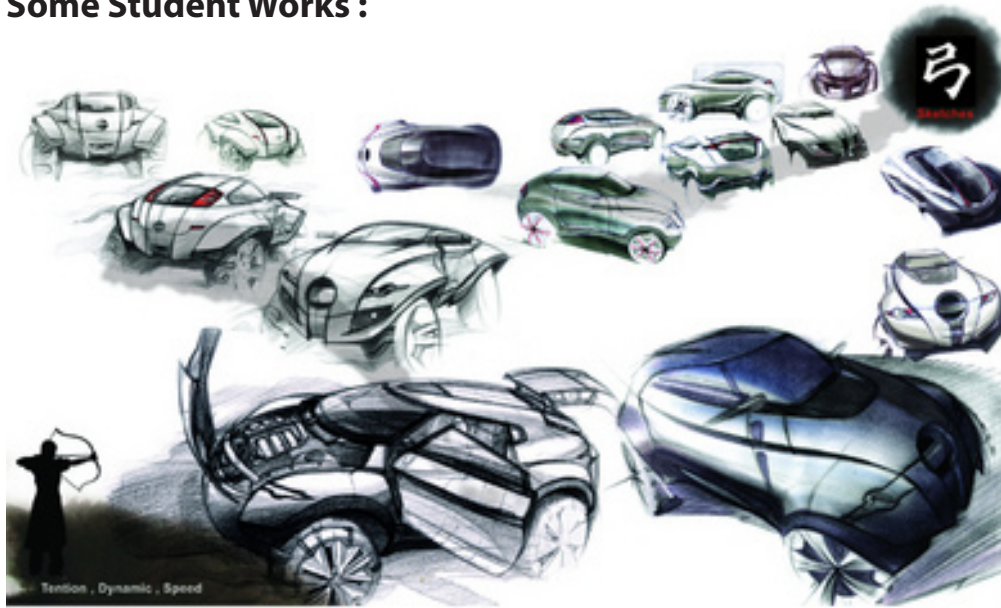
Students entering the masters in Transportation design must have a basic understanding of designer tools, together with a competent level of sketching skill.

They develop their creative thinking process with tutoring support focused on trying to solve future transportation problems. Students explore how vehicles of all types can be designed and developed to be integrated into a growing awareness of the environmental issues.

Students make their design concepts realistic, building around future ifestyles, but equally the designs are attractive and desirable. The essence of the student work is about form and function in balance with the human needs at the centre of their design development process.

In the second year the students focus on specific design areas. Their final degree project allows them to fully experience the design process by connecting to the transport design industry. This connection gives the student valuable experience in becoming a professional designer.

Some Student Works :



COLLEGE *for* Creative STUDIES

College for Creative Studies (CCS)
East Kirby
Detroit, MI
USA

Courses:

Undergraduate programme:

Bachelor of Fine Arts program offers undergraduate degrees in Advertising Design, Art Education, Crafts, Entertainment Arts, Fine Arts, Graphic Design, Illustration, Interior Design, Product Design, Photography, and Transportation Design

Graduate programme:

The College's Master of Fine Arts program offers graduate degrees in Design and Transportation Design.

Transportation Design Programme in CCS

The Transportation Design specialty within the CCS Industrial Design Department gives you the skills you need to work in top positions for top carmakers. At CCS you gain both technical and creative skills and an insider's view of how the industry works.

With intensive technical and creative training, the programme gives opportunities to step through every part of the design development process, making and presenting your work to seasoned professionals who will give you feedback on every aspect of your work.

In the process you'll discover your unique design voice, the amazing vehicle that you'll be ready to create.

In CCS you learn:

- Traditional Drawing
- 3D Modeling and Rendering
- Ergonomics
- Vehicle Packaging
- History of Modern Design

CCS graduates work in:

- Automotive Design
- Bike Design
- Motorcycle Design
- Boat Design
- Airplane Design
- Mass Transit Design

Some Student Works :





IED Torino
Via San Quintino,
Torino, Italy

Courses:

Undergraduate programme:

Bachelor of Fine Arts program offers undergraduate degrees in Advertising Design, Art Education, Crafts, Entertainment Arts, Fine Arts, Graphic Design, Illustration, Interior Design, Product Design, Photography, and Transportation Design.

Graduate programme:

The College's Master of Fine Arts program offers graduate degrees in Design and Transportation Design.

