

# **PERIYAR UNIVERSITY**

**SALEM - 636 011**

## **PERIYAR INSTITUTE OF DISTANCE EDUCATION (PRIDE)**

**DIPLOMA IN TRAFFIC EDUCATION AND ROAD SAFETY**

**ONE YEAR**



### **REGULATION AND SYLLABUS**

**(Effective from the Academic Year 2015 - 2016)**

## **ACADEMIC ELIGIBILITY FOR ADMISSION**

Diploma in Traffic Education And Road Safety: +2 (10 + 2 Stream), Diploma,  
any Graduate

**DURATION OF COURSE:** One Year

## **COURSE OF STUDY AND SCHEME OF EXAMINATIONS:**

Sl.No	Title Of The Subject	Duration	Maximum Marks
1.	Transportation Planning	3 Hours	100
2.	Traffic Education	3 Hours	100
3.	Road Safety System	3 Hours	100
4.	Environmental Impact Assessment Of Transportation Projects	3 Hours	100
5.	Transport Economics & Management	3 Hours	100
Total Marks			500

**PASSING CRITERIA:** The candidates shall be declared to have passed the examination, if they secure not less than 40 marks in each examination.

## **QUESTION PAPER PATTERN:**

### **THEORY**

Duration : 3 Hours

Maximum Marks : 100

Part – A (5 x 5 = 25 Marks)

Answer any 5 Questions

(Eight Questions to be asked)

1, 2, 3, ....8.

Part – B (5 x 15 = 75 Marks)

Answer any 5 Questions

(Eight Questions to be asked)

1, 2, 3, ....8.

**PERIYAR UNIVERSITY (PRIDE)**  
**DISTANCE EDUCATION**

**DIPLOMA IN TRAFFIC EDUCATION AND ROAD SAFETY**

**PAPER I: TRANSPORTATION PLANNING**

**OBJECTIVE:**

The objective of the course is to educate the students on the various components of Highway and Transportation Planning. It exposes the students to highway planning and surveys for highway alignment, Geometric Elements of Highways and Urban roads, Rigid and Flexible pavements design. This course enables the students to develop skill on evaluation of the pavements and to decide appropriate types of maintenance.

**UNIT I: INTRODUCTION**

History of Road construction, Highway development in India – Jayakar Committee Recommendations and Realizations, Twenty Year Road Development Plans – Indian Roads Congress- Highway Research Board , National Highway Authority of India, Ministry Of Road Transport and Highways(MORTH), Central Road Research Institute.

**UNIT II: HIGHWAY ALIGNMENT**

Requirements of ideal alignment – Factors controlling highway alignment, Engineering Surveys for Alignment – Classification and Cross section of Urban and Rural roads.

**UNIT III: HIGHWAY CROSS SECTIONAL ELEMENTS**

Right of way , Carriageway , Camber, Kerbs, Shoulders, Footpath, Cross section of different class of roads, Design of horizontal alignment – Horizontal curves, Super elevation, Widening of pavements on Horizontal Curves and Transition Curves, Design of Vertical Alignment – Rolling , Limiting , Exceptional and Minimum gradients, Summit and Valley curves

**UNIT IV: SIGHT DISTANCES**

Factors affecting Sight Distance , PIEV Theory, Stopping Sight Distance (SSD), Overtaking Sight Distance(OSD), Sight Distance at Intersection, Intermediate Sight Distance- Problems in SSD and OSD. Geometric Design of Hill roads (IRC standards only)

## **UNIT V: FLEXIBLE AND RIGID PAVEMENTS & HIGHWAY MAINTENANCE**

Rigid and Flexible pavements, Factors affecting Design of pavements – ESWL, Climate, Sub-grade Soil, Types of Defects in Flexible pavements – Surface defects, Cracks, Deformation, Disintegration, Symptoms, Causes and Treatments, Types of Pavement, failures in Rigid Pavements, Scaling, Shrinkage, Warping, Structural Cracks, Spalling of Joints and Mud Pumping and Special Repairs.

### **OUTCOME:**

Students would be aware of the various components of the Highway and Transportation Planning, Basic Principles and Design, Planning and Management of Transportation System.

