

Virtual Classroom on Electric Bus Operations & Maintenance

电动巴士运营与维护线上课程

13-14-20-21 September 2022, 2 Weeks span | 2022 年 9 月 13-14-20-21 日, 跨两周时间

UITP Academy is launching an online course on Electric Bus Operations & Maintenance, along with Shenzhen Bus Group (SZBG), an operator who has achieved full electrification. The course runs from 13 to 21 September and features 8 interactive online sessions.

UITP 学院与已经实现全面电动化的深圳巴士集团现正共同推出电动巴士运营与维护线上课程。该课程自 9 月 13 日开始，9 月 21 日结束，共有 8 次在线互动课程。

With most metropolitan areas targeting zero-emission environments, an increasing number of cities and transport companies are considering a fully electric solution for their urban bus network. In this context, UITP Academy and Shenzhen Bus Group designed this training programme on the operations of Electric Buses to offer a comprehensive overview on the operations, maintenance and asset management of electric buses. This training will give you an insight into urban bus networks, the importance of building a sustainable infrastructure, recent technologies, and using data for the operation, maintenance, scheduling and implementation of efficient timetables on city routes.

随着多数大都市地区确定零排放环境的目标，越来越多的城市和运输公司正在考虑为其城市公交网络提供全面电动解决方案。在此背景下，UITP 学院和深圳巴士集团设计了本次电动巴士运营的培训课程，全面介绍电动巴士的运营、维护和资产管理。该培训将让学员深入了解：城市公交网络、建设可持续基础设施的重要性、最新技术、使用数据进行运营与维护、规划实施有效的时间表及路线调度等。

Shenzhen Bus Group is the largest and oldest public transportation operator in Shenzhen, China. After achieving full electrification, with 6,053 electric buses in 2018, SZBG has now become the largest new energy public transport operator in the world. SZBG have also been trialling electric self-driving buses on open and mix-traffic roads since 2017. with zero accidents to date.

深圳巴士集团是中国深圳规模最大、历史最悠久的公共交通运营商。继 2018 年实现全面电动化运营 6,053 辆电动大巴后，深圳巴士已成为全球最大的新能源公共交通运营商。自 2017 年以来，深圳巴士还开始在开放和混合交通的道路上试行电动自动驾驶巴士，迄今为止零事故。

The training and all training materials will be provided in English, and **Simultaneous Interpretation (SI) from English to Chinese** will be provided during this online training.

本次在线培训及所有培训材料采用英语，并提供**中英同声传译 (SI)**。

Reach your objectives | 实现学习目标：

- Adapt your bus operations towards a sustainable city | 让公交运营适应可持续发展的城市
- Introduce the electric solution, the different types of technologies, and compare their benefits and drawbacks | 介绍电动解决方案，不同类型的技术，并比较其优点和缺点
- Understand the different types of vehicles and required infrastructure to operate such vehicles | 了解不同类型的车辆和运营车辆的必要基础设施
- Discover the products on offer and the mainstream technology options available, the maturity level of suppliers, the various competition | 了解提供的产品，可应用的主流技术选项，供应商的成熟度，各种竞争

- Understand how to develop an operation and charging strategy | 理解如何开发运营与充电策略
- Learn how to plan, implement and run electric bus lines successfully | 学习如何成功地规划、实施和运行电动巴士线路
- Understand how technology and data management can help optimise your operations and charging | 理解技术和数据管理可如何帮助优化运营和充电
- Learn from successful major electric bus project operations and maintenance | 学习成功的主要电动巴士项目运营和维护
- Listen to best practices from **Asia and Europe** | 聆听**亚洲和欧洲**的最佳实践

Why choose an online course? | 为何选择网上课程?

