Dr. Debapratim Pandit, Ph.D(University of Tokyo)

Curriculum Vitae, July, 2023

Current Responsibility:

Professor, Architecture and Regional Planning, IIT Kharagpur, India
Channel Coordinator, Swayam Prabha Channel "Architecture and Interior Design"
Laboratory in Charge, Advanced Transportation and Simulation Lab
Laboratory in Charge, Urban Informatics Lab

Contact Information:

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Research areas:

Advanced Transportation planning:
Landuse Transportation modelling, Non-motorized transportation, Public transportation and Shared mobility & logistics
Urban Informatics:
Advanced spatial analytics, Database development, Big data analytics, Simulator development, Internet of things
Urban Utilities & Services planning:

Education:

September 2007: **Ph.D, University of Tokyo**, Japan. Department of Urban Engineering. Environmental Systems laboratory.

May 2004: **Masters in City Planning, Indian Institute of Technology**, Kharagpur.

June 2002: **Bachelor of Architecture, Jadavpur University**, Kolkata, India. Department of Architecture.

Certificate courses: *"Remote Sensing and GIS Applications in Urban and Regional Planning" Indian Institute of Remote Sensing, Dept. of Space, Govt. of India.*

Awards and honours:

1. **Faculty Excellence Award 2022**, IIT Kharagpur for "Outstanding contributions towards teaching, research and institutional development".
2. Best Poster Award (S Saha, S Basu and D Pandit) World Congress of Gerantology and Geriatrics: 3rd International conference on Healthy Ageing in the changing world, 2014
3. Monbukagakusho (MEXT) Fellowship, Govt. of Japan, Ministry of Education, 2004 - 2007.
4. Graduate Aptitude Test in Engineering Scholarship, Govt. of India. 2002 - 2004
5. National Scholarship Award, Govt. of India, 1995(Rank 32 in Board examination).

Teaching and Research

1. SWAYAM-NPTEL MOOCs course **Urban Landuse and Transportation Planning** (12 week course, 60 lectures available on Youtube) **5250+ Learners since 2020**
   Link: https://nptel.ac.in/courses/124/105/124105016/
2. SWAYAM-NPTEL MOOCs course **Urban Utilities Planning: Water Supply, Sanitation and Drainage** (12 week course, 60 lectures) **2270+ Learners since 2021**
   Link: https://nptel.ac.in/courses/124/105/124105158/
3. SWAYAM-NPTEL MOOCs course **Urban Services Planning** (12 week course, 60 lectures)
   Link: https://onlinecourses.nptel.ac.in/noc23_ar07/preview **2023 onwards**

Recent courses taught *(***Post Graduate**):

1. Development Plan (Planning Workshop 2)

Development plans undertaken as part of course taught

· Development strategies for Midnapore Kharagpur Planning Area (2009)
· Strategic actions for Development of Balasore Planning Area (2010)
· Korba Development Plan 2031 (2011)
· Talegaon, Maharashtra Development Plan (2012)
· Development plan of Rourkela, Orissa-Vision 2031 (2013)
· Development plan of Hazaribagh, Jharkhand -Vision 2031 (2014)
· Development plan of the city of Bhilwara, Rajasthan (2015)
· Development plan of Kalyani, West Bengal (2016)
· Development plan of Alipurduar, West Bengal(2017)
· Development plan of Bidhannagar Municipal Corporation (2018)
· Development plan of Jhargram Municipal Area (2019)

2. Urban utilities and services (Water supply, Drainage, Sanitation, Solid waste management)
3. Advanced Transportation Planning
4. Urban informatics

Recent courses taught *(***Under Graduate**):

1. Architectural Design (4th Year)
2. DIY Lab (1st year common UG course on product development)

Earlier courses taught *(*Under Graduate): Water Supply and Sanitation

Professional experience:

1. Senior manager (February 2008-October 2008) "South City Projects (Kolkata) Pvt. Ltd., India.
2. Assistant Professor (October 2008- January 2015) Department of Architecture and Regional Planning (ARP), Indian Institute of Technology, Kharagpur, India.
3. Associate Professor (February 2015 – December 2022)

Membership of Professional Bodies

1. Registered: Council of Architecture
2. Associate Member: Transport Research group of India
3. Associate Member: Institute of Town Planners India (Associate Member)
4. Member: International Society of City and Regional Planners
5. Member: Indian Road Congress

City future research group (www.arp.iitkgp.ac.in/cfl)

Laboratories: Urban informatics laboratory, Advanced Transportation & simulation laboratory

Ph.D. advisee:

1. Dr. Shreya Das (A Methodology to Assess Bus Transit Service Quality based on User Perception)
2. Dr. Md. Rashid (Determination of Quality of Sanitation Services in Rural Settlements of India based on Users' Perception)
3. Dr. Krishanu Santra (A simulation based optimization for frequency setting and timetable development for a single bus route considering individual passenger journey experience)
4. Dr. Tiyali Bose (A Framework to Improve Bus Transit Service Quality Considering the Asymmetric Relationship between User Satisfaction and Service Level)
5. Dr. Suparna Saha (Identifying urban neighbourhood level infrastructure catering to the quality of life of indian elderly) (Joint-guidance)
6. Dr. Dipyaman Sinha (A simulation-based study of hyper-local food delivery and its impact on urban environment and employment)
7. Dr. Jayita Chakraborty (A Simulation-Based Assessment Of Demand-Supply Interactions For Ridesourcing Services In An Urban Environment)
8. Dr. Premjeet Das Gupta(Decoding Bicycling Behaviour in Rural Environments: Evidence From Selected Rural Settlements in Central India) (Joint-guidance, SPA Bhopal)

Ongoing PhD research guidance: 10 IIT Kharagpur scholars
Masters thesis guidance completed: 60
Undergraduate thesis guidance completed: 21

Publication metrics (26.11.2022):

Books: 2, **Book Chapters**: 15
Publication in Refereed **Journal/s[International]**: 33
Publication in Refereed **Journal/s[National]**: 7
Publication in Proceeding of Seminars/**Conferences [International]**: 14
Publication in Proceeding of Seminars/**Conferences [National]**:9
Others:10, **Video lectures published** (30-45 min. duration each): 180

ORCID ID: https://orcid.org/0000-0003-3149-4747
Scopus Author ID: 55785578100
Google Scholar ID: https://scholar.google.co.in/citations?user=ammjCRUAAAAJ&hl=en
Web of Science Researcher ID: AAF-2760-2019

Products developed:

1. **Bus service Planning and Operation Software** (**PUBBS TRANSIT V2.0 software**), 2023
Developed in partial fulfilment for the project titled " An Intelligent Urban Bus Transit Dispatch, Control and Surveillance System using Artificial Intelligence and User Perception. Ministry of Housing and Urban Affairs " (Sanction No: K-14011/39/2019-UT-IV(i), Ministry of Housing and Urban Affairs, GoI, 2019-2023

2. **1st Fully-automatic Made in India Bicycle Smart Lock,** 2023
Developed in partial fulfilment for the project titled "Developing Appropriate Software and Hardware for Fully Automated Self Service Bicycle Share System: Pilot Study in IIT Campus"(Sanction No: K-14011/39/2019-UT-IV, Ministry of Housing and Urban Affairs, GoI, 2019-2023.

3. **Bus service design, timetable development & vehicle scheduling software for bus operators** (**PUBBS TRANSIT V1.0 software**), 2019
Developed in partial fulfilment for the project titled "Service Level Optimization between Public Bus and Para-transit Services along a Transport Corridor" (Sanction No: K-14011/18/2011-UT,) Ministry of Housing and Urban Affairs, GoI, 2015-2019.

4. **Software suite for bicycle sharing including user interface and system management software** (**PUBBS Bicycle Sharing System**), Multiple versions and upgrades till 2023
Developed in partial fulfilment for the projects titled " Framework for improving bicyclists accessibility to rail stations" (F. NO. 4-22/2014-TS.I , Dt. 23-01-2014) Ministry of Human Resource development, GoI 2018 & Developing Appropriate Software and Hardware for Fully Automated Self Service Bicycle Share System: Pilot Study in IIT Campus(Sanction No: K-14011/39/2019-UT-IV, Ministry of Housing and Urban Affairs, GoI, 2019-2023.