### **TEXT BOOKS:**

1. Khanna K and Justo CEG, Highway Engineering, Khanna Publishers, Roorkee 2001.
2. Kadiyali, L.R., “Traffic Engineering and Transport Planning”, Khanna Publishers, Delhi, 2002

### **REFERENCES:**

1. Wolfgang S.Homburger et.al., “Fundamentals of Traffic Engineering” 15th Edition, Institute of Transportation Studies, University of California, Berkely, 2001
2. James L.Pline (Edr), “Traffic Engineering Hand Book”, Institute of Transportation Engineers, Washington DC, USA, 1999
3. Nicholas T.Garber, Lester A Hoel, “Traffic and Highway Engineering”, Revised Second Edition, ITP, California, USA, 1999
4. Thomas Curinan, “An Introduction to Traffic Engineering – A Manual for Data Collection and Analysis”, Books Cole, UK, 2001
5. Kadiyali, L.R., “Traffic Engineering and Transport Planning”, Khanna Publishers, Delhi, 2002
6. IRC Standards (IRC 37 - 2001 & IRC 58 -1998)

7. Bureau of Indian Standards (BIS) Publications on Highway Materials
8. MORTH Guidelines for Highway Engineering
9. Subramani,T. and Elangovan, R “Planning Of A Ring Road Formation For Salem Corporation Using GIS”, International Journal of Engineering Research And Industrial Applications, Vol.5, No.II, pp 109-120, 2012.
10. Subramani, T “Assessment Of Potential Impacts On NH7 – 4 Laning From Salem To Karur”, International Journal of Modern Engineering Research, Vol.2, No.3, pp 707-715, 2012.
11. Subramani,T and Nandakumar,S, “National Highway Alignment Using GIS” International Journal of Engineering Research and Applications, Vol.2, Issue.4, pp 427-436, 2012.
12. Subramani,T and Malaisamy.P, “Design of Ring Road For Erode District Using GIS”, International Journal of Modern Engineering Research,Vol.2, No.4, pp 1914 - 1919, 2012.
13. Subramani,T, Krishnan.S. And Kumaresan.P.K., Study on Existing Traffic condition in Salem City and Identify the Transport Facility Improvement Projects, International Journal of Applied Engineering Research IJAER, Vol.7,No.7, Pp 717 – 726, 2012.
14. Subramani.T, Krishnan.S, Kathirvel.C, Bharathi Devi.S.K, “National Highway Alignment from Namakkal to Erode Using GIS” , International Journal of Engineering Research and Applications ,Vol. 4, Issue 8( Version 6), pp.79-89, 2014.
15. Subramani.T, Sivagnanam.M , " Suburban Changes In Salem By Using Remote Sensing Data" , International Journal of Application or Innovation in Engineering & Management (IJAEM) , Volume 4, Issue 5, May 2015 , pp. 178-187 , ISSN 2319 - 4847. 2015
16. Subramani.T, Sekar.M , " Preplanning And Scheduling Of Road Construction By Using PPM" , International Journal of Application or Innovation in Engineering & Management (IJAEM) , Volume 4, Issue 5, pp. 234-244 , 2015
17. Subramani.T, Pari.D, “Highway Alignment Using Geographical Information System”, IOSR Journal of Engineering, Volume 5 ~ Issue 5 , Version 3, pp 32-42, 2015

## **PAPER II: TRAFFIC EDUCATION**

### **OBJECTIVE:**

Provides a basic understanding on Traffic Education – Planning, Design, Operation and Management

### **UNIT I: TRAFFIC CHARACTERISTICS**

Road Characteristics, Road User characteristics - Physical, Physiological, Environmental Characteristics, Traffic stream Characteristics, Vehicle characteristics – Static and Dynamic, Urban road and Rural road Characteristics

### **UNIT II: SURVEYS AND STUDIES IN TRAFFIC ENGINEERING**

Traffic Surveys and studies – Volume and Capacity – Headway concepts and applications – Speed and Delay, Origin and Destination, Parking, Accident-Level of Services (LOS)

### **UNIT III: DESIGN OF TRANSPORT INFRASTRUCTURE**

Design of Cycle Tracks, Pedestrian Facilities, Networking Pedestrian Facilities and Cycle tracks, Parking Facilities - On Street, Off Street and Multi level, Street Lighting.

### **UNIT IV: ROAD INTERSECTION**

At Grade Intersection – Uncontrolled , Channelization, Rotary, Traffic Signal Control, Signal Co - Ordination, Grade Separated Intersection and Types.

### **UNIT V: TRAFFIC OPERATION**

Traffic Sign, Road Markings, Traffic Control Aids , Hand Signals and Driving Techniques, Traffic Regulation,

### **OUTCOME:**

Students would be aware of the basic Principles and Design, Planning and Traffic operation of Transportation system.