- Interact with public transport professionals from across the world | 与世界各地的公共运输专家互动
- Be time efficient, with 8 sessions over a 2-week timespan | 两周内安排 8 个课时课程，学员可更有效地安排学习时间
- Flexibility to join the sessions from any location in the world, at work or at home | 可在世界任何地方，在工作时间或在家休息时上课

A top-level methodology | 顶级方法:

- Participate in interactive online sessions which includes an introduction by course leaders and open discussions with participants | 参与互动在线课程，包括由课程负责人进行讲解，并与学员进行公开讨论
- Apply your concepts during the online workshop | 在线研讨期间运用你的知识
- Exchange your current practices and experience with your peers | 与同伴交流当前实践和经验
- Each theme will be approached as followed | 每个主题将采用以下方法：
 - Basic principles and conceptual approach | 基本原则和概念化方法
 - State of the art development and innovations | 先进技术开发和创新状态
 - Good practices examples | 良好实践范例
 - Interactive exchange between participants and experts | 学员和专家的互动交流

Who is it for? | 课程适用对象?

- Project managers, engineers and other professionals eager to learn more about the technology, the implementation and the running of electric buses | 想更多了解电动巴士的技术、实施和运行的项目经理、工程师和其他专业人士
- Staff from public transport operators who works in operation and maintenance | 公共交通运营商的运营维护人员
- Staff from the bus industry worldwide involved in the market uptake of electric buses | 全球巴士行业中，期待提高电动巴士市场占有率的人员
- Professionals interested in obtaining a wider and international perspective on electric buses and eager to learn more from international best practice | 在电动巴士方面有兴趣获得更大的国际视角，学习更多国际最佳实践的专业人员

A good level of English is a compulsory requirement to attend the training

参与培训的人必须具备良好的英文水平

Inspiring trainers | 激励人心的讲师

Our skillful trainers are composed of international experts and professionals with extensive experience and knowledge in the strategic, operational and technological areas of electric buses. | 我们高素质的讲师由国际专家和专业人士组成，他们拥有电动巴士的战略、运营和技术方面的丰富经验和知识。

All sessions will take place at 08:00 am CET time (UTC+2) equivalent to 2:00 pm China time (UTC+8).

所有课程将在中欧夏令时间 (UTC+2) 早上 8 点开始，即中国时间 (UTC+8) 下午 2 点。

Day 1, Tuesday 13th September 2022 | 第 1 天, 2022 年 9 月 13 日星期二

08:00 CET Welcome & Introduction to the course (45 mins) | 开场欢迎与课程介绍 (45 分钟)

14:00 CN Expectation Analysis | 预期分析

GAO Bo, Deputy General Manager, Shenzhen Bus Group, China

中国深圳巴士集团副总经理 GAO Bo 先生

Poornima SINGH, Manager for Research and Membership Services, UITP Asia Pacific

UITP 亚太区研究和会员服務經理 Poornima SINGH 女士

08:45 CET Panel Discussion: Trends of Electric Bus (45 mins) | 小组讨论: 电动巴士的发展趋势 (45 分钟)

14:45 CN Marc FIGULS, Managing Partner and Strategy Director, Factual Consulting Ltd, Spain

西班牙 Factual Consulting Ltd 执行合伙人兼战略总监 Marc FIGULS 先生

Stefan WIDLUND, City Mobility Director, Volvo Bus Corporation, Sweden

瑞典沃尔沃汽车公司城市交通总监 Stefan WIDLUND 先生

Darek KOPER, Group Manager Metro Service, Auckland Transport, New Zealand

新西兰奥克兰交通局地铁服务组负责人 Darek KOPER 先生

Chris LIANG, Operations Manager, International Development Department, Shenzhen Bus Group, China

中国深圳巴士集团国际部运营经理 梁渝东先生

Dr Abhijit LOKRE, Founder, The Urban Lab, India

印度 The Urban Lab 创始人 Abhijit LOKRE 博士

- Climate change and electrification around the world | 气体变化和世界各地的电动化
- Technology overview on electric bus | 电动巴士的技术概要
- Asia Pacific perspective on developments | 亚太发展前景
 - Australia | 澳大利亞
 - Singapore | 新加坡
 - China | 中國
 - India | 印度

09:30 CET Break (tea-break) | 课间休息 (茶歇)

15:30 CN

09:45 CET Session 1A: An electric solution for urban bus networks (60 mins)

15:45 CN 第 1A 节: 城市公交网络的电气解决方案 (60 分钟)