Transportation Design programme in IEDTorino

The Master or Arts in Transportation Design – work experience, was set up with the idea of providing the kind of training that would turn out to be a winning tool with which to face up to the challenges of the workplace and enable the students to provide the solutions to many of the questions often addressed by Car Manufacturing Companies and Style Centres.

Over the course of two years on a full-time basis, this course expects to hone and develop the student's competence in terms of his/her critical approach, analytical and methodological skills providing them with the tools they need to start creating their own innovative concepts.

Course structure:

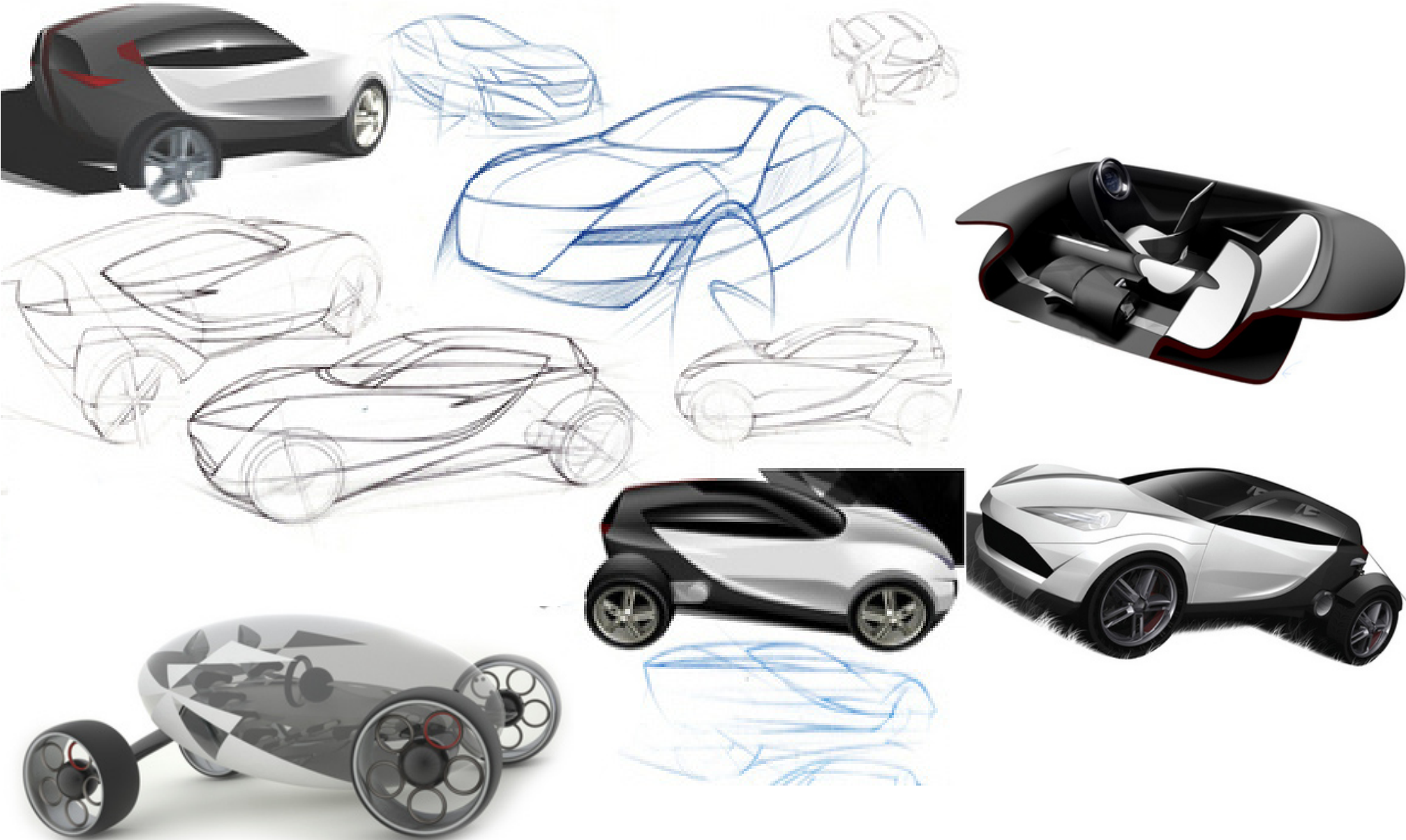
The didactic pathway includes a first year focused on providing the theoretical and design tools required to produce 1:4 scale models that are considered the final goal of the first part of the Master course.

