Vidya Pratishthan's

Kamalnayan BajajInstitute of Engineering and Technology, Baramati.

Faculty of Science and Technology

Board of Studies

Civil Engineering

Syllabus

Double Minor Subjects in Municipal or urban Engineering

S.Y. B. Tech. (SEM.-III)

Civil Engineering

(w.e.f. AY: 2025 - 2026)

[2024 pattern]

Syllabus: Double Minor Subjects in Municipal or urban Engineering [2024 patt] w.e.f. AY:2025-26															
SEMESTER-III															
Course Code	Courses Name	Teaching Scheme			Examination Scheme and Marks							Credits			
		TH	PR	TUT	Activity	ISE	ESE	TW	PR	OR	Total	TH	PR	TUT	Total
CE24261	Traffic Engineering	2	2	-	10	20	50	20	20	-	120	2	1	-	3
Total		**2**	**2**	-	**10**	**20**	**50**	**20**	**20**	-	**120**	**2**	**1**	-	**3**

BOS
Civil Engineering

DEAN
Academics

DEAN
Autonomy

PRINCIPAL
VPKBIET, Baramati.

Principal
Vidya Pratishthan's
Kamalnayan Bajaj Institute of
Engineering & Technology, Baramati
Vidyanagari, Baramati-413133

VPKBIET BARAMATI
Affiliated to S.P.P.U. Pune
Id No. PU/PN/Engg/152/2003
PUNE (MS.)

Vidya Pratishthan's
Kamalnayan BajajInstitute of Engineering and Technology, Baramati.

Faculty of Science and Technology

Board of Studies

Civil Engineering

Syllabus

Double Minor Subjects in Municipal or urban Engineering

S.Y. B. Tech. (SEM.-IV)

Civil Engineering

(w.e.f. AY: 2025 - 2026)

[2024 pattern]

Syllabus: Double Minor Subjects in Municipal or urban Engineering w.e.f. AY:2025-26															
SEMESTER-IV															
Course Code	Courses Name	Teaching Scheme			Examination Scheme and Marks							Credits			
		TH	PR	TUT	Activity	ISE	ESE	TW	PR	OR	Total	TH	PR	TUT	Total
CE24271	Transportation Planning	2	2	-	20	20	50	20	20	-	130	2	1	-	3
Total		2	2	-	20	20	50	20	20	-	130	2	1	-	3

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Vidyanagari, Baramati-413133

VPKBIET BARAMATI
Affiliated to S.P.P.U. Pune
Id No./PU/PN/Engg/152/2003
PUNE (MS.)

Course Name with Code: Traffic Engineering (CE24281)

Teaching Scheme:
TH: 2 Hrs./week
PR: 2 Hrs./Week

Credits
3

Examination Scheme:
Activity: 10 Marks
In Semester: 20 Marks
End Semester: 50 Marks
TW: 20 Marks
PR: 20 Marks

Prerequisite:
1. Basics of Civil Engineering

Companion Course, if any: Laboratory Practical

Course Objectives:
1. Learn basics of traffic and transportation planning
2. Provide a strong foundation in mathematical, scientific and engineering fundamentals required to Formulate, analyze and solve Transportation Engineering related problems.
3. Inculcate ethical practices in students through laboratory experiments, field work, live projects and interaction with industry.
4. Study of traffic control devices and signals

Course Outcomes:
CO1: Students will be able to identify, formulate and solve Transportation Engineering problems.
CO2: Students will be able to provide optimal and technical solutions for Transportation Engineering problems using knowledge of science, mathematics and engineering.
CO3: Students will be able to develop the ability to design and conduct tests/experiments in areas related to Transportation engineering and interpret the results.
CO4: Students will be able to study traffic control devices and signals

Course Contents

Unit I: **(07 Hours)**

a. Scope of Traffic Engineering & Study of its elements: Introduction, Objectives and Scope of Traffic Engineering; Components of Road Traffic – Vehicle, Driver and Road;
b. Road User and Vehicle Characteristics and their effect on Road Traffic; Traffic Manoeuvres. Traffic Stream Characteristics- Relationship between Speed, Flow and Density

Unit II: **(06 Hours)**

a. Traffic Engineering Studies and Analysis: Sampling in Traffic Studies, Adequacy of Sample Size; Objectives, Methods of Study, Equipment, Data Collection, Air Pollution due to Traffic.
b. Analysis and Interpretation (including Case Studies) of (a) Speed (b) Speed and Delay (c) Volume (d) Origin and Destination (e) Parking (f) Accident & other Studies.

