***5CE121 Transportation Engineering - I***

**L-T-P-Cr: 3-1-0-4**

**Objective:**

To introduce the elements related to highway engineering. The subject knowledge of traffic engineering, geometric design and pavement design shall be imparted along with highway material and construction.

**Theory:**

1. **Introduction:** Importance of transportation, Different modes of transportation, Characteristics of road transport, historical development of roads, Scope of Highway Engineering, Classification of roads and road patterns, recently launched highway projects in India. **3 Lectures**

2. **Traffic Engineering:** Introduction, Traffic characteristics, Traffic studies, Traffic flow characteristics, traffic control devices. **6 Lectures**

3. **Highway Geometric Design:** Introduction, Highway cross-section elements, sight distances, Design of horizontal Alignment, Design of vertical alignment, IRC Specifications. **12 Lectures**

4. **Highway Materials:** Subgrade soil, stone aggregates, binding materials (bitumen, emulsion tar and cut back), Introduction to modified binders, Geosynthetics and SUPERPAVE. **6 Lectures**

5. **Design of Highway Pavements:** Flexible pavement and their design, IRC: 37-2012 method of design, Rigid pavement and their design, IRC: 58-2011 method of design. **8 Lectures**

6. **Highway construction:** Earthwork, construction of various layers of the pavements. **4 Lectures**

7. Highway maintenance, Pavement evaluation, Highway drainage. **3 Lectures**

**Scheme of Examination:**

Class test I/Assignment : 5Marks

Class test II/Assignment : 5Marks

Mid Semester Examination : 20Marks

End Semester Examination : 70 Marks

**Text Books:**

1. Khanna, S. K. and Justo, C. E. G., Highway Engineering, Nemchand Bros., Roorkee

2. Kadiyali, L. R., Principle and Design of pavements, Khanna Publishers, New Delhi

3. Kumar SrinivasaR.,Textbook of Highway Engineering, University Press

**Reference Books:**

1. Wright, P. H., Highway Engineering, John Wiley and Sons, New York.

2. Hay, W. W., Introduction to Transportation Engineering. John Wiley and Sons, New York.

3. Papacostas, C. S., Fundamentals of Transportation Engineering, Prentice Hall of India, New Delhi.

4. Huang, Y. H., Pavement analysis and Design. Prentice Hall, Englewood Cliffs, New Jersey.

**Expected Outcome:**

The students would have ability for design of highways including pavement. They have awareness of highway materials, construction materials, maintenance and elements traffic engineering.

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