5. **1st Made in India IOT enabled bicycle lock, (BluLock & Glock)**, 2018-2019
Developed in partial fulfilment for the projects titled " Framework for improving bicyclists accessibility to rail stations" (F. NO. 4-22/2014-TS.I , Dt. 2301-2014) Ministry of Human Resource development, GoI 2018

6. **Smart bicycle station** (RFID based access control and parking system)
WI-FI hotspot (Implemented in multiple locations)
Bicycle infrastructure design for Newtown (Newtown Kolkata, Cycle for Change, GoI, Among Top awardees) Developed in partial fulfilment for the projects titled " Framework for improving bicyclists accessibility to rail stations" (F. NO. 4-22/2014-TS.I , Dt. 2301-2014) Ministry of Human Resource development, GoI 2018 & "Cycle Hire System in Action Area-I in New Town, Kolkata" (1047/HIDCO/Ping/666/2015 , Dt. 21-12-2015), West Bengal Housing Infrastructure Development Corporation Ltd.,2016.

7. **Model bus stop** (Implemented at multiple locations in Kolkata)
Developed in partial fulfilment for the projects titled “Mobility Improvement Plan for NDITA, NDITA, Govt. of West Bengal, (2017)

Sponsored Research and Consultancy Undertaken:

*As **Principal Investigator**:*

1. DTH SWAYAM Prabha Architecture and Interior design, Ministry of Education, Department of Higher Education, **45 lakhs (2023)**

2. An Intelligent Urban Bus Transit Dispatch, Control and Surveillance System using Artificial Intelligence and User Perception. Ministry of Housing and Urban Affairs, **99.4 lakhs (2019-23)**

3. Developing Appropriate Software and Hardware for Fully Automated Self Service Bicycle Share System: Pilot Study in IIT Campus, Ministry of Housing and Urban Affairs, **119.68 lakhs (2019-23)**

4. Service Level Optimization Between Public Bus and Paratransit Services Along a Transport Corridor, Ministry of Housing and Urban Affairs, **75.84 lakhs (2015-19)**

5. Framework for improving bicyclists accessibility to rail stations, **MHRD, 32.32 lakhs (2015-19)**

6. Improving quality of life of senior citizens in residential neighbourhoods in an Indian context **MHRD, 31.72 lakhs (2015-19)**

7. Mobility Improvement Plan for NDITA, **NDITA, Govt. of West Bengal, 40 lakhs (2017)**

8. Planning and Design of Bicycle Track along the Saltlake Bypass Road, Kolkata, **NDITA, 17.2 lakhs (2017**)

9. Cycle Hire System in Action Area 1 in Newtown, **WBHIDCO, Govt. of West Bengal, 24 lakhs (2015-2016)**

10. Development of a Methodology for Bus Transit Reform and Redesign: Case study Kolkata, **SRIC, IIT, 2.8 lakhs (2010-13)**

*As **co-principal investigator**:*

11.Future of cities (FOC). Sponsored By: **MHRD**, Government of India, Project Value: **Rs. 25 crores**. **(2014-19)**

12. Convergent Lab for Digital cum Spectral Analytics of Historical and GeoArchaeological (Driven) Iconography Sponsored By: **SRIC**, IIT Kharagpur **Rs. 36 lakhs. (2018-2019)**

13. Making of a survey on sustainability of tourism industry in Kerala/Thrissur. Sponsored By: Prof. Tetsuo Shimizu, **Department of Tourism Science, Tokyo Metropolitan University**, Project Value: **Rs. 3.74 lakhs. (2011-2012)**

14. Making of report on Vulnerability of Cities. Sponsored By: **The GCOE program, The University of Tokyo, Global Center of Excellence for Sustainable Urban Regeneration**, Project Value: **Rs. 2.77 lakhs. (2011)**

15. Development Plan Preparation for Korba Urban Area. Sponsored By: The Director, **Directorate of Town & Country Planning,Chhattisgarh**, Project Value: **Rs. 29.9 lakhs. (2012-2013)**

16. Perspective Plan for MKDA region. Sponsored By: Midnapore Kharagpur Development Authority.

Conferences/Workshop organized:

1. Sustainable Urban Mobility, SUMo 2020 at Kolkata on 1st, 2nd & 3rd October, 2021(Technical Committee Member)

2. Urban Informatics and Artificial Intelligence Driven Analytics (As Coordinator) Year: 2018 Participants: 120

3. Workshop organized Enhancing Well Being of the Elderly in Indian Neighborhoods, Kolkata, India (As Coordinator) Year: 2015 Participants:50

4. INTCON 2018, 6th SPIC MACAY International Convention 2018, IIT Kharagpur (As Organizing (Transport) Committee member) Year:2018 Participants:1300

5. Workshop organized Knowledge Beyond Boundaries: The role of Interdisciplinary Communication in Intellectual Property and Technology Transfer at WSC-SD Conference, 2006. Rasa, Switzerland (As coordinator) Year:2006 Participants:30

6. Seminar invited Organized Lectures by Dr. Tetsuo Shimizu, Associate Professor, Department of Civil Engineering, University of Tokyo, Japan Year:2009 Participants: 60

Recent Invited lectures/seminars/workshops/symposiums:

1. Invited lecture on "Sensors, Perceptions, and Proof: A Paradigm Shift in Urban Planning " organized by ITPI Nagpur under the Lecture Series Program of ITPI, MRC, Nagpur on occasion of World Environment Day program, June 9th 2023.
2. Invited lecture on "Application of IT on sustainable transportation" organized by BIT Mesra and NIUA, for the **short term training program** "Mobility in Sustainable Cities", June 20th to June 24th, 2022.
3. Nayak S., Pandit D., Invited Article on Research paper "Potential of telecommuting for different employees in the Indian context beyond COVID-19 lockdown ", WCTRS Research Newsletter, Volume 1, Issue 13, March 2022.
4. Invited speaker at the Conference on Sustainable Urban Mobility, SUMo 2020 at Kolkata on 1st, 2nd & 3rd October, 2021. Lecture on Land use-transportation interaction and more: Future challenges and planning implications
5. Lecture on "Smart Sustainable Mobility and Cycling" at webinar SPA, Bhopal (May 25, 2020)
6. Lecture on "Activity based modeling" at Ranbir and Chitra Gupta School of Infrastructure and Design, IIT Kharagpur, TEQIP-III Course, India (2018)
7. Lecture on "Bicycle sharing system" at the "Urban Informatics and Artificial Intelligence Driven Analytics'' symposium at the Department of Architecture and Regional Planning, IIT Kharagpur (2018)
8. Lecture on "Public cycle sharing scheme" at HIDCO, West Bengal 16th October 2015.
9. Lecture on "Effective planning for transport management in Bidhannagar Municipal Corporation" at Poura Bhawan West Bengal 11th August 2017.
10. Special invitee to workshop on "Big data for better governance-Promoting data driven policy making and governance in west Bengal (November 28-29, 2017
11. Special invitee for roundtable discussion and lecture at the "International Symposium on Frontiers Of Infrastructure Finance (ISFIF)"- 14th Decemeber, 2017
12. Special invitee to workshop on "International Symposium on Infrastructure Design and Management" 26TH February, 2015
13. Special invitee to workshop on "Indo-German Workshop on Intelligent Mobility " at the Indo-German Collaborative Research Center on Intelligent Transportation Systems, IIT Kharagpur, 29th October,2018.