Unit III: **(07 Hours)**

a. Design of Traffic Engineering Facilities: Control of Traffic Movements through Time Sharing and Space Sharing Concepts; Design of Channelizing Islands, T, Y, Skewed, Staggered, Roundabout, Mini-roundabout and other forms of AT-Grade Crossings including provision for safe crossing of Pedestrians and Cyclists;

b. Grade Separated Intersections, their Warrants and Design Features; Bus Stop Location and Bus Bay Design, Design of Road Lighting.

Unit IV: **(06 Hours)**

a. Traffic Control Devices: Traffic Signs, Markings and Signals; Principles of Signal Design, Webster's method of Signal Design,

b. Redesign of Existing Signals including Case Studies; Signal System and Coordination.

Books & Other Resources:

Text books:

1. Pignataro, L., Traffic Engineering – Theory & Practice, John Wiley, 1973.
2. Kadiyali, L.R., Traffic Engineering and Transport Planning, Khanna publishers, 2007.
3. The Institute of Transportation Engineers, Transportation and Traffic Engg. Hand Book, Prentice Hall (1982) Chapters 8, 17, 21, 23 and 24.

Reference books:

1. O'Flaherty C A, Highways- Traffic Planning & Engineering, Edward Arnold, UK, 2002
2. McShane W R & Roess R P, Traffic Engineering, Prentice-Hall, NJ, 2010
3. IRC-SP41: Guidelines for the Design of At-Grade Intersections in Rural & Urban Areas
4. Salter, R J., Highway Traffic Analysis and Design, ELBS, 1996.
5. Matson, Smith and Hurd, Traffic Engineering, Mc-Graw Hill Book Co, 1955.

Term work will be based on performance of practicals, submission of assignments.
Practical examination will be based on Laboratory Experiments/Assignments.

Laboratory Experiments/Assignments

1. Assignments based on each unit
2. Practical case studies of different cities need to be studied and summarized.
3. Traffic Engineering Studies (**(Field Studies)** and Analysis (any 3)

- Volume Studies – Straight Roads and at Intersections
- Speed Studies - Spot Speed Studies by Stop Watch, Enosocpe and Radar Speed Meter
- Journey Time and Delay Studies - Floating Car Method
- Parking Surveys and Parking Turnover Studies
- Study of Gaps and Lags – Critical Gaps and Lags at Intersections
- Delay Measurement at Signalised and Unsignalised Intersections

4. **Study of Driver Characteristics**: any one
   - Reaction Time
   - Visual Acquity
   - Glare Recovery.

Activity:

1. Seminar on one topic from syllabus of Traffic Engineering
2. Mini project on issues discussed in theory with reference to city problems and solutions. Students may select different cities of their choice.
3. Registration to NPTEL course related to this subject and get certification (desirable)
4. Study on Planning of new routes of buses in a city considering demand
5. Report on visit to RTO and traffic branch in city to understand issues and solutions provided by them in city to reduce traffic and jams.

Course Name with Code: Transportation Planning (CE24271)

Teaching Scheme:	Credits	Examination Scheme:
TH: 2 Hrs./week	3	Activity: 10 Marks
PR: 2 Hrs./Week		In Semester: 20 Marks
		End Semester: 50 Marks
		TW: 20 Marks
		PR: 20 Marks

Prerequisite:

1. Basics of Traffic Engineering

Companion Course, if any: Laboratory Practical

Course Objectives:

1. To understand public transport planning and design.
2. To learn urban travel patterns and forms
3. To learn Urban Transportation Planning Process & Concepts
4. To estimate travel demand

Course Outcomes: Students will be able to

CO1: Understand public transport planning and design
CO2: Learn urban travel patterns and forms
CO3: Learn Urban Transportation Planning Process & Concepts
CO4: Estimate travel demand

Course Contents

Unit I: **(07 Hours)**

Public Transport - Modes of public transport and comparison - Public transport travel characteristics - Transit Network Planning - Objectives, principles, considerations, transit lines - Prediction of transit usage - Evaluation of network, accessibility considerations –

b. Transit Scheduling - Scheduling procedure - Marginal ridership - Crew scheduling - Transit Agency Structure and Economics - Transit system statistics, performance and economic measures - Fare structure - Design of Facilities.

