

Unit 8 - Week 6

Course outline

How does an NPTEL online course work?

Week 0 Assignment 0

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

- Lecture 25: Non-Motorised Transportation (NMT) Planning: Basic NMT Characteristics
- Lecture 27: Non-Motorised Transportation (NMT) Planning: Pedestrian Data Collection and Flow Characteristics
- Lecture 28: Non-Motorised Transportation (NMT) Planning: Pedestrian Flow models
- Lecture 29: Non-Motorised Transportation (NMT) Planning: Pedestrian flow characteristics on footpaths
- Lecture 30: Non-Motorised Transportation (NMT) Planning: Pedestrian Level of Service (PLOS) based on flow models

Week 6 Lecture Material

Unit - Week 6 Assignment 6

Week 6 Feedback Form

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

Download Videos

Detail Solution

Live Interactive session

Text Transcripts

Week 6 Assignment 6

The due date for submitting this assignment has passed. **Due on 2020-10-28, 23:59 IST.**  
As per our records you have not submitted this assignment.

1) What are the space requirements for a pedestrian body ellipse (carrying no luggage) as per Indo-HCM?

- a) Body width= 0.6m; Body depth= 0.5m
- b) Body width= 0.51m; Body depth= 0.52m
- c) Body width= 0.51m; Body depth= 0.35m
- d) Body width= 0.6m; Body depth= 0.35m

a)  
 b)  
 c)  
 d)

No, the answer is Incorrect  
Score: 0  
Accepted Answers: c)

2) What is the fundamental equation of traffic flow?

- a)  $q=uk$ ; where,  $q$ = Flow;  $u$ =velocity or speed;  $k$ =density
- b)  $q=8*k$ ; where,  $q$ = Flow;  $k$ =density
- c)  $q=k*u$ ; where,  $q$ = Flow;  $u$ =velocity or speed;  $k$ =density
- d)  $q=u*k$ ; where,  $q$ = Flow;  $u$ =velocity or speed;  $k$ =density

a)  
 b)  
 c)  
 d)

No, the answer is Incorrect  
Score: 0  
Accepted Answers: c)

3) An independent sample t-test was used to test walking speed of two age groups— 15-20 and 21-30. Data is displayed in table 1, also given  $t_{0.05} = 2.262$  and  $t_{0.10} = 1.833$ . Select the correct statement from the following options.

Table 1

S.No.	Speed of age= 15 to 20 (m/min)	Speed of age= 21 to 30(m/min)
1	70	69
2	73	62
3	75	68
4	73	67
5	66	63
6	71	64
7	73	63
8	64	68
9	67	67
10	69	69

- a) Both groups do not have significant difference in walking speed at p-value 10%
- b) Both groups have significant difference in walking speed at p-values 5% and 10%
- c) Both groups do not have significant difference in walking speed at p-values 5% and 10%
- d) Both groups have significant difference in walking speed at p-value 5%

a)  
 b)  
 c)  
 d)

No, the answer is Incorrect  
Score: 0  
Accepted Answers: c)

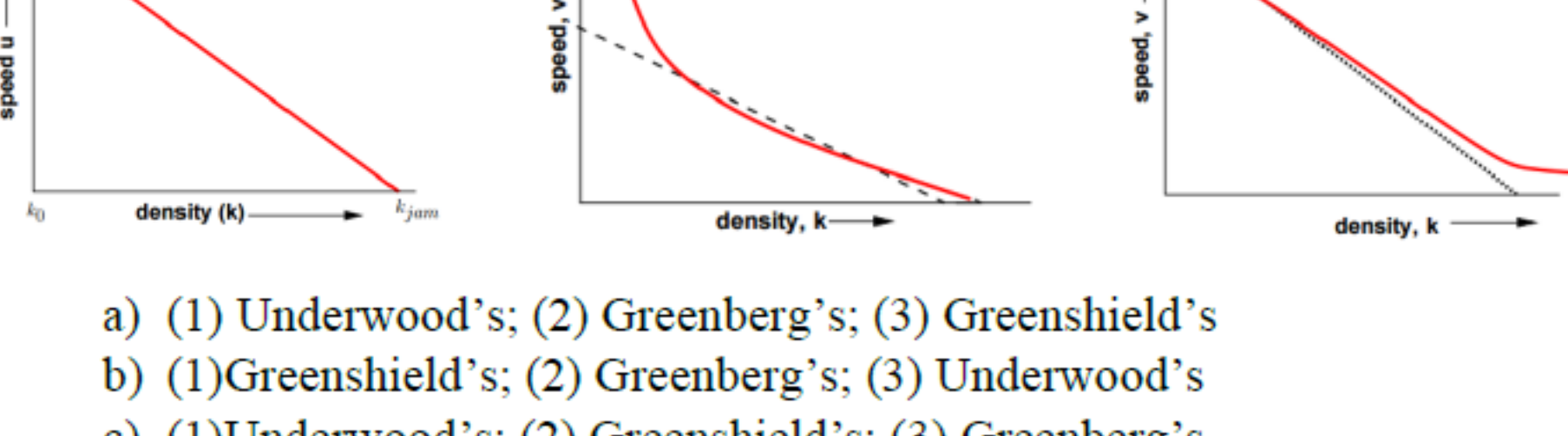
4) What advantages and disadvantages does videographic technique of pedestrian data collection possess?