Recent Review assignments:

Journals:

a) Public Transport (Springer), b) Transport (Taylor Francis) c)Transportmetrica: Transportation science A(Taylor Francis), d)Transport policy(Elsevier) e)Asian transport studies journal (EASTS)), f) Travel behavior and society(Elsevier), g) Case Studies on Transport Policy(Elsevier) h) Transportation in Developing Economies i) Environment and Planning B: Urban Analytics and City Science, j) Transportation research Part D, k) Transportation research Part E l)Local Environment(Taylor Francis)

Conferences:

a)World Conference on Transport(2016,2019) , b)Conference of Transportation research group of India(since 2011) c) TIPCE-2022(2nd International Conference on Transportation Infrastructure Projects: Conception to Execution)

Recent collaborations:

a) Curtin University, Australia (Collaborator(s) :Jianhong Cecilia Xia), Joint Guidance, Thesis: Dynamic Optimization of fleet size for Ride-sourcing services for urban areas: Study of Perth Metropolitan Area (Ongoing)
b) Joint proposal submitted with German colleagues for the CONNECT Bildung-Forshung-Innovation Funding program, 2019.
c) Joint proposal submitted with Prof. Dr. Constantinos, TUM Munich, Logistics solutions that deal with requirements of the 'on demand economy' and for shared-connected and low-emission logistics operations, 2019

Major administrative duties: Department

1. Research Scholar Coordinator, Architecture and Regional Planning
2. MCP Project Co-coordinator
3. Professor In-charge, Computer & Informatics Laboratory
4. Professor In-charge, Advanced Transportation and Simulation Laboratory
5. Professor In-charge, Computer Laboratory
6. Co-In-charge, Departmental reporting authority for non-faculty APAR
7. Chairman, Co-In-charge, Department Purchase Committee
8. Member, Departmental Academic Committee, Write-off Committee, Events Committee
9. Development plan Field Tour Co-ordination committee
10. Professor In-charge, UG training and placement
11. Faculty advisor/Course coordinator (ARP)

Major administrative duties: Institute

1. **Faculty DIY Project for first year students**, 2020 onwards
2. **Member, UG Curricula Committee**, 2020
3. PMRF Coordinator-member in Nodal Committee Team (2018,2019)
4. Institute UG induction Program, 2018, Transport Coordinator
5. INTCON 2018, 6th SPIC MACAY International Convention 2018, IIT Kharagpur, Organizing (Transport) Committee member
6. Program officer (Health and Fitness), Institute extra academic activity (2013-2015 July)
7. **GATE duties**

Multiple other committees and programs at both Institute and Departmental level.

Publication list (till 12.07.2023):

2023

90. Sinha D., Pandit D., *Assessing the economic sustainability of gig work: A case of hyper-local food delivery workers in Kolkata, India*, **Research in Transportation Economics, Elseiver**, Accepted (2023)

89. Jacob, J.C., Pandit, D., Sen, J., Energy-saving potential in Indian open-plan offices using Micro-Zonal Occupant Centric Control (MZOCC), (2023) Energy and Buildings, 282, art. no. 112799, DOI: 10.1016/j.enbuild.2023.112799

88. Nayak, S., Pandit, D. A joint and simultaneous prediction framework of weekday and weekend daily-activity travel pattern using conditional dependency networks (2023) Travel Behaviour and Society, 32, art. no. 100595, DOI: 10.1016/j.tbs.2023.100595

2022

87. Chakraborty J., Pandit D, et.al., Modeling the decision of Ridesourcing drivers to park and wait at trip ends: A comparison between Perth, Australia and Kolkata, India, **Transportation, Springer(**2022), https://doi.org/10.1007/s11116-022-10367-9.

86. Nayak S., Pandit D., A critical review of activity participation decision: a key component of activity-based travel demand models, **International Journal of Urban Sciences. Taylor and Francis.**, 2022 (https://doi.org/10.1080/12265934.2022.2154249 Accepted)

85. Saha, S., Basu, S., Pandit, D., A framework for exploration of variation in prioritization of neighborhood infrastructure influencing the overall Quality of Life (QoL) of older citizens, across varied socio-demographic groups: a case study of Kolkata, India, Presented at **58th ISOCARP World Planning Congress**, Brussels, Belgium (virtual session), 2022. (Full paper, In-press)

84. Nayak S., Pandit D., An investigation of telecommuters perceived productivity from pre to post Covid19 pandemic, Presented at **58th ISOCARP World Planning Congress**, Brussels, Belgium (virtual session), 2022. (Full paper, In-press)

83. Saha, S., Basu, S., Pandit, D., Identifying the domains and factors influencing perceived Quality of Life (QoL) of Indian elderly in the context of their neighbourhoods: A case study of Kolkata, India. **Research Square. Preprint**. (2021) https://doi.org/10.21203/rs.3.rs-432566/v1

82. Saha S., Rashid M., Basu S. and Pandit D., Exploring a framework for identifying and prioritising neighbourhood-based support services catering to the Quality of Life (QoL) of older adults: discussion on findings from two Indian cities, **Ageing International, Springer**(2022) https://doi.org/10.1007/s12126-022-09506-5

81. Pandit, D., Sharma, D. (2022). Expected service dimensions and service levels for paratransit considering future mobility needs in emerging countries. **Transportation Research Part A: Policy and Practice, Elsevier**(https://doi.org/10.1016/j.tra.2022.05.021)

80. Saha S., Basu S., and Pandit D., A framework for identifying perceived Quality of Life indicators for the elderly in the neighbourhood context: a case study of Kolkata, India, **Quality and Quantity, Springer**, 2022(https://doi.org/10.1007/s11135-022-01419-4).

79. Pandit, D., Sharma, D. (2022). **Bicycling Infrastructure Design for Indian Cities and Emerging Economies**. Design Science and Innovation. **Springer**, Singapore. https://doi.org/10.1007/978-981-19-2203-9 , **Hardcover ISBN978-981-19-2202-2**, Softcover ISBN978-981-19-2205-3, eBook ISBN978-981-19-2203-9, Series E-ISSN2509-5994, Edition Number1, Number of PagesXIII, 231.

78. Pandit, D., Sharma, D. (2022). Introduction. In: Bicycling Infrastructure Design for Indian Cities and Emerging Economies. **Design Science and Innovation. Springer, Singapore.** https://doi.org/10.1007/978-981-19-2203-9_1

77. Pandit, D., Sharma, D. (2022). State of Bicycling Infrastructure in Indian Cities. In: Bicycling Infrastructure Design for Indian Cities and Emerging Economies. **Design Science and Innovation. Springer, Singapore.** https://doi.org/10.1007/978-981-19-2203-9_2

76. Pandit, D., Sharma, D. (2022). Bicycle Tracks. In: Bicycling Infrastructure Design for Indian Cities and Emerging Economies. **Design Science and Innovation. Springer, Singapore.** https://doi.org/10.1007/978-981-19-2203-9_3

75. Pandit, D., Sharma, D. (2022). Bicycle-Friendly Intersections. In: Bicycling Infrastructure Design for Indian Cities and Emerging Economies. **Design Science and Innovation. Springer, Singapore.** https://doi.org/10.1007/978-981-19-2203-9_4

74. Pandit, D., Sharma, D. (2022). Bicycle Parking Facilities. In: Bicycling Infrastructure Design for Indian Cities and Emerging Economies. **Design Science and Innovation. Springer, Singapore.** https://doi.org/10.1007/978-981-19-2203-9_5

73. Pandit, D., Sharma, D. (2022). Signage. In: Bicycling Infrastructure Design for Indian Cities and Emerging Economies. **Design Science and Innovation. Springer, Singapore.** https://doi.org/10.1007/978-981-19-2203-9_6

72. Pandit, D., Sharma, D. (2022). Markings. In: Bicycling Infrastructure Design for Indian Cities and Emerging Economies. **Design Science and Innovation. Springer, Singapore.** https://doi.org/10.1007/978-981-19-2203-9_7

71. Pandit, D., Sharma, D. (2022). Lighting, Drainage, Landscaping and Street Furniture. In: Bicycling Infrastructure Design for Indian Cities and Emerging Economies. **Design Science and Innovation. Springer, Singapore.** https://doi.org/10.1007/978-981-19-2203-9_8

70. Jacob J. C., Pandit D., Sen J., Reducing HVAC Energy Consumption Through Optimal Sub-Zoning Considering Occupant-Centric Control (OCC), **(ASHRAE)**Fifth International Conference on Efficient Building Design. Materials and HVAC Equipment Technologies, Beirut, Lebanon, October 20–21, 2022