Unit II: **(06Hours)**

a. Urban Travel Patterns and Urban Transportation Technologies, Land use-Transportation Planning Process, Hierarchy of Urban Activity System, Hierarchy of Urban Transportation Network, Functions of Transportation Network, Urban Structure and its Characteristics

b. Study of Urban Forms, Demographic Forecasting Models, Employment Forecasting Models, Population and Employment Multiplier Models, Location, Opportunity and Lowry based Land use Transportation models, Dynamic and Disaggregated extensions, Evaluation of Land use – Transportation Plans

Unit III: **(07 Hours)**

a. Urban Transportation Planning Process & Concepts: Role of Transportation and Changing Concerns of Society in Transportation Planning; Transportation Problems and Problem Domain; Objectives and Constraints;

b. Flow Chart for Transportation Planning Process- Inventory, Model Building, Forecasting and Evaluation Stages, planning in System Engineering Framework; Concept of Travel Demand and its Modelling based on Consumer Behavior of Travel Choices- Independent Variables, Travel Attributes.

Unit IV: **(06 Hours)**

a. Methods of Travel Demand Estimation: Assumptions in Demand Estimation- Sequential, Recursive and Simultaneous Process - Introduction to Transportation Planning Practices; Definition of Study Area, Zoning. Trip Generation Analysis: Trip Generation Models- Zonal Models,

b. Category analysis, Household Models, Trip Attractions of Work Centers & Commercial Trips Trip Distribution Analysis: Trip End and Trip Interchange Models; Trip Distribution Models - Growth Factor Models, Gravity Models, Opportunity Models and their calibration; Estimation of Travel Demand based on link volume philosophy; Entropy based Trip Distribution models.

Books & Other Resources:

Text books:

1. Hutchinson, B.G., Principles of Urban Transportation System Planning, Mc-Graw Hill 1974.
2. Khisty, C J., Transportation Engineering – An Introduction, Prentice-Hall, NJ, 2007
3. Dickey, J.W., Metropolitan Transportation Planning, Tata Mc-Graw Hill, 1980
4. ITE (1982), 'Transportation and Traffic Engineering Hand Book', Chapters 10,12, and 17, Prentice Hall, New Jersey
5. Kanafani, A., Transportation Demand Analysis, McGraw-Hill, 1983.

Reference books:

1. Oppenheim, N., Applied Models in Urban and Regional Analysis, Prentice-Hall, NJ, 1995.
2. Bruton M.J., Introduction to Transportation Planning, Hutchinson of London, 1970.
3. Gallion A.B and Eisner S., The Urban Pattern, Affiliated East-West Press, New Delhi, 1993.
4. Wilson, A.G, Urban and Regional Models in Geography and Planning, John Wiley and Sons, 1974.
5. Meyer M.D. and Miller E.J., Urban Transportation Planning, McGraw-Hill International, 2001
6. Wilson, A.G., Entropy in Urban and Regional Modeling, Pion, London, 1970 12. Ortuzar J D & Willumsen L G, Modelling Transport, John Wiley & Sons Ltd, 2001.

Term work will be based on performance of practical's, submission of assignments.
Practical examination will be based on Laboratory Experiments/Assignments.

Laboratory Experiments/Assignments

1. Practical case studies of different cities need to be studied and summarized wrt to theory.
2. Comparing public modes of transport and their suitability for particular city
3. Study of Hierarchy of Urban Transportation Network
4. Study of Travel Demand and its Modelling based on Consumer Behavior of Travel Choices
5. Study of methods of Travel Demand Estimation
6. Study of Trip Distribution Models

Activity:
Assignments based on each unit