This is then followed by a detailed analysis of the main manual and digital representation techniques, the ergonomics and architectural features of a vehicle, marketing and modelling techniques.

During the second year the students become involved in a true work environment, simulating the work of a team in a professional design studio equipped with all the most innovative information technology tools.

For the 2nd year of the course a Style Centre will commission a project from the Istituto Europeo di Design of Turin for the development of a concept car.

Some Student Works :





Royal College of Art

Postgraduate Art and Design

Royal College of Art
Kensington Gore
London

Courses:

MA Programme in:

Animation, Architecture, Ceramics & Glass, Communication Art & Design, Conservation, Critical and Historical Studies, Curating Contemporary Art, Design Interactions, Design Products, Drawing Studio, Fashion Menswear, Fashion Womenswear, Goldsmithing, Silversmithing, Metalwork & Jewellery, History of Design, Industrial Design Engineering, Painting, Photography, Printmaking, Sculpture, Textiles, Vehicle Design

MA Programme in Vehicle Design

Central to the course methodology is the understanding of the broader issues of vehicle design necessary to optimise opportunities for mobility. Students are expected to develop an awareness of the range of issues that affect mobility including accessibility, aerodynamics, environmental impact, ergonomics, legislation, materials, production, safety and technology, as well as aesthetic principles.

Course Structure

The MA curriculum is structured around three themes:

- **Urban Flow:** concentrates on providing advanced inclusive mobility, moving people and goods within specific urban environments, inspiring design innovation for integrated journeys, improving the design of urban vehicles and systems and exploring successful interfaces between them.
- **Inside Out:** focuses on the vehicle's materials, production and manufacturing technologies, considering in particular the

functional design of vehicle interface with the user.

- **Automark:** explores strategic design solutions creating innovative vehicle concepts that provide significant value to a business, identifying and creating new commercial and brand potential.

Learning and Teaching

Studio teaching supports design development from research to initial design concepts and resolved feasible design solutions. Students are expected to visualise design narratives to a high quality using a range of devices, from hand-sketching to computer rendering and clay-modelling. The department hosts a series of seminars to challenge perceptions, encourage the mixing of design disciplines and to generate discussion between students and design professionals. The staff team are committed professionals with a range of specialist knowledge and experience of professional practice and design education.

Since the foundation of the course in 1967 graduates have influenced thinking on all aspects of vehicle

design. Consequently, the department has excellent contacts with the motor industry and public-transport operators. Visiting professionals and vehicle design affiliates enrich specialist projects by lectures, workshops and visits to design studios.

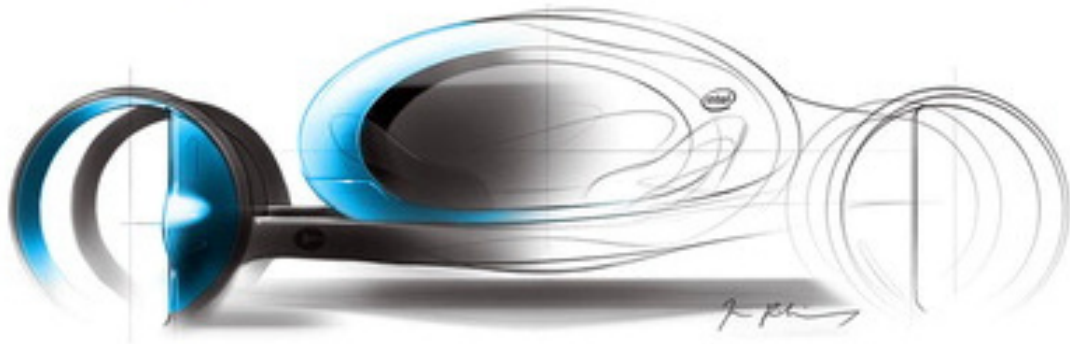
Critical and Historical Studies

As part of the experience of being at the RCA, all MA students, except those in the School of Humanities, attend a programme of lectures organised by the Department of Critical & Historical Studies during their first year at the College. This work culminates in the submission of a dissertation, which is a requirement for all MA students (see MA College-wide Programme).

Professional Practice

The Vehicle Design Department supports career development by tailoring professional practice provision for students to the culture of the discipline. Information, training and advice on work and life skills are also available centrally through FuelRCA.