- a) Advantage: Accurate; Disadvantage: labour intensive
- b) Advantage: Can be easily done; Disadvantage: less accurate than manual counting
- c) Advantage: More accurate than manual counting; Disadvantage: requires more skill
- d) Advantage: Cheapest technique available; Disadvantage: requires more skill

a)  
 b)  
 c)  
 d)

No, the answer is Incorrect  
Score: 0  
Accepted Answers: c)

5) The following images relate to u vs. k relationships. These relationships are called: (1) \_\_\_\_\_ (linear), (2) \_\_\_\_\_ (logarithmic), and (3) \_\_\_\_\_ (exponential) speed-density relationships.



- a) (1) Underwood's; (2) Greenberg's; (3) Greenshield's
- b) (1) Greenshield's; (2) Greenberg's; (3) Underwood's
- c) (1) Underwood's; (2) Greenshield's; (3) Greenberg's
- d) (1) Underwood's; (2) Underwood's; (3) Greenshield's

a)  
 b)  
 c)  
 d)

No, the answer is Incorrect  
Score: 0  
Accepted Answers: c)

6) Consider this hypothetical data, where,  $k$ = density ( $ped/m^2$ ) and  $u$ =speed ( $m/min$ ) of pedestrians on a footpath. Determine the parameters of the flow model using Greenshield's relationship,  $u=a+bk$ ? Use the method of least-squares.

S.No.	k	u
1	171	5
2	129	15
3	20	40
4	70	25
5	170	3
6	130	25
7	100	15
8	164	30
9	167	20
10	169	21

- a)  $u=37.96+0.14k$
- b)  $u=37.96-0.14k$
- c)  $u=38.96+0.24k$
- d)  $u=38.96-0.24k$

a)  
 b)  
 c)  
 d)

No, the answer is Incorrect  
Score: 0  
Accepted Answers: c)

7) In pedestrian flow models, single speed regime means:

- a) speed-density relation will also be different in different zone of densities
- b) speed-density relation will also be different in only one zone of densities
- c) that the same speed-density relation is valid for the entire range of densities seen in traffic streams
- d) that the same speed-density relation is valid for the some range of densities seen in traffic streams

a)  
 b)  
 c)  
 d)

No, the answer is Incorrect  
Score: 0  
Accepted Answers: c)

8) What are the needs of a pedestrian flow model?

- a) To forecast future flow parameters using the model equations
- b) To design the capacity of pedestrian facilities
- c) To understand the performance of the facility—Level of Service (LOS)
- d) All of the above

a)  
 b)  
 c)  
 d)

No, the answer is Incorrect  
Score: 0  
Accepted Answers: d)

9) Given the following equation of a speed-density relationship, determine the other flow relationships—(1)  $Q_p$  vs  $K_p$ ; (2)  $Q_p$  vs  $V_p$ ; (3)  $Q_p$  vs. S. Also determine their nature of relationship.

$V_p = 60 - 10K_p$

Where,  
 $Q_p$  = Unit flow rate ( $ped/min/m$ )  
 $V_p$  = Pedestrian speed ( $m/min$ ), and  
 $K_p$  = Pedestrian density ( $ped/m^2$ )  
S = Space module ( $m^2/ped$ )

- a) (1)  $Q_p = 60K_p - 10(K_p)^2$  (parabolic); (2)  $Q_p = (60V_p - V_p^2)/10$  (parabolic); (3)  $Q_p = 60(1/S) - 10(1/S)^2$  (inverse-parabolic)
- b) (1)  $Q_p = 60K_p - 10(K_p)^2$  (inverse-parabolic); (2)  $Q_p = (60V_p - V_p^2)/10$  (parabolic); (3)  $Q_p = 60(1/S) - 10(1/S)^2$  (parabolic)
- c) (1)  $Q_p = 60K_p - 10(K_p)^2$  (parabolic); (2)  $Q_p = (60V_p - V_p^2)/10$  (inverse-parabolic); (3)  $Q_p = 60(1/S) - 10(1/S)^2$  (parabolic)
- d) (1)  $Q_p = 60K_p - 10(K_p)^2$  (parabolic); (2)  $Q_p = (60V_p - V_p^2)/10$  (parabolic); (3)  $Q_p = 65(1/S) - 15(1/S)^2$  (parabolic)

a)  
 b)  
 c)  
 d)

No, the answer is Incorrect  
Score: 0  
Accepted Answers: d)

10) Select one of the following statement related to pelican, puffin and toucan pedestrian signalization.