69. Jeslu Celine Jacob, Debapratim Pandit & Joy Sen (2022), An explorative study on transient cooling pattern and energy efficiency while using micro-zonal occupant-centric control, **Architectural Engineering and Design Management**, **Taylor and Francis.** DOI: 10.1080/17452007.2022.2049439

68. Sharma D., Balan N. and Pandit D., Planning and design strategies towards improving bicycle safety in Indian cities, Proceedings of the **4th National Conference on Traffic Technologies**, 3-4 March 2022, Bhopal India.(Full paper)

67. Geethanjali J. and Pandit D., A protocol for designing a dynamic bus dispatch and control system along an urban corridor in the Indian context, Proceedings of the **4th National Conference on Traffic Technologies**, 3-4 March 2022, Bhopal India.(Full paper)

66. Saha S. and Pandit D., Neighborhood based support services for the well-being of older adults in Indian urban neighborhoods, Proceedings of the **ARCS 6.0-2022 Conference** at XIM university, Bhubaneshwar India, 2022. (Extended abstract)

65. Nayak S., Pandit D., Concerns for sustainable mobility during the post-pandemic situation in a developing country, India, Proceedings of the **ARCS 6.0-2022 Conference** at XIM university, Bhubaneshwar India, 2022. (Extended abstract)

64. Bhui, S., Pandit, D. (2023). Underlying Factors and Dependencies Towards a Dynamic Vehicle Ownership Model in India: A Content Analysis Approach. In: Devi, L., Asaithambi, G., Arkatkar, S., Verma, A. (eds) Proceedings of the Sixth International Conference of Transportation Research Group of India . CTRG 2021. **Lecture Notes in Civil Engineering, vol 272. Springer, Singapore**. https://doi.org/10.1007/978-981-19-3494-0_10

63. Jaiswal, A., Pandit, D. (2023). A Full–Day Intercity Bus Frequency Setting Model Considering Dedicated Fleet Size and User Perception Using Genetic Algorithm. In: Devi, L., Das, A., Sahu, P.K., Basu, D. (eds) Proceedings of the Sixth International Conference of Transportation Research Group of India. CTRG 2021. **Lecture Notes in Civil Engineering, vol 271. Springer, Singapore**. https://doi.org/10.1007/978-981-19-3505-3_21

62. Pandit, D., Sharma, D. (2023). Determinants of Users' Perception of Fixed Route Paratransit Service Quality. In: Devi, L., Das, A., Sahu, P.K., Basu, D. (eds) Proceedings of the Sixth International Conference of Transportation Research Group of India. CTRG 2021. **Lecture Notes in Civil Engineering, vol 271. Springer, Singapore.** https://doi.org/10.1007/978-981-19-3505-3_13

2021

61. Balan N., Pandit D., Identification of factors for a dynamic bicycle route recommendation system for transit catchment areas, 12th Research Symposium on Urban Transport as a part of the 14th **Urban Mobility India Conference** 2021 organized by the **Ministry of Housing and Urban Affairs**, Government of India & Institute of Urban Transport (IUT), India, IUT Journal(Accepted)

60. Sinha D., Pandit D., A simulation-based study to determine the negative externalities of hyper-local food delivery, **Transportation Research Part D: Transport and Environment. Elseiver**, Volume 100, 2021, https://doi.org/10.1016/j.trd.2021.103071.

59. Nayak S., Pandit D., Potential of telecommuting for different employees in the Indian context beyond COVID-19 lockdown, **Transport Policy. Elsevier,** (2021) DOI: 10.1016/j.tranpol.2021.07.010

58. Pandit D. (2021), **Book: Urban Landuse and Transportation Planning**, Pages(1-1003), Published by: nptel.ac.in,swayam.gov.in (**NPTEL course support book**).
Link: https://nptel.ac.in/courses/124/105/124105016/

57. Sharma D., Pandit D., Determining the level of service measures to evaluate service quality of fixed-route shared motorized para-transit services, **Transport Policy. Elsevier**, 100, pp.176-186, 2021, DOI:10.1016/j.tranpol.2020.11.002

2020

56. Rashid, M., Pandit, D. An assessment of service level of household toilet attributes based on the users satisfaction in rural Bihar, India. **Environment Development and Sustainability. Springer** (2020). DOI:10.1007/s10668-020-00921-9

55. Saha S., Basu S., and Pandit D., Identifying factors influencing perceived Quality of life (QoL) of Indian elderly: case study of Kolkata, India", **Social Indicators Research, Springer**, 2020. DOI:10.1007/s11205-020-02493-7

54. Chakraborty J., Pandit D, et.al., A review of Ride-Matching strategies for Ridesourcing and other similar services, **Transport Reviews. Taylor and Francis**, 2020. DOI:10.1080/01441647.2020.1866096

53. Bose T., Pandit D., Heterogeneity in perception of service quality attributes of bus transit across various user categories- A case of Kolkata, **Transportation Research Procedia Journal. Elsevier** Volume 48, Year 2020, Pages 2784-2799, DOI:10.1016/j.trpro.2020.08.239

52. Sharma D., Pandit D. et.al., Determination of service quality attributes based on user perception for paratransit services in developing country like India, **Transportation Research Procedia Journal. Elsevier**, Volume 48, Year 2020, Pages 3577-3594. DOI:10.1016/j.trpro.2020.08.093

51. Rashid M., Pandit D., Rural communities' perception of and willingness to pay for wastewater and storm-water management infrastructure in Bihar, India, Journal of **Water Sanitation and Hygiene for Development. IWA publishing**, 10(1),36-47, 2020. DOI:10.2166/washdev.2020.033

50. Chakraborty J., Pandit D, et.al., A Protocol for Simulation Modeling of Ridesourcing Services: Optimisation of Fleet Size in an Urban Environment, **International Journal of Intelligent Transportation Systems Research. Springer** , Volume 18, Year 2020, Pages 267-276. DOI:10.1007/s13177-019-00197-y

2019

49. Rashid M., Pandit D., Determining the provision of wastewater management infrastructure in rural India from the local communities' perspective, **Water Science & Technology. IWA Publishing**, 79(3), pp 489-500 2019. DOI:10.2166/wst.2019.074

48. Rashid M., Pandit D., Analysis of service quality of household toilets expected by households practicing open defecation: A study in rural settlements of Bihar, (India.), **Environment,**

Development and Sustainability. Springer, 21(5), 2487-2506, 2019. DOI:10.1007/s10668-018-0145-8

47. Sinha D., Pandit D., Cost modelling of hyper-local food delivery in an urban area- A case study of Kolkata, **Geophysical Research Abstracts Vol. 21**, Proceedings of EGU 2019-17218, EGU General Assembly 2019. Link:https://ui.adsabs.harvard.edu/abs/2019EGUGA..2117218S/abstract

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8. Designing Sustainable Products, Services and Manufacturing Systems, Chapter 8: A model for sustainable neighborhood regeneration towards an efficient urban form. by Debapratim Pandit and Keisuke Hanaki, Published by **Research Publishing Services, Singapore, 2011. Reference, ISBN: 978-981-08-5466-9.** Link: https://www.google.co.in/books/edition/Designing_Sustainable_Products_Services/xt-TM1_hi5MC?hl=en&gbpv=1&dq=Designing+Sustainable+Products,+Services+and+Manufacturing+Systems&printsec=frontcover

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P.T.O.