Some Student Works :



Coventry University
Coventry
United Kingdom

Courses:

**Undergraduate degrees and
Postgraduate & Research degrees in:**

Media and Communication
Journalism
Photography
Art
Fashion
Graphic Design
Automotive
Product Design
Transport
Music
Performing Arts

**Department Of Industrial Design-
Transportation Design**

Transport has been a theme of Coventry University since we started our unique Transport Design course back in 1972. Transport has come to cover the whole field from rollerskates to aircraft, railways and all forms of road vehicle.

The Department of Industrial Design offers courses in transport.

Today's graduates of Transport Design benefit not only from our many years of experience in this field but also from our continued investment in the latest design and modelling technology. Past graduates of Transport Design are now world leaders in the automotive design and marine design industries, some at director level.

With a view to the future of transport beyond the car we have established another unique degree course in Transport Design Futures which seeks to integrate transport planning and design in one discipline. In 2005 Coventry University was recognised as an international Centre of Excellence in Teaching & Learning

in Transport & Product Design (CETL). In 2006 our new CETL came 'on line' introducing Transport Design students to new technologies in ePortfolio building and global communications.

**Transport Design MDes degree
programme in Coventry- Four years**

Transport Design degree in RCA gives you the skills and understanding to work as a designer in any transportation industry. This course was developed in consultation with the transport industries which have employed its graduates for over thirty years.

Course structure:

On the course you learn both 2-D and 3-D design skills, as well as how to use physical and virtual tools to create innovative transport designs.

You also learn the theory and analysis needed to underpin successful design work, plus gain an understanding of engineering and ergonomic requirements for successful transport designs.

During the third year of our four year course you are able to undertake collaborative projects with the automotive industry as well as apply for an industrial placement (internship) in the latter part of that year.

In the final year you work on substantial design projects that will allow you to integrate your knowledge and skills and to present yourself at our prestigious Degree Show.

This course enables students who have performed exceptionally well within the first three years of study to tackle a major piece of Master's-level, self-directed transport design in the final year. Your final year project work will focus on a selected area of transport design, from cars to boats.

Some Student Works :





Domus Academy
Milan, Italy

Courses:

Masters course in:

Accessories Design, Car Design, Business Design, Cultural Experience design and Management, Fashion Design, Interaction Design, Interior and living design.

Master Program in Car Design
11 months

Domus Academy's Master Program in Car Design is part of the design logic of an increasing functional relation between mobility and territory, facing the complexity of developing vehicles suited to new needs.

The Master in Car Design aims at updating and developing professional competencies of young, promising designers. It benefits from Italian car design tradition, and it pursues an integrated design approach, where means of transportation are built respecting ergonomics, safety, without forgetting the environmental impact, and taking into a very serious account aesthetics.

The Master in Car Design is based on the principle of **"learning by designing"**. In order to design it is not important what the theory describes as possible: the designer is interested in the potentials, those possibilities the theory does not eliminate.

Course structure:

The Master course in Car Design and Mobility lasts 11 months and is articulated into lectures, project seminars, workshops and a final Master thesis.

Workshops

Workshops are the backbone of Domus Academy's unique learning approach. During workshops, students work on different areas of project in collaboration with car designers and partner automotive companies. Every workshop includes lectures (cultural, methodological and technical), meeting with automotive sector experts, and a design project, developed with the supervision of experienced designers.

Master Thesis

In the last months of the program, participants will work on a project that gathers all the competences developed during their studies, starting from a global vision and getting to the design of a detail. Participants to the Master in Car Design will be asked to choose a design theme to be developed, to give a sense to their project and to carry it out

keeping an high level of research in all the steps of the design process. Project results will be prepared at an actual professional level, will be shown during the thesis dissertation and will enrich the student's personal portfolio.