- (a) Pelican: Button+ Sensor → for activating the pedestrian green in the traffic signal cycle; Puffin: Button → for activating the pedestrian green in the traffic signal cycle; Toucan: Both cyclist and pedestrians can cross
- (b) Pelican: Button → for activating the pedestrian green in the traffic signal cycle; Puffin: Button+ Sensor → for activating the pedestrian green in the traffic signal cycle; Toucan: Both cyclist and pedestrians can cross
- (c) Pelican: Both cyclist and pedestrians can cross; Puffin: Button+ Sensor → for activating the pedestrian green in the traffic signal cycle; Toucan: Button → for activating the pedestrian green in the traffic signal cycle
- (d) Pelican: Button → for activating the pedestrian green in the traffic signal cycle; Puffin: Button+ Sensor → for activating the pedestrian green in the traffic signal cycle; Toucan: No signalization, both pedestrians and bicyclists can cross at free-will

a)  
 b)  
 c)  
 d)

No, the answer is Incorrect  
Score: 0  
Accepted Answers: (b)

11) What form of statistical data representation is used for Raff's method of critical gap calculation?

- (a) Histograms
- (b) Pie-chart
- (c) Bar-diagrams
- (d) Ogives

a)  
 b)  
 c)  
 d)

No, the answer is Incorrect  
Score: 0  
Accepted Answers: (d)

12) Determine the pedestrian critical gap ( $t_c$ ) from the following data?

Length of Gap (t sec.)	Frequency
0	0
0-1	5
1-2	15
2-3	25
3-4	35
4-5	24
5-6	42

- (a) 3.4 sec
- (b) 2.5 sec
- (c) 5.5 sec
- (d) 4.4 sec

a)  
 b)  
 c)  
 d)

No, the answer is Incorrect  
Score: 0  
Accepted Answers: (d)

13) Letter grade "F" in a Pedestrian Level of Service (PLOS) assessment of sidewalk indicate:

- (a) The worst possible performance of a sidewalk
- (b) The best possible performance of a sidewalk
- (c) Sidewalk is performing moderately
- (d) None of these

a)  
 b)  
 c)  
 d)

No, the answer is Incorrect  
Score: 0  
Accepted Answers: (a)

14) In PLOS, flow rate of pedestrians (in  $ped/min/m$ ) and pedestrian delay (in  $sec/ped$ ) are used to classify the service level grades (LOS A, B, C etc.) at sidewalks and signalised intersections, respectively. What are these elements technically known as?

- (a) Attributes
- (b) Variables
- (c) Measure of Effectiveness
- (d) Service levels

a)  
 b)  
 c)  
 d)

No, the answer is Incorrect  
Score: 0  
Accepted Answers: (c)

15) A 3.5 m wide footpath around an institutional area is barricaded with guard rail on both sides. The existing peak flow rate is 1000 pedestrians per 15 min. What will be the PLOS considering pedestrians at institutional areas? Use Indo-HCM PLOS definition.

	(in $ped/min/m$ )				
LOS	Commercial	Institutional	Terminal	Recreational	Residential
A	$\leq 13$	$\leq 13$	$\leq 15$	$\leq 12$	$\leq 16$
B	$> 13-19$	$> 13-19$	$> 15-26$	$> 12-20$	$> 16-23$
C	$> 19-30$	$> 19-27$	$> 26-32$	$> 20-32$	$> 23-34$
D	$> 30-47$	$> 27-36$	$> 32-68$	$> 32-54$	$> 34-47$
E	$> 41-69$	$> 36-42$	$> 68-78$	$> 54-91$	$> 47-59$
F	Variable	Variable	Variable	Variable	Variable

Obstacle	Shy Distance (m)
Bench	0.3 - 0.5
Kerb (in case of Divided Carriageway)	0.1 - 0.2
Kerb (in case of Bidirectional)	0.2 - 0.4
Wall	0.4 - 0.6
Guardrails	0.4 - 0.6
Hawkers	0.3 - 0.5
Light Pole	0.8 - 1.1
Traffic Signs	0.6 - 0.8
Traffic Signal Poles and Boxes	0.9 - 1.2

Also use the IndoHCM definition of shy away distances.

- (a) LoS C
- (b) LoS D
- (c) LoS E
- (d) LoS F

a)  
 b)  
 c)  
 d)

No, the answer is Incorrect  
Score: 0  
Accepted Answers: (a)

16) Calculate the PLOS of pedestrian crossings at both major and minor streets of a signalized intersection operating with 100.0s cycle length, and no pedestrian signals. Major street: Phase green time,  $G_{maj} = 54.0$  s; Crosswalk length,  $L_{maj} = 20.0$  m; Minor street: Crosswalk length,  $L_{min} = 10$  m; Phase green time,  $G_{min} = 38.0$  s. Use HCM 2000 PLOS definition.

LOS	Pedestrian Delay ( $s/pt$ )	Likelihood of Noncompliance
A	$< 10$	Low
B	$\geq 10 - 20$	
C	$> 20 - 30$	Moderate
D	$> 30 - 40$	
E	$> 40 - 60$	High
F	$> 60$	Very high

(a) Major: LoS B; Minor: LoS A  
(b) Major: LoS A; Minor: LoS B  
(c) Major: LoS A; Minor: LoS A  
(d) Major: LoS B; Minor: LoS B

a)  
 b)  
 c)  
 d)

No, the answer is Incorrect  
Score: 0  
Accepted Answers: (d)