Video lectures published in Youtube (till 2.12.2022):

Urban Land use and Transportation Planning

Lecture No	Concepts Covered	YouTube ID
Lecture 01	***Introduction to Landuse transportation planning:*** *Introduction to Landuse transportation planning: Urban land use transportation linkage;Urban local self government; Responsibilities of urban local bodies; Rules, regulations and laws; Urban planning institutions*	https://youtu.be/0EIUnwcNLQY
Lecture 02	***Plans and planning process:*** *Overview of planning process; Different type of plans; National urban planning guidelines and transport policy; Planning Regions*	https://youtu.be/uTywQgFmmgI
Lecture 03	***Urban landuse planning:*** *Land use and land cover; Land use classification and structure; Town planning guidelines; Municipal Bye laws*	https://youtu.be/KIoKen7nKbU
Lecture 04	***Comprehensive mobility plan:*** *Comprehensive mobility plan; Traffic Analysis Zones(TAZs); Comprehensive mobility plan tasks; Travel demand analysis; Components of Comprehensive mobility plan*	https://youtu.be/hzOjNSC5Cys
Lecture 05	***Landuse transport interaction:*** *Land use transportation interaction and purpose; Other linked phenomena and systems; Land use transportation feedback cycle*	https://youtu.be/a4HkjWHh6Hs
Lecture 06	***Theoretical foundations Part 1:*** *Economic theories of land price and land use; Location theory; Urban Land use models; Bid rent theory; Discrete choice model*	https://youtu.be/Aldr4bzrNVQ
Lecture 07	***Theoretical foundations Part 2:*** *Spatial interaction theory; Accessibility based location models; Social theory*	https://youtu.be/InDNXPx8VlY
Lecture 08	***Modeling approaches:*** *Introduction to modeling approaches: Pure statistical model; Cellular automata; Optimization; Rule based simulation; Agent based modeling; Microsimulation*	https://youtu.be/1Nn-fEQYXkc
Lecture 09	***Existing integrated land use transportation models:*** *Early land use transportation models; Lowry's model of metropolis; Urban simulation models in use; ITLUP,MUSSA,URBANSIM*	https://youtu.be/Ct6vc-CnuDI
Lecture 10	***Land use transportation model components and future challenges:*** *Components of a Land use Transportation model; Software architecture for urban simulation systems; Land use componenets in existing Comprehensive mobility plans; Future challenges*	https://youtu.be/0XvYvnpn59I
Lecture 11	***Sampling Theory - 1:*** *Sample design; Sampling error and sampling bias; Sampling procedure; Probability sampling; Non probability sampling*	https://youtu.be/s-uO6Tbe0Ow
Lecture 12	***Sampling Theory - 2:*** *Sample size; Variability, Degree of precision and Confidence level; Population parameter estimation method; Sample size for mean; Sample size for proportion*	https://youtu.be/IQaNUHoKof4
Lecture 13	***Data and Surveys:*** *Primary and Secondary data; Measurement scale; Attitudinal scale; Data types; Data collection techniques; Good quality data and data cleaning*	https://youtu.be/LXkAtFISMPA
Lecture 14	***Transport Planning surveys Part1:*** *Transport Planning surveys;Revealed preference and Stated preference surveys; Contingent Valuation; Conjoint Analysis; Typical travel behaviour survey*	https://youtu.be/HU_1VGkZ0I0

Lecture 15	***Transport Planning surveys Part2:*** *Conjoint analysis: Fractional factorial design; Conjoint analysis: Design of choice cards using SPSS; Advanced data collection techniques; Mobile aplication based survey and data collection; Data collection using Application programming interface (API)*	https://youtu.be/oVnvzKZqXJ4
Lecture 16	***Demographic Transition:*** *Demographic Indicators; Demographic transition; Five stages of demographic transition; Effect of age structure on phases of demographic transition*	https://youtu.be/uaukAr_AgGc
Lecture 17	***Demographic Models 1:*** *Demographic models; Demographic projection techniques; Parametric and semi-parametric model; Demographic projection techniques: Mathematical methods*	https://youtu.be/OBn7ucFzoq4
Lecture 18	***Demographic Models 2:*** *Demographic projection: Economic methods; Demographic projection: Component methods*	https://youtu.be/HnKhT4ov-ok
Lecture 19	***Microsimulation and Population Synthesis 1:*** *Microsimulation and population synthesis; Cross-classification table; Steps for microsimulation and population synthesis; Major population synthesis techniques; Iterative proportional fitting*	https://youtu.be/l8eUt1pDxZY
Lecture 20	***Microsimulation and Population Synthesis 2:*** *Iterative proportional fitting:3 dimensional table; Synthetic reconstruction; Combinatorial optimization; Other methods*	https://youtu.be/BdaSfAf73XI
Lecture 21	***Urban Growth Assessment:*** *Urban growth and transformation process; Landsat satellite data; Land cover classification using satellite image processing; Urban transition; Urban growth pattern*	https://youtu.be/lrD1-8jzWgQ
Lecture 22	***Urban land suitability assessment:*** *Steps in Land Suitability Assessment; Urban land suitability analysis factors; Land suitability analysis methods; Weighted Linear Combination; AnalyticHeirarchy Process(AHP); Land Suitability Index (LSI) Model*	https://youtu.be/Gy3eg49aXOw
Lecture 23	***Accessibility 1:*** *Accessibility definition and concept; Accessibility construct; Accessibility measures; Regional vs local accessibility; Accessibility and centrality*	https://youtu.be/LxcNG1DxT7o
Lecture 24	***Accessibility 2:*** *Spatial separation measures; Cumulative opportunity measure; Gravity measure; Logsum/Utility measure; Time space model*	https://youtu.be/132rObqigLQ
Lecture 25	***Land Price Model:*** *Land use transportation context; Supply and Demand; Land value theories; House price theories; Hedonic regression analysis; Hedonic regression examples*	https://youtu.be/HOvgq0kV-zk
Lecture 26	***Discrete choice theory:*** *Discrete Choice modelling; Alternatives; Decision rules; Utility theory; Probabilistic choice theory; Multinomial logit model*	https://youtu.be/w-_SZrbFepE
Lecture 27	***Residential mobility and location choice 1:*** *Background on residential location choice process; Residential location choice theory; Residential mobility; Intent to move model*	https://youtu.be/Wnaffwskaxc
Lecture 28	***Residential mobility model using binary logistic regression:*** *Residential mobility model using binary logistic regression and SPSS; Residential mobility model using binary logistic regression and Python*	https://youtu.be/VLiYOcPGtIc
Lecture 29	***Residential mobility and location choice 2:*** *Conceptual model for residential choice; Residential location choice; Discrete*	https://youtu.be/LLPuCz2RU0o

	choice theory; Residential location choice: Indian context; Residental location choice model	
Lecture 30	***Residential location choice model using multinomial logistic regression:*** *Residential location choice model using multinomial logistic regression and SPSS; Residential location choice model using multinomial logistic regression and Python*	https://youtu.be/BKN4JKoYP_o
Lecture 31	***Travel demand forecasting and Trip generation:*** *Travel demand forecasting; Advanced travel demand forecasting; Trip generation; Trip rate analysis; Cross-classification analysis*	https://youtu.be/szkiq4_ANiY
Lecture 32	***Multiple linear regression:*** *Multiple linear regression; Assumptions for multiple linear regression; Multiple linear regression using SPSS*	https://youtu.be/oTIb1CxvmzM
Lecture 33	***Trip Production and Attraction1:*** *Growth factor model; Regression model; Trip production; Trip attraction*	https://youtu.be/351x6aYo8QU
Lecture 34	***Trip Production and Attraction2:*** *Trip generation model using SPSS; Trip attraction model using SPSS; Multiple linear regression with PYTHON*	https://youtu.be/MGwrjiU13dQ
Lecture 35	***Trip distribution:*** *Trip distribution; Gravity model; Growth factor model*	https://youtu.be/ZFTk9DRxGaY
Lecture 36	***Mode choice theory:*** *Mode choice theory; Factor impacting mode choice*	https://youtu.be/TjmXH4Vz93Q
Lecture 37	***Mode choice model:*** *Mode choice model using binary logistic regression in SPSS; Mode choice model using multinomial logistic regression*	https://youtu.be/e1KS-jXKOSQ
Lecture 38	***Hybrid mode choice model 1 (Factor Analysis):*** *Perception and Latent variables; Factor Analysis; Exploratory factor analysis; Confirmatory factor analysis*	https://youtu.be/glfeBmdeI5Q
Lecture 39	***Hybrid mode choice model 2 (Joint RP SP model):*** *Hybrid Mode Choice Modelling; Joint RP and SP model; Hybrid mode choice model using Python Biogeme*	https://youtu.be/Znpvo2xx_Zo
Lecture 40	***Nested logit model:*** *Independence of irrelevant alternative(IIA); Nested Logit Model; Logsum parameter; Complex nested logit structure*	https://youtu.be/44nGXqofe5c
Lecture 41	***Introduction to Trip Assignment:*** *Introduction to trip assignment; Transportation supply; Traffic flow theory; Network flow model*	https://youtu.be/Rygip8aF0pw
Lecture 42	***Route Choice:*** *Route Choice; Minimum Spanning Tree; Kruskal's algorithm; Prim's algorithm; Shortest path; Minimum Tree algorithm; Djikstra's algorithm*	https://youtu.be/QI2FeRS4yn4
Lecture 43	***Link assignment 1:*** *Background on link assignment; All-or-Nothing Traffic Assignment; Incremental Taffic Assignment; Capacity Restrained Traffic-Assignment*	https://youtu.be/HjtrVwUy9io
Lecture 44	***Link assignment 2:*** *User Equilibrium assignment; System Equilibrium assignment; Stochastic Assignment algorithm; Simulation based Method: Burrell's Algorithm; Proportional stochastic Method: Dial's Algorithm; Stochastic user equilibrium*	https://youtu.be/m4YOeI3p9xw
Lecture 45	***Dynamic traffic assignment:*** *Dynamic nature of Traffic; Static versus Dynamic Assignment; Dynamic Traffic Assignment Requirements; Dynamic user equilibrium; Dynamic assignment models, Information required, Process and Solution procedure;*	https://youtu.be/nY8Di82Px2c