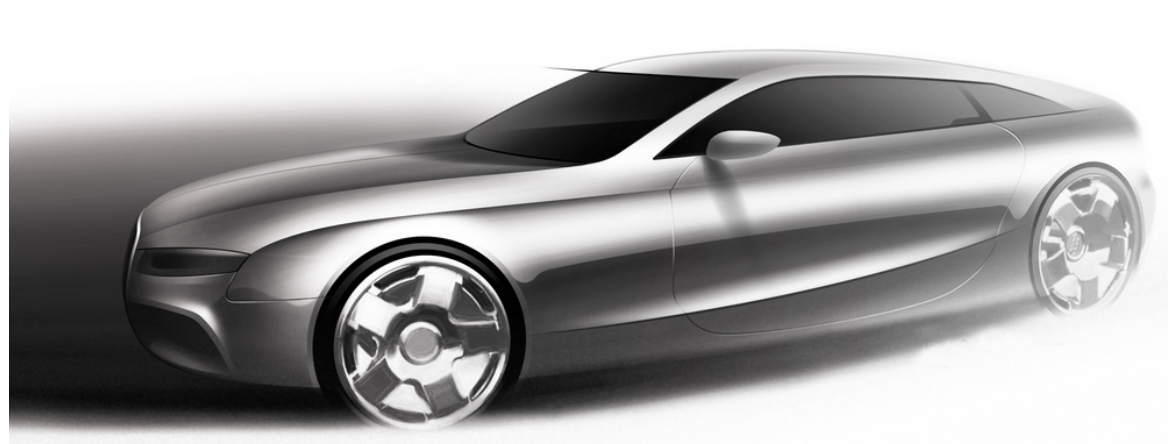
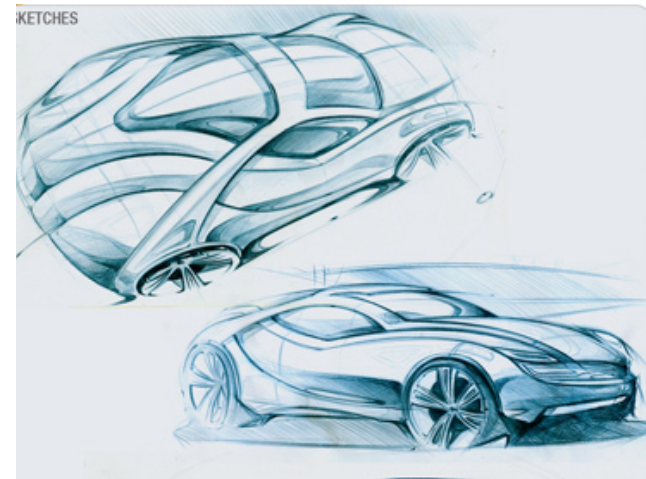
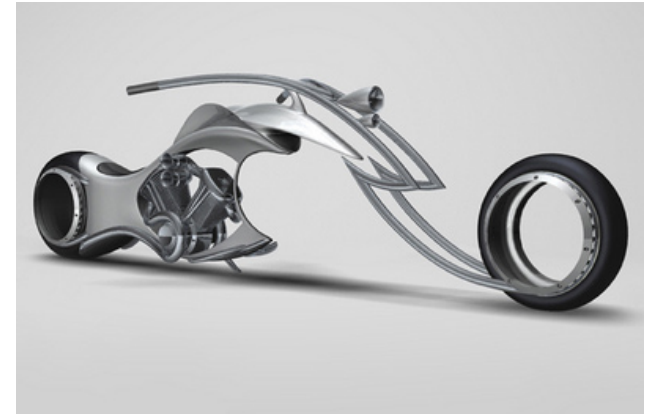
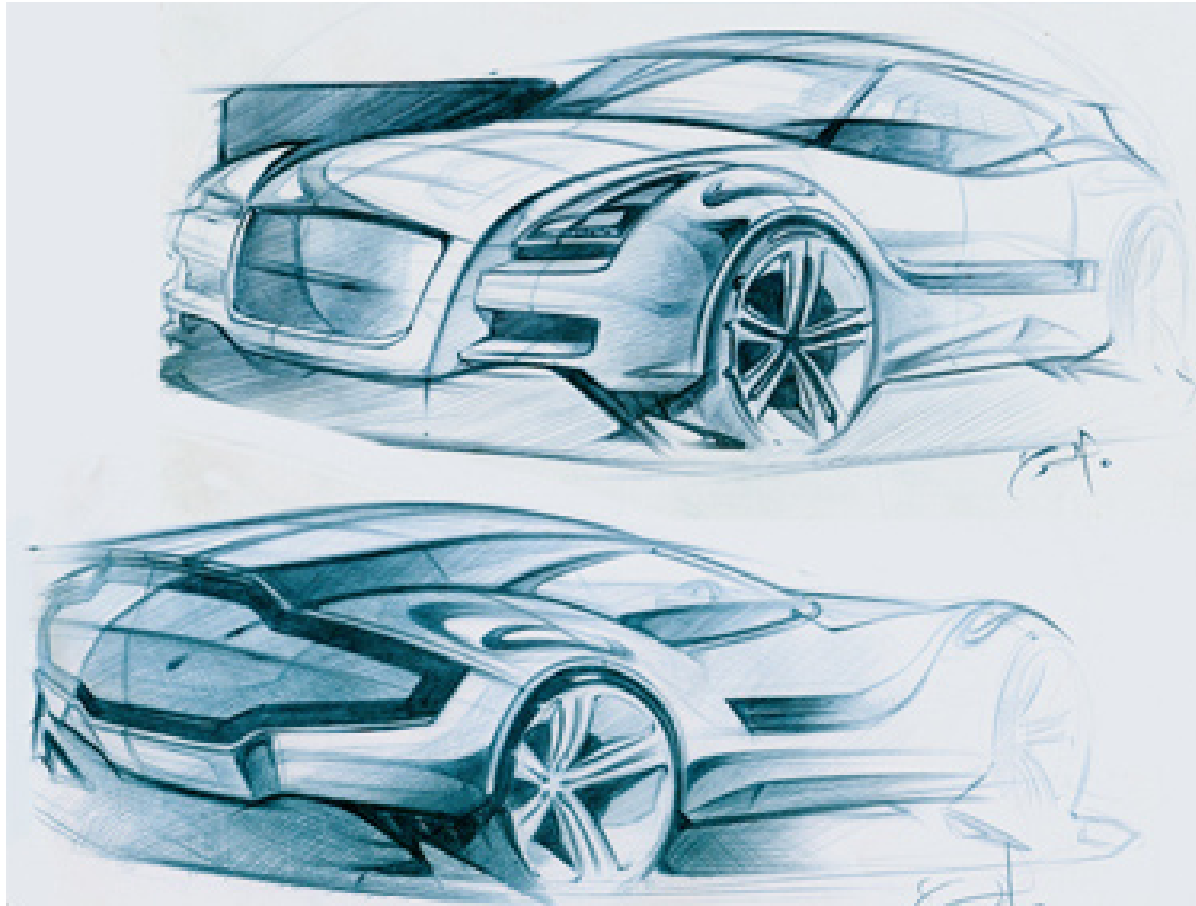
Industry collaboration:

