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| **Course Code – CE691** | | **Highway Engineering Lab.** | **3P** | **2 Credits** |
| **Course Objective** | Transportation engineering applies scientific and technical knowledge to provide economical and efficient transportation service that meets societal needs while maintaining compatibility with environmental, energy, and safety goals. | | | |
| **Course Outcome (CO)** | The student will be able to   1. Identify engineering properties of aggregate. 2. Indentify the grade & properties of bitumen. 3. Perform quality control tests on pavements and pavement materials. 4. Understand importance of soil quality for design of pavement. | | | |

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| **CO Distribution** | **Test 1 (T1)** | **Test 2 (T2)** | **Test 3 (T3)** | **Test 4 (T4)** |
| **CO1** | Q1, Q2 |  | Q1 | Q1 |
| **CO2** |  | Q1, Q2 | Q2 | Q2 |
| **CO3** | Q3, Q4 | Q3, Q4 |  | Q3 |
| **CO4** |  |  | Q3,Q4 | Q4 |

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| **Course outcomes** | **% of students achieved CO** | **Decision on CO result (achieved) (Y/N) with level** |
| **CO1** | 78% | Y (Level: 2) |
| **CO2** | 76% | Y(Level: 2) |
| **CO3** | 82% | Y(Level:3) |
| **CO4** | 72% | Y(Level:2) |
| **Average CO attainment for the course through CIE CE691** | 77% | Level: 2 |

**Overall CO attainment (CE691) in the scale of 3**

= (40% of target level of average CO attainment through CIE) +(60% of target level of CO attainment through SEE)

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| **Subject Code** | **CO1** | **CO2** | **CO3** | **CO4** | **Average CO Score**  **(CIE)** | **CO Score**  **(SEE)** | **Overall CO Attainment Score** |
| **CE691** | 2 | 2 | 3 | 2 | 2 | 3 | 2.6 |

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| **CO-PO Mapping**  Highway Engineering Lab  **(Course Code – CE691)** | | | | | | | | | | | | | |
|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| **CO1** | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 |
| **CO2** | 2 | 2 | 1 | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 3 |
| **CO3** | 3 | 1 | 1 | 1 | 2 | 1 | 3 | 2 | 3 | 1 | 3 | 3 |
| **CO4** | 2 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 3 |
| **Average CO** | **2.25** | **1.5** | **1.5** | **1.75** | **2.25** | **1.25** | **2.25** | **1.75** | **2.0** | **1.5** | **2** | **3** |

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| **CO-PSO Mapping**  Highway Engineering Lab  **(Course Code – CE691)** | | | |
|  | **PSO1** | **PSO2** | **PSO3** |
| **CO1** | 3 | 1 | 2 |
| **CO2** | 2 | 3 | 2 |
| **CO3** | 3 | 2 | 2 |
| **CO4** | 3 | 2 | 3 |
| **Average CO** | 2.75 | 2.0 | 2.25 |

Following table has been generated considering mapping of CO-PO and CO attainment.

For, PO1 mapping value is = 2.25

Target PO = 3

Overall CO1 attainment score = 2.6

**Therefore, contribution to PO3 attainment is 2.6 × (2.25/3) =2.08. Others are calculated accordingly**

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| **PO Articulation Matrix** | | | | | | | | | | | | |
|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| **CE691** | **1.95**  (2.25/3)\*2.6 | **1.3**  (1.5/3)\*2.6 | **1.3**  (1.5/3)\*2.6 | **1.52**  (1.75/3)\*2.6 | **2.08**  (2.25/3)\*2.6 | **1.08**  (1.25/3)\*2.6 | **1.95**  (2.25/3)\*2.6 | **1.52**  (1.75/3)\*2.6 | **1.73**  (2.0/3)\*2.6 | **1.3**  (1.5/3)\*2.6 | **1.74**  (2.0/3)\*2.6 | **2.6**  (3/3)\*2.6 |

Following table has been generated considering mapping of CO-PSO and CO attainment.

For, PSO1 mapping value is = 2.75

Target PSO = 3

Overall CO1 attainment score = 2.6

**Therefore, contribution to PO3 attainment is 2.6 × (2.75/3) =2.38 Others are calculated accordingly**

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| **PSO Articulation Matrix** | | | |
|  | **PSO1** | **PSO2** | **PSO3** |
| **CE691** | **2.38**  (2.75/3)\*2.6 | **1.73**  (2.0/3)\*2.6 | **1.95**  (2.25/3)\*2.6 |