Lecture 46	***Dynamic assignment models:*** *Simulation approach, Steps and Parameters; Model validation and calibration Transportation Software: Background on transport modelling softwares; Macroscopic transport demand models; Microscopic traffic simulation models*	https://youtu.be/lKI-oY00IKQ
Lecture 47	***CUBE Overview:*** *Introduction to CUBE; Components of CUBE; CUBE interface; Integration of ArcGIS with CUBE and data editing and visualization; CUBE extensions; Landuse Transportation Integrated model in CUBE: CUBE Land*	https://youtu.be/8SMIcWwkTdM
Lecture 48	***Travel demand modelling using CUBE and VISUM:*** *Travel Demand modelling using CUBE Voyager: Trip Generationin CUBE Voyager; Trip distribution in CUBE Voyager; Mode choice in CUBE Voyager; Traffic assignment in CUBE Voyager; Travel Demand modelling in VISUM*	https://youtu.be/OzPHe9ENskw
Lecture 49	***Activity based modelling in CUBE:*** *Activity based Travel Demand Modelling in CUBE; Steps in Activity-based Travel demand Modelling: Network costs, Population synthesis, Accessibility, Activity travel simulator; Travel aggregator; Traffic assignment*	https://youtu.be/A2PzmMHJFDE
Lecture 50	***Vehicular emission and pollution modelling:*** *Introduction to pollutants and major factors influencing transport emission; Indian Emission standards; Transportation emission measurement technologies; Transportation emission modelling; IVE MODEL; Transportation pollution monitoring*	https://youtu.be/_xqrZVHbGOs
Lecture 51	***Urban Freight Planning: Theory:*** *Introduction to urban freight; Urban freight-management; Urban freight planning; Urban freight survey techniques*	https://youtu.be/gQFGRMdKuGs
Lecture 52	***Urban Freight Planning: Demand Modelling:*** *Introduction to stages for freight modelling; Stakeholders involved in Freight modelling Relationships among choices by decision-makers and urban policies; Urban freight modelling framework; Urban freight model classification; Truck based vs Commodity based models vs Delivery based approaches; Truck based model; Commodity based model; FreightSIM: A sequential freight model*	https://youtu.be/5veg3Gx3ivQ
Lecture 53	***Urban Freight Planning: Logistics:*** *Logistics; Freight flow estimation using logistics cost optimization model; Regional Freight Flows using Input Output Analysis; Transshipment logistics; Transshipment problems*	https://youtu.be/WIjTeo_D-og
Lecture 54	***Last Mile Logistics 1: Last Mile Logistics:*** *Transportation problem; North West Corner Method; Least cost method; Vogel's Approximation Method; Optimality Test using MODI/UV method; Transshipment Problem:Examples*	https://youtu.be/ABXOS5iVbGw
Lecture 55	***Last Mile Logistics 2: Focus on Hyper local:*** *Hyper local food delivery in India; Distribution in India; Distribution Problem; Travelling Salesman problem using Hungarian Method; Vehicle routing problem; Optimization technique for VRP; Solving TSP and VRP in ArcGIS using Network Analyst*	https://youtu.be/ny7PMAYmG-g
Lecture 56	***Employment location choice and Real estate Development location choice:*** *Employment location choice; Real estate development location choice*	https://youtu.be/omgD6Kgx4B0

Lecture 57	***Activity based model 1:*** *What is Activity Based Model; Theoritical Framework; Modelling Approaches; Activity based model system; Activity based model components (Long term and Mobility Choice Models)*	https://youtu.be/qz1iXzLWCz8
Lecture 58	***Activity based model 2:*** *Activity based model components(Daily model); Daily Activity patterns and activity scheduling; Time of Day in Activity based models; Scheduling of tours; ALBATROSS; Data requirements for Activity based model*	https://youtu.be/GRl2jFeTa_o
Lecture 59	***Mode choice using Machine Learning:*** *Machine learning algorithm used in Mode Choice; Decision Tree; Decision Tree Typology; Mode choice model using Decision tree and Python; Random Forest Decision Tree (RFDT); Mode choice model usinf RFDT and Python*	https://youtu.be/x5CLOc5tf2w
Lecture 60	***Shared Mobility:*** *Shared mobility Classification; On-demand en-route ride services Evolution; Components and process; Algorithms (Search algorithms, Assignment algorithm); Surge pricing; Simulation Modelling for integration with Land use transportation models*	https://youtu.be/oDmAHaSF99I

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Urban Utilities Planning: Water Supply, Sanitation and Drainage

Lecture No	Concepts Covered	YouTube ID
Lecture 01	***Urban Utilities Planning Issues**: Drainage, Water supply, Sanitation, Water security, Hydrology*	https://www.youtube.com/watch?v=epBTzh-u0kE
Lecture 02	***Planning Strategies:** Need for Planning, Design period, Population forecast*	https://www.youtube.com/watch?v=OlQ9P1JHntw
Lecture 03	***Planning Strategies (Contd.):** Landuse forecast, Engineering design options, Siting of infrastructure, Service level benchmarks, Data and surveys*	https://www.youtube.com/watch?v=36z8LjJBWbA
Lecture 04	***Urban Utilities:** Utility networks: Key Issues, Transformation of utility providers in the global context, Full privatization, Public private partnership, PPP projects in India Service Delivery principles Issues related to service delivery and urban planning*	https://www.youtube.com/watch?v=sCTQi5YgFXg
Lecture 05	***Water Sensitive Urban Planning:** Water sensitive city, Green infrastructure, Water sensitive urban planning, Recharge structures, Water conservation: Jal Shakti Mission Rain water harvesting, Reuse of treated waste water Rejuvenation of urban water bodies, Plantation*	https://www.youtube.com/watch?v=44ArIwlKVFE
Lecture 06	***Water Demand Prediction and Management:** Water Demand and Key Issues, Urban Water Demand forecasting, Urban water demand and natural systems, Spatial and temporal patterns of water demand, Methodological advances*	https://www.youtube.com/watch?v=1Rz6ljso-sU
Lecture 07	***Types of Urban Water Demand:** Domestic water demand, Industrial water demand, Institutional, commercial and other water demand, Fire demand, Factors affecting per capita demand*	https://www.youtube.com/watch?v=4B_xbYqBjs0
Lecture 08	***Fluctuations in Urban Water Demand:** Fluctuations in demand, Assessment of fluctuations, Effects of fluctuations*	https://www.youtube.com/watch?v=jSRXrROQQIM
Lecture 09	***Role of Government:** Water supply responsibilities, Role of central government, National policy framework, Government programs, Service delivery levels and benchmarks*	https://www.youtube.com/watch?v=HWhFYRT4HFk
Lecture 10	***Cost of water supply:** State of urban water supply in India, Cost recovery and types of cost, Tariff design, Key measures, Tariff setting*	https://www.youtube.com/watch?v=t9FD9yRtgv8
Lecture 11	***Rainfall, Runoff and Ground Water:** Hydrologic cycle of water, Precipitation and run-off, Measurement of rainfall, Measurement of run-off, Run-off determination*	https://www.youtube.com/watch?v=n9h3bH80tmI
Lecture 12	***Groundwater Properties and Flow Characteristics:** Groundwater fundamentals, Infiltration and soil characteristics, Sub-surface water, Aquifers, Ground water flow and yield*	https://www.youtube.com/watch?v=kzeZE416SN4
Lecture 13	***Groundwater Intakes and Issues:** Groundwater use and issues, Groundwater quality, Groundwater management, Groundwater intakes*	https://www.youtube.com/watch?v=ZuujynGInFA