Audi and Domus Academy together in the Master in Car Design.

Audi will support the 2009 edition of the Master in Car Design with its technical and design consultancy.

Audi will launch a project theme which will be developed during the academic year and, through a committed team, will follow the workshop activity and the final Master projects. In order to facilitate the participation of young designers coming from all over the world to this brand new project, Domus Academy provides some scholarships covering part of the tuition fee of the Master.

Some Student Works :





राष्ट्रीय डिज़ाइन संस्थान
NATIONAL INSTITUTE OF DESIGN

**National Institute of Design,
Paldi, Ahmedabad,
India**

Courses:

**Graduate Diploma Programme in
Design (GDPD)**

Product Design, Furniture & Interior Design, Ceramic & Glass Design, Graphic Design, Animation Film Design, Film & Video Communication, Exhibition (Spatial) Design, Textile Design

**Post-Graduate Diploma Programme in
Design (PGDPD)**

Product Design, Furniture & Interior Design, Transportation & Automobile Design, Ceramic & Glass Design, Textile Design Graphic Design, Animation Film Design, Film & Video Communication, Toy & Game Design, Apparel Design & Merchandising, Lifestyle Accessory Design, New Media Design, Strategic Design Management, Information & Interface Design, Design for Retail Experience, Design for Digital Experience.

**Transportation & Automobile
Design (PGDPD)**

Transportation as understood at NID includes not only cars and other vehicles or off road vehicles but also vehicles on tracks, water vessels and other mobility devices and equipments. In India, where there is still a value base for resource conservation and adopting one product for multipurpose use, transportation of both people and goods has many co-existing modes. Transportation has explored all possibilities of movement viz. land, air and water.

The National Institute of Design offers a two-and-half-year (2½ years) postgraduate course in Transportation & Automobile Design.

Course Structure:

This course seeks to establish a credible relationship of products and services with the user, technology and environment. The course aims to train young professionals with a thorough grounding in the systems approach to holistic problem solving processes and a sensitivity of concerns towards the environment and needs and requirements of different user groups. The Transportation and Automobile Design department has also recently setup collaboration with the reputed Domus Academy of Milan, Italy offering an Integrated Degree at post-graduate level (optional). Students of NID will have the opportunity to avail of the partial scholarships being offered by Domus Academy exclusively to NID, with most of these being awarded to young talent in the Transportation and Automobile Design discipline. This has been initiated with the aim of creating awareness and exposure to the students at an international level and further facilitating their learning and growth.