Alok JAIN, Managing Director, Trans-Consult Ltd., Hong Kong SAR, China

中国香港特别行政区亚洲交通咨询有限公司执行总裁 程艾乐先生

- The policy context and city strategies for the introduction of electric buses | 引入电动巴士的政策背景和城市策略
- Legislation/policy aspect: how to incentivize e-buses deployment with a focus on the EU Clean Vehicles Directive mandatory country targets and other international examples | 立法/政策方面：如何促进电动巴士发展，重点放在欧盟清洁车辆指令强制性国家目标和其他国际实例
- Current state of the global electric bus market, the products on offer | 全球电动巴士市场和产品的现状
- Main challenges for deployment: upfront costs, operational requirements, procurement, interoperability, cooperation with energy sector | 主要发展挑战：前期成本，运营要求，采购，互用性，与能源部门合作
- Planification of charging infrastructure, a quite critical part when planning to deploy e-buses | 充电基础设施的计划，在规划部署电动巴士时是一个相当关键的问题
- The system approach and steps of an implementation and deployment process | 实施和部署过程的系统方法和措施

10:45 CET Break (tea-break) | 课间休息 (茶歇)

16:45 CN

11:00 CET **Session 1B: Case Study - Implementing and optimising large e-bus fleet operations (75 mins)**

17:00 CN **第 1B 节：案例研究 - 实施和优化大型电动巴士车队的运营 (75 分钟)**

Chris LIANG, Operations Manager, International Development Department, Shenzhen Bus Group, China

中国深圳巴士集团国际部运营经理 梁渝东先生

12:15 CET End of Day 1 | 第 1 天结束

18:15 CN

Day 2, Wednesday 14th September 2022 | 第 2 天，2022 年 9 月 14 日星期三

08:00 CET **Session 2: Vehicles, infrastructure, auxiliaries, state of the market (75 mins)**

14:00 CN **第 2 节：车辆，基础设施，附件，市场状况 (75 分钟)**

Alok JAIN, Managing Director, Trans-Consult Ltd., Hong Kong SAR, China

中国香港特别行政区亚洲交通咨询有限公司执行总裁 程艾乐先生

This session will look into new technologies and auxiliaries used to run electric busses, whether it be the installation and running of charging infrastructure, the impact on information technology systems, driver assistance and standardisation of the connection or the technical evolution of the battery.

该课程将考察电动巴士使用的新技术和辅助设备，是否安装和运行充电基础设施，对信息技术系统的影响，驾驶员帮助和连接标准化或电池的技术演变。

This session includes: | 该课程包含：

- An insight into vehicles (battery, plus-in hybrid, trolley, fuel cell) and infrastructure (overnight and opportunity charging, types of pantographs, in-motion charging) | 对车辆（电池，插电式混合直动力车，电车，燃料电池）和基础设施（隔夜充电、机会充电和受电弓营运中充电）的深刻理解
- State of the market from industry perspective | 行业前景的市场状况

- Updated electric bus product overview: latest models and trends | 最新电动巴士产品概述：最新型号和发展趋势
- Figures and market numbers | 数字和市场编号
- Driveline – Batteries – auxiliary components & HVAC – technology & maintenance – infrastructure costs | 动力传动系统 - 电池- 辅助部件和 HVAC（供暖通风与空气调节）-技术和维护-基础设施成本

09:15 CET Break (tea-break) | 课间休息（茶歇）
15:15 CN

09:30 CET Session 3A: Timetable and scheduling of E-bus routes (45 mins)
15:30 CN 第 3A 节: 电动巴士路线的时间表和调度（45 分钟）
Tao LIU, Associate Professor of School of Transportation and Logistics, Southwest Jiaotong University, China
中国西南交通大学交通运输与物流学院副教授 刘涛博士

10:15 CET Session 3B: Case Study - Operation (45 mins)
16:15 CN 第 3B 节: 案例研究 - 运营（45 分钟）
Josep Enric GARCÍA ALEMANY, Public Transport Consultant, Spain
西班牙公共交通顾问 Josep Enric GARCÍA ALEMANY 先生

11:00 CET End of Day 2 | 第 2 天结束
17:00 CN

Day 3, Tuesday 20th September 2022 | 第 3 天, 2022 年 9 月 20 日星期二

08:00 CET Session 4: Electric Buses in China - Operations & Maintenance (75 mins)
14:00 CN 第 4 节: 中国的电动巴士 - 运营和维护（75 分钟）
JIANG Peng, Manager, Technology and New Energy Department, Shenzhen Bus Group, China
中国深圳巴士集团技术与新能源部经理 JIANG Peng 先生