**TEXT BOOKS:**

- 1.Kadiyali, L.R., “Traffic Engineering and Transport Planning”, Khanna Publishers, Delhi, 2002
- 2.Khanna K and Justo CEG, Highway Engineering, Khanna Publishers, Roorkee 2001

**REFERENCES:**

1. Wolfgang S.Homburger et.al., “Fundamentals of Traffic Engineering” 15th Edition, Institute of Transportation Studies, University of California, Berkely, 2001.
2. James L.Pline (Edr), “Traffic Engineering Hand Book”, Institute of Transportation Engineers, Washington DC, USA, 1999
3. Nicholas T.Garber, Lester A Hoel, “Traffic and Highway Engineering”, Revised Second Edition, ITP, California, USA, 1999
4. Thomas Curinan, “An Introduction to Traffic Engineering – A Manual for Data Collection and Analysis”, Books Cole, UK, 2001
5. Indian Roads Congress (IRC) specifications: Guidelines and special publications on Traffic Planning and Management
6. Guidelines of Ministry of Road Transport and Highways, Government of India.
7. Subramani, T. “Parking Study On Main Corridors In Major Urban Centre”, International Journal of Modern Engineering Research, Vol.2, No. 3, pp 742-748, 2012.
8. Subramani, T “Assessment Of Potential Impacts On NH7 – 4 Laning From Salem To Karur”, International Journal of Modern Engineering Research, Vol.2, No.3,pp 707-715, 2012.
9. Subramani, T. “Pedestrian Study on Road links in Major Urban Centre”, IOSR Journal of Engineering, Vol.2, No. 4, pp 750-754, 2012.
10. Subramani, T. “Parking Study On Main Corridors In Major Urban Centre”, International Journal of Modern Engineering Research, Vol.2, No. 3, pp 742-748, 2012.

11. Subramani, T. "Study of Pollution Prevention Strategies For Reclamation of Ooty Lake" International Journal of Engineering Research and Applications, Vol.2, Issue.3, pp 783-791, 2012
12. Subramani,T, Krishnan.S. And Kumaresan.P.K., "Study on Existing Traffic condition in Salem City and Identify the Transport Facility Improvement Projects", International Journal of Applied Engineering Research IJAER, Vol.7,No.7, Pp 717 – 726, 2012.
13. Subramani.T, Arutselvan.S, Ganesan.S.K , "Analysis Of Highway Air Pollution" International Journal of Engineering Research and Applications, Volume. 4, Issue. 6 (Version 5), pp 173 - 182, 2014.
14. Subramani.T, Sivagnanam.M , "Suburban Changes In Salem By Using Remote Sensing Data" , International Journal of Application or Innovation in Engineering & Management (IJAIEEM) , Volume 4, Issue 5, May 2015 , pp. 178-187 , ISSN 2319 - 4847. 2015



## **PAPER III: ROAD SAFETY SYSTEM**

### **OBJECTIVES:**

Helps in identifying the reasons for Road Accidents and Scientific Investigation. Provides knowledge on safety audit and its methodology

### **UNIT I: DESCRIPTION OF PROBLEMS**

Causes of Accidents – Human Factors – Vehicles – Road and its Condition – Environmental Studies.

### **UNIT II: ACCIDENT ANALYSIS TECHNIQUES**

Collision Diagram – Preparation, Spatial Analysis of accidents – Methods and GIS in Accident Analysis – Black Spot Black Route and Area Identification.

### **UNIT III: BEFORE AND AFTER STUDIES**

Accident Prediction Model – Development – Empirical Bayes Approach – Before and After Evaluation – Case Studies, Accident Prevention Study over Human factors, Vehicles & Road, Golden hour.

### **UNIT IV: ROAD SAFETY EQUIPMENTS & SAFETY AUDIT**

Anti log Breaking system, Speed Governors, Seat belt, Helmets, Need for Safety Audit – Concept and Elements of Safety Audit for existing roads – Legal Requirements – Provisions of Motor Vehicle Act and Role of NGO's in Prevention of Accidents.

### **UNIT V: ACCIDENT STUDIES AND INVESTIGATION**

Accident data – Identification of Accident Prone Location – Prioritization – Investigation – Accident Information Report - Problems and Remedies.

### **OUTCOME:**

The students would have gained knowledge on different aspects of road safety audit and its methodology

### **TEXT BOOKS:**

1. Khanna S.K. and Justo C.E.G, "Highway Engineering", Nem Chand and Brothers, Roorkee, 2001
2. Robert F. Baker, "Hand Book of Highway Engineering", Van Nostrand Reinhold Company, New York, 1975