The objectives of this Programme are:

1. To develop an understanding of the field of Transportation Design with respect to the discipline of Industrial Design.
2. To develop skills in analysis, concept generation, formulation of design strategies, holistic problem solving, product detailing, communication and teamwork.
3. To understand the socio-economic, cultural, ecological and environmental contexts of transportation design and ethical responsibilities of a professional designer.
4. To understand research concepts, strategies and methods and the skills to apply them in the domain of transportation products, systems and services.
5. To develop the capability to practice as a professional designer in transportation and automotive sector of industry.

Some Student Works :



Preparing IDC Transportation Design Course Structure

Transportation design at IDC seeks to pioneer new approaches for our mobile futures.

Centre of the course methodology will be the understanding of the broader issues of vehicle design necessary to create opportunities for mobility. Students will be working on related issues like accessibility, aerodynamics, environmental impact, ergonomics, materials, production, alternative propulsion technologies etc.

The course aims to provide essential and practical training in designing a variety of vehicles. The programme is meant to develop skills, knowledge and aptitude among students to become creative problem solvers who can bring about innovation in the Design, manufacturing and communication industry.

The objectives laid down for this programme are:

- To develop a deep understanding of the field of Transportation Design.
- Understand appropriate automotive design terminology.
- To develop skill in sketching, concept generation, presentation techniques, formulation of design strategies, holistic problem solving, product detailing etc.
- To understand the socio-economic, cultural, ecological and environmental contexts of transportation design and ethical responsibilities of a professional designer.
- Analyse transportation design problems.
- Understand types of materials, construction techniques, Recent advances in engineering and technology in transportation industries.
- Develop abilities to detail out final design solutions using appropriate means and materials.
- To develop the capability to practice as a professional designer in transportation and automotive sector of industry.

Course structure:

This is a proposed course structure for masters in Transportation Design course, which will consist of 4 semesters.

In general, the first two semesters in the first year consist of theory courses and learning/instruction oriented projects, while the second year is more or less spent on design projects.

Semester 1

Introduction to Design

This module includes introductory lectures on **what is design?...**

Elements of Design

Introduction to basic elements and concepts of visual design: line, texture, colour, form balance, proportion, size, shape, mass, unity and variety

Applied Ergonomics

Human being in man made world, this module explains gross human anatomy, Anthropometry, static and dynamic, Muscles and work physiology. Research techniques in Ergonomic data generation etc

Sketching skills-2D & 3D

In this module students are made to work to improve their sketching abilities. They are given tasks to draw accurate 2D and 3D views in perspective. Classes are taken up by visiting faculties, designers from various industries.

Rendering Techniques

Students are taught basic hand rendering with color pencils and dry pastels.

Materials and processes

This module teaches students about the commonly used materials like plastics, metals, wood etc and it also deals with study of different manufacturing processes used in today's products.

Art Design and Society.

It explains the concept of Industrial Design starting from the time of the Great Exhibition leading to the Bauhaus and after, work of Bauhaus, history of design profession in Europe and America. A survey of major developments of 20th Century painting, sculpture and architecture.

Transportation systems-(Vehicle theory)

This module will cover the theoretical aspects of automobiles, Some lectures on vehicle layouts, Drivetrains, new technologies, engine nomenclature, logistics, traffic RTO rules etc.

Automotive design terminologies

Educate students with the automotive design language so that they understand better.

Semester 2

Automotive form studies

Studies of different Styling trends in the transportation industry

Representation techniques-Alcohol markers

To further improve presentation skills, and to explore new and fast ways of presentating concepts Marker rendering techniques will be taught by experienced designers visiting from industry.

Digital techniques-photoshop, wacom etc

Some workshops on digital rendering techniques using Photoshop and a Wacom Tablet.

Model making techniques

Small assignmnets and tasks given to make students work in workshop to develope model making skills using materials like PU foam, POP, wood, Plastics, Metal etc.

Computer aided design-Alias studio tools

A introductory course on Studio tools with some small assignmnets to get hands on the modelling package.