09:15 CET Break (tea-break) | 课间休息（茶歇）
15:15 CN

09:30 CET Session 5: Operation of electric buses (60 mins)
15:30 CN 第 5 节: 电动巴士的运营（60 分钟）
Rafael ORIHUELA NAVARRO, Head of Division, Head of Sanchinarro Depot, Transport Services Management, Empresa Municipal de Transportes de Madrid, S.A., Spain
西班牙马德里市政交通公司运输部负责人 Rafael ORIHUELA NAVARRO 先生

- Requirements and performance: standardization, interoperability | 要求和性能：标准化，互用性
- Impact on operations: LCC, Maintenance, data, autonomy and performance | 对运营的影响：LCC（全生命周期成本），维护，数据，自主权和性能
- Contractual framework: system approach, share of risks, commitment | 合同框架：系统方法，风险分担，承诺
- International experience in operating electric buses | 运营电动巴士的国际经验

10:30 CET Break (tea-break) | 课间休息 (茶歇)
16:30 CN

10:45 CET **Session 6: The impact of driving behaviour in the performance of EV bus fleet (75 mins)**
16:45 CN **第 6 节: 驾驶行为对于电动巴士车队的影响 (75 分钟)**

Fernando APARICIO, Business Development Manager, Bledsystem, Spain
西班牙 Bledsystem 业务发展经理 **Fernando APARICIO** 先生

Managing successful efficient driving on bus operators has been a must for combustion vehicles. Urban EV fleet present a new challenge and possibilities for improving energy consumption and overall performance. Homogenizing driving styles according to vehicle makers and incorporating a continuous improving methodology can decisively contribute to a predictable operation, minimizing potential issues. This session will show how to walk the way in a successful approach.

实现巴士运营人员成功高效驾驶车辆对于燃油车来说是必要的。电动车队面临新的挑战，并且有可能提高能源消耗和整体性能。按照车辆制造商的要求进行驾驶并且持续改进明显提高可预见的运营，尽可能降低潜在问题。本课程将介绍如何成功实施。

12:00 CET End of Day 3 | 第 3 天结束
18:00 CN

Day 4, 21st September 2022 | 第 4 天, 2022 年 9 月 21 日

08:00 CET **Session 7: The power of data in electric bus operations (75 mins)**
14:00 CN **第 7 节: 电动巴士运营的数据力量 (75 分钟)**

LU Jian, Senior Project Manager, IT Department, Shenzhen Bus Group, China
中国深圳巴士集团资讯科技部高级项目经理 **LU Jian** 先生

Energy consumption, charging and overall performance need be monitored and managed in the most optimal way to ensure efficient and seamless electric bus operations. How to intelligently use data to achieve such performance will be presented and discussed in this session. Continuous improvement by integration of smart data (feedback loop) for the optimisation in operational simulations is thereby the key.

能源消耗，充电和整体性能需要以最优方式进行监测和管理，以确保高效和无缝的电动巴士运营。本课程将介绍和讨论如何聪明地使用数据来实现这一性能。因此，通过集成智能数据进行持续改进（反馈环节）优化运营仿真是关键所在。

09:30 CET Break (tea-break) | 课间休息 (茶歇)
15:30 CN

09:45 CET **Session 8: Batteries for electric buses (75 mins)**
15:45 CN **第 8 节: 电动巴士的电池 (75 分钟)**

Stefan WIDLUND, City Mobility Director, Volvo Bus Corporation, Sweden
瑞典沃尔沃汽车公司城市交通总监 **Stefan WIDLUND** 先生

- Technologies cell type | 技术电池类型
- Behaviour | 行为
- Management systems | 管理系统

- Lifetime | 寿命
- Standards | 标准
- Safety | 安全性
- Thermal management | 热管理
- Models | 型号

11:00 CET Wrap Up and Closing | 课程总结
17:00 CN

11:15 CET End of Online Course Programme | 线上课程圆满结束
17:15 CN

**UITP reserves the right to make amendments to the programme or any related activity at its discretion | UITP 有权自行决定修改课程或任何相关活动*