## **REFERENCES:**

1. Ministry of Surface Transport, "Accident Investigation and Prevention
2. Manual for Highway Engineers in India, Government of India, 2001
3. Robert F. Baker, "The Highway Risk Problem – Policy Issues in Highway Safety", John Wiley and Sons.
4. Subramani, T. "Parking Study On Main Corridors In Major Urban Centre", International Journal of Modern Engineering Research, Vol.2, No. 3, pp 742-748, 2012.
5. Subramani, T "Assessment Of Potential Impacts On NH7 – 4 Laning From Salem To Karur", International Journal of Modern Engineering Research, Vol.2, No.3, pp 707-715, 2012.
6. Subramani, T. "Pedestrian Study on Road links in Major Urban Centre", IOSR Journal of Engineering, Vol.2, No. 4, pp 750-754, 2012.
7. Subramani, T. "Parking Study On Main Corridors In Major Urban Centre", International Journal of Modern Engineering Research, Vol.2, No. 3, pp 742-748, 2012.
8. Subramani, T, Krishnan.S. And Kumaresan.P.K., Study on Existing Traffic condition in Salem City and Identify the transport facility improvement projects, International Journal of Applied Engineering Research IJAER, Vol.7, No.7, Pp 717 – 726, 2012.
9. Subramani.T, Sivagnanam.M , " Suburban Changes In Salem By Using Remote Sensing Data" , International Journal of Application or Innovation in Engineering & Management (IJAEM) , Volume 4, Issue 5, May 2015 , pp. 178-187 , ISSN 2319 - 4847. 2015

## **PAPER IV: ENVIRONMENTAL IMPACT ASSESSMENT OF TRANSPORTATION PROJECTS**

### **OBJECTIVE:**

Provides an exposure to various Environmental Laws and importance of EIA on Transportation Projects with respect to noise, air pollution, visual intrusion etc.

### **UNIT :I ENVIRONMENTAL STANDARDS IN URBAN AREAS AND EIA**

Laws concerned with protection of the environment such as Environmental Protection Act, Air and Noise Pollution Act, Motor Vehicle Act, Town and Country Planning Act, Development Control Regulation.

### **UNIT :II MEASUREMENT AND POLLUTION PREDICTION**

Measurement of Air and Noise Pollution, Land Acquisition, Rehabilitation, Collection, Compilation and Presentation of Pollution and Impact Data, Measuring Impact before construction, at the time of construction and after construction

### **UNIT :III ENVIRONMENTAL QUALITY AND MANAGEMENT**

Importance of EIA, Environmental Appraisal, EIA Statement, Vehicle and Traffic Noise, Ambient Noise Level, Health Effects, Vibration – Damage to building, Exhaust Emission – Pollutant, Health effects, Air Pollution, Urban Ambient Air Quality Standards, Effects on Human being, Vegetation and Animals

### **UNIT :IV ENVIRONMENTAL MAINTENANCE AND LEGAL SYSTEMS**

Impact of Traffic on Environment – Network Pattern, Urban Growth Indicators of Environmental Quality, Energy use, Fuel Economy in Transportation, Energy Efficiency strategies

### **UNIT :V MITIGATIVE MEASURES AND POLICIES**

Mitigative Measures for Air and Noise Pollution Policies and Strategies, Involvement of Stakeholders, Public Participation, Institutional Arrangements.

### **OUTCOME:**

Students would have understood the impact of Transportation projects on the environment and to adopt mitigative measures in the planning stage.

**TEXT BOOKS:**

1. Larry W Canter, "Environmental Impact Assessment", McGraw Hill Publishers, 1996.

**REFERENCES:**

1. Rao V. Kolluru; "Environmental Strategies Handbook", McGraw Hill Publishers, 1994.
2. David Banister; "Transport Policy and Environment" E&FN Spain, 1999
3. World Bank; "The Impact of Environmental Assessment – A Review of a World Bank Experience, Washington, 1997.
4. World Bank; Road and the Environment, Washington, 1997.
5. Subramani, T. "Parking Study On Main Corridors In Major Urban Centre", International Journal of Modern Engineering Research, Vol.2, No. 3, pp 742-748, 2012.
6. Subramani, T "Assessment Of Potential Impacts On NH7 – 4 Laning From Salem To Karur", International Journal of Modern Engineering Research, Vol.2, No.3, pp 707-715, 2012.
7. Subramani, T. "Pedestrian Study on Road links in Major Urban Centre", IOSR Journal of Engineering, Vol.2, No. 4, pp 750-754, 2012.
8. Subramani, T. "Parking Study On Main Corridors In Major Urban Centre", International Journal of Modern Engineering Research, Vol.2, No. 3, pp 742-748, 2012.
9. Subramani, T. "Study of Pollution Prevention Strategies For Reclamation of Ooty Lake", International Journal of Engineering Research and Applications, Vol.2, Issue.3, pp 783-791, 2012.
10. Subramani, T, Krishnan.S. And Kumaresan.P.K., "Study on Existing Traffic condition in Salem City and Identify the Transport Facility Improvement Projects", International Journal of Applied Engineering Research IJAER, Vol.7, No.7, Pp 717 – 726, 2012.
11. Subramani.T, Arutselvan.S, Ganesan.S.K, "Analysis Of Highway Air Pollution", International Journal of Engineering Research and Applications, Volume. 4, Issue. 6 (Version 5), pp 173 - 182, 2014.