Lecture 14	***Groundwater Yield:*** *Groundwater flow, Darcy's Law, Measurement of yield of an open well, Measurement of yield of a well*	https://www.youtube.com/watch?v=iCfHjWo8jlE
Lecture 15	***Surface Water Intakes:*** *Surface water intakes, Sources of water supply, State of water supply in urban India*	https://www.youtube.com/watch?v=8vT66t0SyQU
Lecture 16	***Pumping Stations:*** *Lifting of water, Pumping stations, Site selection, Setting of pumps*	https://www.youtube.com/watch?v=R_eV2a2CTI4
Lecture 17	***Pumps:*** *Pump operation, Displacement pump, Centrifugal pump, Air lift pump, Impulse pump*	https://www.youtube.com/watch?v=Pja2skeEjFk
Lecture 18	***Sizing of Pumps:*** *Total lift of pumps, Pump sizing, Economical diameter of pumping mains, Centrifugal pump characteristics*	https://www.youtube.com/watch?v=nYfPKD1jAEs
Lecture 19	***Service Reservoir - Part I:*** *Service reservoirs functions, Service reservoir types, Service reservoir capacity, Mass curve method, Storage of water in buildings, Economic depth of service reservoirs*	https://www.youtube.com/watch?v=hWaIIFd3NDk
Lecture 20	***Service Reservoir - Part II:*** *Service reservoir capacity problems*	https://www.youtube.com/watch?v=H--7lEbokgs
Lecture 21	*Distribution System Layout: Distribution system fundamentals, Zoning, Hydraulic performance and network model, Pressure in distribution system, Distribution system layout, Valves*	https://www.youtube.com/watch?v=fHOuJx4-IcY
Lecture 22	***Conveyance of water Part 1:*** *Modes of conveyance, Pressure conduit design, Sizing of pipes(Diameter, grade and velocity), Darcy-Weisbach & Colebrook-White formula, Open channel flow (Chezy's & Manning's formula), Pressure conduits(Hazen-Williams's formula), Problem*	https://www.youtube.com/watch?v=BjHDMdkudCw
Lecture 23	***Conveyance of water Part 2:*** *Sizing of pipes(Diameter, grade and velocity), Modified Hazen-Williams's formula, Problem, Pressure in pipes, Detection of leakage in the distribution system, Laying of pipe*	https://www.youtube.com/watch?v=gur83KHofCU
Lecture 24	***Pipes, Joints, Meters and SCADA Systems:*** *Selection of pipe materials, Classification of pipes based on materials, Checklist for selection of pipe materials, Pipes and joints, Water meters, Telemetry and SCADA systems*	https://www.youtube.com/watch?v=IQ3VAsZ0WC0
Lecture 25	***Distribution Network Design:*** *Distribution Network Design, Sizing of pipes in a network, Pipe networks, Simple branch network design, Simple loop network design using equivalent pipe method, Complex pipe network design, Hardy-cross method, Network design using EPANET*	https://www.youtube.com/watch?v=m6kK8GsWKu4
Lecture 26	***Water quality and testing Part I:*** *Potable water, Impurities in water, Physical and chemical quality of drinking water, Bacteriological guidelines, Recommended treatment for various water sources, Sampling procedures for testing*	https://www.youtube.com/watch?v=iY4xy8MG2pA
Lecture 27	***Water quality and testing Part II:*** *Physical analysis, Chemical analysis, Biological tests*	https://www.youtube.com/watch?v=tNpN9RVjSe8

Lecture 28	***Water treatment Part I:*** *Water treatment, Treatment methods, Sequence of treatment units, Water treatment plant, Screening*	https://www.youtube.com/watch?v=Pbdgib5_E98
Lecture 29	***Water treatment Part II:*** *Aeration, Plain Sedimentation, Coagulation, Flocculation and clarification*	https://www.youtube.com/watch?v=rDD_vBHx9PU
Lecture 30	***Water treatment Part III:*** *Filtration, Disinfection, Other treatment, Case studies*	https://www.youtube.com/watch?v=ibkKLwPiU88
Lecture 31	***Sanitation basics Part 1:*** *Sanitation basics, Sanitation key issues, Purpose of sewage collection, conveyance and disposal, Sewerage and sewage treatment responsibilities*	https://www.youtube.com/watch?v=L3rNiVqwRkU
Lecture 32	***Sanitation basics Part 2:*** *Sewage project plan, City sanitation plan, Sanitation and health, Data and surveys*	https://www.youtube.com/watch?v=eiiXGKFL3BI
Lecture 33	***Sewage systems Part 1:*** *Sewage Systems, On site sanitation systems, Pour flush water seal latrine, Leach pits, Septic tank, Secondary treatment and disposal of effluent*	https://www.youtube.com/watch?v=sUp0xOWUFho
Lecture 34	***Sewage systems Part 2:*** *Up-flow aerobic filter, Aqua privy, Package septic tank, Advanced systems, Septage, Cess pool, Chemical toilet, Night soil digesters*	https://www.youtube.com/watch?v=vXojviFDZEc
Lecture 35	***Sewage systems Part 3:*** *Decentralized Sewerage Systems, Simplified sewerage, Small bore sewer system, Shallow sewer system, Decentralized wastewater treatment system(DEWATS), Secondary treatment and disposal of effluent, Public toilets, Community toilets, Slum sanitation*	https://www.youtube.com/watch?v=2oH32qzojh4
Lecture 36	***Water carriage system and sewerage layout:*** *Water carriage system, Types of water carriage system, Combined system, Separate system and Partially separate system, Pressurized sewer system, Vacuum sewer system, Pattern of sewage collection system*	https://www.youtube.com/watch?v=3swkHpuLuOA
Lecture 37	***Quantity of sanitary sewage:*** *Sewer design, Sources of discharge, Population estimate and forecast, Per capita sewage flow, Daily and seasonal variation in per capita sewage flow, Sewage from other sources, Net quantity of sewage*	https://www.youtube.com/watch?v=WW-yVsShDJc
Lecture 38	***Storm water drainage planning Part 1:*** *Storm water drainage issues, Case study: Kolkata's brick sewer renewal, Storm water drainage planning*	https://www.youtube.com/watch?v=Bf0KJ-YXmwA
Lecture 39	***Storm water drainage planning Part 2:*** *Storm water volume, Rainfall intensity duration frequency relationship, IDF curve generation, IDF curve generation using Bernard equation, IDF curve generation using probabilistic method, IDF curve generation using Gumbel distribution, Storm water runoff estimation*	https://www.youtube.com/watch?v=N4t-zHEvrfc
Lecture 40	***Storm water drainage planning Part 3:*** *Data and Surveys, Catchment area, Components of storm water drainage, Cost and financial viability of project, Other aspects of storm water drainage planning, Storm water drainage indices*	https://www.youtube.com/watch?v=YiRoVnBQA7A