Contemporary trends in theater, Film and Art

Message, Media, Audience, Critics, Promoters etc. as a system. Invited seminars by outside experts and professionals

Summer project

Design project 1- Internship

During the vacations students are supposed to work in the industry for a period one month. students can decide upon where and what kind of projects they want to do. there is a small presentation to be given after finishing the project and students are graded on their presentations.

Semester 3

Vehicle exteriors/interiors

Students are made to develop concepts for automotive exteriors and interiors. This includes sketches and final renderings or 3D models which are to be presented.

Advanced 3D modelling-Alias studio tools

Further in depth study of Studio tools to develop class A surface products.

Product semantics

Semantics is the study of meaning in communication. The course looks back towards formal concepts such as visual complexity, visual interest and recall of forms. It also discusses the role of characteristics features in objects / form recognition and natural categorization process.

Product planning and marketing

Corporate strategy for product planning, Management thinking on new products, Developing a product plan and product mix, price policy, positioning the company, product positioning, planning for future position etc.

Clay modelling workshop

This workshop teaches students how to use industrial styling clay to create complex surfaces by using special clay modelling tools.

Design project-2

Students take up a Design project based upon their area of interest.

Semester 4

Special project

Special project is oriented towards design research. Students choose from topics floated by faculty members.

Color and trim introduction

This course covers the importance of materials and their influence on design form and perceived quality. Students will evaluate trends and use them as reference material during project development.

Design project-3

The final project is a long duration project and students can take up bigger challenging projects this time in P3.

Future prospects :

Career options after doing this course include automotive design, research, Teaching, design management etc.

Entry Requirements:

Valid CEED Score
Bachelor's Degree/Diploma or equivalent Degree/Diploma in Engineering, Architecture, Design, Interior Design, B.Des from IIT Guwahati or equivalent, Professional Diploma of NID, Professional Diploma of CEPT (5 year program) with a minimum 60% marks or equivalent grades (55% in case of SC/ST).

Feedback from Industry

To further improve the curriculum for transportation design and to get inputs or suggestions for our course a questioner was made which contained questions related to transportation design studies.

This Questioner is a word document which will be sent to designers in the industry. This can be filled by them and sent to us by email.

Conclusion:

The Questioner was sent to various designers in automobile industry and the feedback given by them was analyzed. Important points were listed down which would help us in improving our transportation design programme.

The points were also rated on a 1-5 scale according to their importance. 1 stands for low importance and 5 stands for highly important.

During the course special people from industry should be called to give an insight into industrial practices and methods involved. Interaction with industry people and frequent industrial visits are a must.	5
A small course on aerodynamics and vehicle dynamics will also help the students greatly.	2
Focus should be on alternative energy sources and try to develop new design languages.	3
I personally believe that a lot can be learned from nature and one can try to adapt from them e.g bio mimicry or bio mechanics.	2
We should move towards a more function driven aesthetics and strive to achieve a sustainability.	3
Public transportation and alternate energy sectors are likely to boom in the near future so more focus should be given to these areas especially for a country like India.	4
Importance should be given on manufacturing process and technologies that are relevant for auto industry.	2
Talk from international level designers, professors and industry people are a bonus. It gives a tremendous exposure to students.	5

Student participation in auto design competitions should be encouraged if not made a part of class assignment.	5
Student exchange programs and industry run projects must be taken up. The concept of summer internships needs to be negotiated between various industries.	5
It is important to understand the design strategies of various companies and how cars from a particular company have evolved over time.	3
'Brand identity' and how do various companies maintain it, needs to be studied in detail.	3
Study of trends in automotive design is a necessity.	2
In order to understand the physiology and psychology of the masses and nation at large, cultural knowledge is important.	1
The world is moving towards more eco friendly vehicles, less pollution and more efficiency. Hybrids and electrics are the answers to the current energy woes. Projects must focus on these energy platforms and the use of technology should also reflect in the styling of the vehicle.	3

In a country like ours, we need more robust, flawless community transports. Better railways and buses.	4
The designer needs to make exploratory models, in foam, clay for his own understanding/ to make explain his design etc.	4
Apart from good design skills (hand and digital etc), enthusiasm and passion for automotive is a must.	5
Good Presentation skills also come in handy.	5
It's a common trend among the student to give more importance to personal vehicles rather than commercial transportations (buses, trucks etc.) the course should give equal importance to all types and segment of vehicles.	3

1- low importance
5 - high importance

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Feed back from designers in the Automobile industry.