## **PAPER V: TRANSPORT ECONOMICS & MANAGEMENT**

### **OBJECTIVE:**

Provides knowledge in economic evaluation and Public private partnership in developing road infrastructure projects and application of systems simulation techniques in modeling transport economic systems.

### **UNIT I ECONOMIC EVALUATION**

Need for Economic Evaluation of Urban Transport Projects – Principles of Economic Analysis – Methods of Economic Evaluation – Comparison of various methods

### **UNIT II MODELING OF ROAD USER COSTS**

Components of Vehicle Operating Cost – Factors affecting Vehicle Operating Cost – Value of Travel Time Saving - Accident Cost

### **UNIT III TRANSPORT DEMAND SUPPLY CONCEPT**

Transport Demand and Supply Concepts - Status of Transport Demand Supply in Metropolitan Cities – Demand and Supply equilibrium - Subsidy in Transport demand – Supply Augmentation and Saturation Consideration

### **UNIT IV TRANSPORT PRICING**

Transport costs – Elasticity of Demand – Average Cost and Marginal Cost Pricing – Market Pricing and Market Segmentation – Second best Pricing – Pricing Policy – Congestion Pricing – Public and Private Transport Pricing – Price Co-ordination

### **UNIT V FINANCING TRANSPORT SYSTEM**

Characteristics of Transportation Infrastructure – Trends in Transportation Infrastructure – Investment Needs, Options and Budgetary Support in Transport Sector – Existing Financing Practices – Principles of Build, Operate and Transfer (BOT) – BOT variants and its applicability– Special Purpose Vehicles-Alternative Financial Resources.

## **UNIT V: TRAFFIC MANAGEMENT**

Cost Effective Management Measures – Traffic Systems Management and Travel Demand Management – Congestion Management, Traffic Calming and Pricing. Area Traffic Management System – Traffic System Management(TSM) with IRC standards- Traffic Regulatory Measures – Travel Demand Management (TDM) - Direct and Indirect Methods - Congestion and Parking Pricing – All Segregation Methods – Coordination among different agencies – Intelligent Transport System for Traffic Management, Enforcement and Education

### **OUTCOME:**

Students would be equipped with the economic principles in dealing with transport supply and demand.

### **TEXT BOOKS:**

1. Robert F Baker, (eds), "Hand Book of Highway Engineering, Van Nostrand Reinhold Company, New York, 1975

### **REFERENCES:**

1. Indian Roads Congress Standards (2002), "Economic Evaluation of Transport Projects", New Delhi.
2. John Khisty C, Kent Lall B, "Transportation Engineering – An Introduction, 3rd Edition, Prentice Hall of India, New Delhi, 2002
3. Hanspeter George; "Cost Benefit Analysis and Public Investment in Transport" – A Survey Butterworths, London, 1973
4. The Institution of Engineers India (1997), "Proceedings of the National Seminar on Infrastructure Development" – Strategies for Transportation Sector, New Delhi.
5. Subramani, T "Assessment Of Potential Impacts On NH7 – 4 Laning From Salem To Karur", International Journal of Modern Engineering Research, Vol.2, No.3,pp 707-715, 2012.
6. Subramani,T, Krishnan.S. And Kumaresan.P.K., "Study on ExiSting Traffic Condition in Salem City and Identify the Transport Facility Improvement Projects", International Journal of Applied Engineering Research IJAER, Vol.7,No.7, Pp 717 – 726, 2012.

7. Subramani.T, Arutselvan.S, Ganesan.S.K , “Analysis Of Highway Air Pollution” International Journal of Engineering Research and Applications, Volume. 4, Issue. 6 (Version 5), pp 173 - 182, 201
8. T.Subramani, M.Sivagnanam , " Suburban Changes In Salem By Using Remote Sensing Data" , International Journal of Application or Innovation in Engineering & Management (IJAIEEM) , Volume 4, Issue 5, May 2015 , pp. 178-187 , ISSN 2319 - 4847. 2015
9. T.Subramani, M.Sekar , " Preplanning And Scheduling Of Road Construction By Using PPM" , International Journal of Application or Innovation in Engineering & Management (IJAIEEM) , Volume 4, Issue 5, pp. 234-244 , 2015