Lecture 41	***Sewer Design:*** *Sewer sections, Sewer design, Self cleansing velocity, Limiting velocity, Hydroden sulphide in sewers, Design depth and slope of flow, Gravity sewer design, Problem*	https://www.youtube.com/watch?v=aF7elnRsEys
Lecture 42	***Runoff estimation Part 1:*** *Runoff estimation, Return period selection, Time of concentration, Rational method runoff coefficient, Peak flow estimation using rational formula, Problem*	https://www.youtube.com/watch?v=cLozaBf9ejk
Lecture 43	***Runoff estimation Part 2:*** *SCS-CN method, SCS-CN method: Factors determining CN, Curve number selection, Time area method, Unit hydrograph method, Other methods*	https://www.youtube.com/watch?v=EOoWnb5pobc
Lecture 44	***Sewerage Network Design Part 1:*** *Sewerage network design, Catchment/watershed area demarcation, Watershed area demarcation using topographic map, Watershed area demarcation using GIS and DEM, Node based geometric method of catchment division*	https://www.youtube.com/watch?v=BiQhp1JYaSc
Lecture 45	***Sewerage Network Design Part 2:*** *Sewerage network design, Sewage system, Sewerage layout, Sewerage network design overview, Introduction to SWMM*	https://www.youtube.com/watch?v=VXiveAaLjPw
Lecture 46	***Sewer appurtenances Part 1:*** *Manholes, Drop Manhole, Flushing Manholes, Sand silt and oil trap, Gutter and Inlets, Culverts*	https://www.youtube.com/watch?v=qDWZMDSi6_o
Lecture 47	***Sewer appurtenances Part 2:*** *Inverted siphon, Over flow systems, Pumping station, Outfall structure, Backflow prevention devices, Erosion control and drainage in hilly areas Temporary erosion and sedimentation control practices*	https://www.youtube.com/watch?v=UX11eZyjeeo
Lecture 48	***Storm water drains:*** *Storm water drains, Hydraulic routing of storm water, Open channel storm water drain design, Modified natural channels*	https://www.youtube.com/watch?v=gKjN3ihOMw8
Lecture 49	***Sewer maintenance and cleaning:*** *Sewer maintenance, Inspection and examination of sewer, Indirect inspection, Sewer cleaning, Inspection and maintenance of storm water drains, Desiliting of storm water drains*	https://www.youtube.com/watch?v=TQiTEKDkAms
Lecture 50	***Laying of sewer and utility corridors:*** *Sewer layout and installation, Trenches and tunneling, Laying of pipes and backfilling, Testing of sewer lines, Utility corridors and ducts, Sewer layout and installation, Utility ducts*	https://www.youtube.com/watch?v=M-NL-DIZViE
Lecture 51	***Sewage disposal and treatment in India:*** *Introduction: Sewage disposal and treatment in India: Introduction, Sewage characteristics, Surface water classification as per water quality, General standards for Discharge, Artificial methods of sewage treatment, Biological Sewage Treatment, Sewage Treatment Plant(STP)*	https://www.youtube.com/watch?v=Vfbjwx7EIc0
Lecture 52	***Natural methods of sewage treatment:*** *Treatment by dilution, Self purification process, Factors affecting self purification, Four zones undergoing self purification process, Oxygen balance, Disposal in sea, Land treatment, Sewage farming*	https://www.youtube.com/watch?v=eDzrbikfiVI
Lecture 53	***Artificial sewage treatment Part 1:*** *Primary treatment: Artificial way of sewage treatment, Screening and skimming,*	https://www.youtube.com/watch?v=cEcSQkRKDqc

	Grit removal, Sedimentation or settling or clarification, Plain sedimentation, Chemical sedimentation	
Lecture 54	***Artificial sewage treatment Part 2:*** *Secondary treatment: Biological/secondary treatment, Attached growth systems, Activated sludge process, Stabilization/Oxidation pond, Artificial methods of sewage treatment*	https://www.youtube.com/watch?v=o3FkYbmDhfo
Lecture 55	***Artificial sewage treatment Part 3:*** *Advanced methods : Sequencing batch reactor, Sequencing batch reactor: Product study, Membrane bioreactor, Membrane bioreactor: Product study*	https://www.youtube.com/watch?v=UCyY-iLRVC8
Lecture 56	***Ground water Recharge Part 1:*** *Need for Artificial recharge, Artificial recharge, Benefits of Artificial recharge, Planning of Artificial recharge*	https://www.youtube.com/watch?v=k_xalFWrkbQ
Lecture 57	***Ground water Recharge Part 2:*** *Artificial recharge techniques, Surface spreading techniques, Subsurface techniques, Ground water conservation techniques, Rooftop rainwater collection and recharge of ground water*	https://www.youtube.com/watch?v=xQd7bdf-8LU
Lecture 58	***Urban flood management and drainage plans Part 1:*** *Storm water drainage, Flood modeling, Basic approach using GIS, Case study*	https://www.youtube.com/watch?v=KHJCI7i9xAw
Lecture 59	***Urban flood management and drainage plans Part 2:*** *1D/2D dual drainage approach, Flood modeling using HEC-RAS, Case study*	https://www.youtube.com/watch?v=S_wSUyEg258
Lecture 60	***Urban flood management and drainage plans Part 3:*** *Storm water management, WSUD, LID, SuDS, Case study: Drainage master plan for NCT of Delhi*	https://www.youtube.com/watch?v=fh3W-T6D-7U

P.T.O.

Urban Services Planning (Currently being prepared): 60 Lectures

Lecture 1-5: ***Urban Services Planning:*** *Introduction Different type of municipal services, Strategic aspects, Regulatory framework, Role of stakeholders, Urban management and finance, Public private partnerships, Benchmarks, Government programs*

Lecture 6-10: ***Service planning approaches:*** *Planning theories, Pollution and health perspectives, Greenhouse gas emission reduction, Environmental Impact assessment, Life cycle analysis, Community participation and awareness*

Lecture 11-15: ***Integrated municipal solid waste management and plan preparation for urban areas:*** *Solid waste management rules, Extended producer responsibility, Source segregation, Decentralized waste management, Integration of informal sector, Municipal solid waste management planning and organizational setup, Operation and maintenance, Financial implementation plan, Schedule for plan preparation*

Lecture 16-20: ***Solid Waste generation, storage and minimization:*** *Waste classification, Waste quantity, Waste minimization, Waste characteristics, Data collection and sampling strategy, Waste forecasting, Waste storage*

Lecture 21-25: ***Waste collection planning for urban areas:*** *Primary and secondary waste collection strategies, Equipment, vehicles and staffing requirements, Depot, containers and transfer stations, Routing and scheduling for solid waste vehicles, Case studies*

Lecture 26-30: ***Waste processing, recycling and recovery planning:*** *Waste processing, Concept of 3Rs, Recycling and recovery, Composting, Vermicomposting, E -waste management and recovery, Case studies*

Lecture 31-35: ***Waste disposal planning for urban areas:*** *Landfill siting criteria, Landfill area calculation, Landfill Types, Landfill Design, Landfill phasing, Identification of land and inclusion in city development plan, Case studies*

Lecture 36-40: ***Adoption of advanced waste treatment technologies:*** *Waste to energy, Incineration, Pyrolysis, Gasification, Bio-methanation, Refuse derived fuel, Evaluation of alternative technologies, Case studies*

Lecture 41-45: ***Other municipal waste management services:*** *Street sweeping, Cleaning of surface drains, Plastic waste, Construction and demolition waste, Hazardous waste management, Case studies*

Lecture 46-50: ***Municipal health services:*** *National urban health mission, Public health challenges, Health facilities, Stakeholders, Improving healthcare access for the urban poor, Community based healthcare programs, Epidemic and pandemic control, Government programs*

Lecture 51-55: ***Municipal social services:*** *Planning for economic and social development, Urban poverty alleviation, Vulnerable population groups, Social welfare services, Geriatric services, Government programs and case studies*

Lecture 56-60: ***Other Municipal services:*** *Street lighting services, Fire services, Urban forestry, environment and ecology, Provision of parks, gardens and playground, burial grounds and cremation facilities*

Date: 16.07.2023 *Signature: Debapratim Pandit*