

Indian Institute of Technology, Kanpur

Department of Management Sciences

Proposal for a New Course

1. **Course No:**
2. Course Title: **Transformative Mobility and Sustainability**
3. Units: 3-0-0-0 (10)
4. Duration of Course:
5. Proposing Department: DoMS
6. Other Departments:
7. Proposing Instructor(s): Suvendu Naskar, Anil Srivastava
8. Office Hours:
9. Pre-requisite Courses: None
10. **Course Description:**

Mobility has been an integral part of the human evolution and has always played a critical role in socio-economic growth of a society or a country. With increased global attention on environment and sustainability mobility's contribution to air pollution and environmental degradation is studied, but it is not studied/researched independently keeping it at the centerstage. A course on Transformative Mobility is timely because world is in the middle of a new mobility revolution where mobility is one of the primary drivers for economic growth, ease of living and reducing emissions. Mobility, which has always played an important role in evolution and growth of a society, is no longer just about transportation. With the emergence and proliferation of cutting-edge technologies coupled with their tremendous impact on economy and citizens' life, mobility is reshaped by clean energy, urbanization, climate goals, geo-political considerations, changing business models and new policy

frameworks. It is important that we study all the facets of changes taking place in the movement of people and goods and how is it impacting the socio-economic fabric of society and country at large. This course will provide an insight into the paradigm shift in mobility, rapid technological disruptions, sustainability and climate change related issues, changing travel patterns because of urbanization, digital and economic transformation of transportation and above all the policy and governance challenges. It is expected to provide an integrated perspective as it integrates Engineering, Economics, Environmental Science, Urban Planning, Data Science, Behavioral Science, Public Policy and Business management.

Affordable, accessible, inclusive and safe mobility solutions are important strategic levers for rapid economic development and improving 'Ease of Living' in a country. Shared, connected and clean mobility is increasingly becoming the key principles of effective mobility solutions across the world. Given our country's current economic growth, its commitment to climate goals, it would be pertinent to formulate, study and analyse our strategies to place ourself as a key driver of the sustainable mobility revolution in the world.

11. Expected Learning Outcomes:

At the end of this course the student is expected to be able to understand mobility as a system that enhances access, opportunity, productivity and quality of life. What emerging technologies, public policies, climate considerations, urbanization, changing geo-political equations and other forces are transforming the way people and goods move in a country. The changing role of mobility in the development of a country and the complexities in framing policies related with mobility and transportation for a country along with related sustainability issues. The student is expected to be able to evaluate technologies, understand urbanization and public policy issues impacting mobility paradigm.

12. Course Contents: (preferably in the form of 5 to 10 broad titles):

Sr. No.	Broad Title	Topics	No. of Lectures
1.	Mobility: The Big Picture	What is mobility and why mobility matters. Mobility and access at the cusp of a revolution: Mobility as an enabler of Economic Growth, Jobs, Markets, Education, Health Care, Social Inclusion.	3
2.	Mobility Ecosystem	Systems approach to Mobility, Passenger & Freight Mobility, key actors and their interrelationships: Vehicles, Source of Energy, Infrastructure, Data, Platforms, Operators & Government. Impact of technological advancements to wider mobility eco system	4
3.	Forces Transforming Mobility	ICE vs Electric Motor, Convergence of Technologies, Geo-political and Economic Considerations, Mobility-as-a-Service, Shared-Connected-Clean-Intermodal Mobility, Climate transition and AI revolution. Disruptions - learning curve and pace of adoption.	4
4.	Changing Source of Energy – Electrification – EV Ecosystem	Need to change from fossil fuel to renewable sources – Advanced cell chemistries, Ecosystem of batteries including fuel cells, integration with grid. Seminar on “Advanced Cell Chemistries and Evolution of Battery Technologies”.	3
5.	Urbanization and Mobility	Intelligent cities and dynamic mobility management. Project – to design an AI based mobility command center of a city. Role of mobility in shaping a city or shape of a city determines mobility in a city. Data driven interventions- VAHAN portal. Demand forecasting, traffic management and urban planning.	4
6.	Economics of Transformative Mobility	Traditional value chain-dealer and vehicle centric, emerging value chain-energy source-vehicle-software-data-mobility as a service. Micro and macro level implications-global perspective. Recycling of batteries.	3

7.	Government Policy & Regulations – Existing & Future	Government's role as mobility architect - active vs passive. Roadmap for transformative mobility by introducing a sustainable ecosystem in India. Scrapping and recycling policies. Innovations hand in hand with public good.	3
8.	India's Mobility Transformation	Pace of construction of highways, low-cost air connectivity in underserved regions and new air routes, growth of waterways, energizing rural roads program, growth of EVs, energy transition. Policy Papers prepared by groups on Mobility Transformation in India - Presentation and Discussion.	4

13. Remarks:

India is now the third largest automobile manufacturer in the world, is the fastest growing automobile market and is the fastest growing aviation market in terms of passenger traffic, with largest population in the world and being the fastest growing large economy, its performance on indicators of peoples' and goods movement is low. Movement of people and goods has a direct correlation with economic growth, with that perspective, country is making heavy capital expenditure (>\$100B+ annually) and doing aggressive policy restructuring, to increase efficiencies dramatically (cut down transport delays etc.), though it has to bridge a vast gap to meet global efficiency benchmarks. **Mobility as a sector is bound to grow and gain importance. The course is to expose students to a newer area which is an integral part of economic activity and more importantly a major contributor to air pollution.** Disruptive and major changes are taking place in the movement of people and freight and how to make it sustainable without making it economically unviable is a major challenge to the world and particularly to our country, having the largest pool of people, who are gradually moving upwards in financial ladder. The course will also have participation of practitioners, policy makers, start-ups and industry experts in proposed workshops and seminars.

14. Textbooks:

1. Clean Disruption of Energy and Transportation: How Silicon Valley Will Make Oil, Nuclear, Natural Gas, Coal, Electric Utilities and Conventional Cars Obsolete by 2030 – Tony Seba
2. Tony Seba's Clean Disruption – 10 years later: RethinkX : Tony Seba, Adam

- Dorr, Bradd Libby, Taylor Hinds
3. Commoning Mobility for a Low-Carbon Future-Peter Aday, Tim Cresswell, Jane Yeonjae Lee, Anna Nikolaeva
 4. Mobility Revolution - How AI, Evs, Robotaxis, and New Modes Radically Transform the Ecosystem – Marc Amblard
 5. Transformations in Mobility: Trends, Disruptions and the Future of Mobility and Transportation – Gilles Roucolle
 6. Human Transit: How Clearer Thinking about Public Transit Can Enrich Our Communities and Our Lives - Jarrett Walker

15. References:

1. Moving Forward Together: Enabling Shared Mobility in India: NITI Aayog-RMI Report
2. World Bank – Urban Mobility & Accessibility: Open Knowledge Repository
3. Goods on the Move: Efficiency & Sustainability in Indian Logistics: NITI Aayog-RMI
4. Valuing Society First: An Assessment of the Potential for a Feebate Policy in India, NITI Aayog-RMI Report
5. Transformative Mobility Solutions for India, NITI Aayog-RMI
6. Data-Drive Mobility: Improving Passenger Transportation through Data NITI Aayog-RMI Report
7. Transforming Freight Movement- A Perspective on the Future of Goods Transport in India, NITI Aayog - RMI Report

Dated: 09/10/2026 Proposer: Suvendu Naskar Signature: _____

Dated: 09/10/2026 Proposer: Anil Srivastava Signature: _____

Dated: _____ DPGC Convener: _____

The course is approved / not app.

Chairman, SUGC/SPGC

Dated: