*LESSON PLAN –HIGHWAY ENGG.*

# G.B.N GOVT. POLYTECHNIC, NILOKHERI

NAME OF FACULTY :
DISCIPLINE : **CIVIL ENGG.**
SEMESTER : **5TH**
SUBJECT : HIGHWAY ENGINEERING
LESSON PLAN DURATION : **15WEEKS**

WORK LOAD (THEORY/PRACTICAL) PER WEEK (IN HOURS): THEORY-05, PRACTICAL-02

| WORKING WEEK | WORKING DAY | TOPIC TO BE COVER (THEORY) | TOPIC TO BE COVER (PRACTICAL) |
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| 1ST | IST | INTRODUCTION | DETERMINATION OF WATER ABSORPTION OF AGGREGATES |
| | IIND | IMPORTANCE OF HIGHWAY ENGINEERING | |
| | IIIRD | FUNCTION OF IRC, CRRI, MORT&H, NHAI | |
| | IVTH | IRC CLASSIFICATION OF ROADS | |
| | VTH | GLOSSARY OF TERMS USED IN ROAD GEO-METRICS AND THEIR IMPORTANCE: RIGHT OF WAY | |
| 2ND | IST | ROAD MARGIN, ROAD SHOULDER, CARRIAGE WAY, SIDE SLOPES, KERBS, FORMATION LEVELS, CAMBER AND GRADIENT | DETERMINATION OF LOS ANGLES ABRASION VALUE OF AGGREGATE |
| | IIND | AVERAGE RUNNING SPEED, STOPPING AND PASSING SIGHT DISTANCE | |
| | IIIRD | NECESSITY OF CURVES, HORIZONTAL AND VERTICAL CURVES INCLUDING TRANSITION CURVES. | |
| | IVTH | SUPER ELEVATION AND METHODS OF PROVIDING SUPER ELEVATION | |
| | VTH | SKETCH OF TYPICAL CROSS-SECTIONS IN CUTTING AND FILLING ON STRAIGHT ALIGNMENT AND AT A CURVE | |
| 3RD | IST | HIGHWAY SURVEYS AND PLAN | DETERMINATION OF IMPACT VALUE OF THE ROAD AGGREGATE |
| | IIND | TOPOGRAPHIC MAP, READING THE DATA GIVEN ON A TOPOGRAPHIC MAP | |
| | IIIRD | BASIC CONSIDERATIONS GOVERNING ALIGNMENT FOR A ROAD IN PLAIN AND HILLY AREA | |
| | IVTH | HIGHWAY LOCATION; MARKING OF ALIGNMENT | |
| | VTH | TOPOGRAPHIC MAP, READING THE | |

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| | | DATA GIVEN ON A TOPOGRAPHIC MAP | |
| 4TH | IST | ROAD MATERIALS | RIVISION OF PRACTICAL NO. 1 |
| | IIND | DIFFERENT TYPES OF ROAD MATERIALS IN USE; SOIL, AGGREGATE, BINDERS – BITUMEN, CUTBACK, EMULSION AND MODIFIED BITUMEN (CRMB, PMB) | |
| | IIIRD | BINDERS: COMMON BINDERS; BITUMEN, PROPERTIES AS PER BIS SPECIFICATIONS, PENETRATION | |
| | IVTH | SOFTENING POINT, DUCTILITY AND VISCOSITY TEST OF BITUMEN, PROCEDURES | |
| | VTH | CUT BACK AND EMULSION AND THEIR USES, BITUMEN MODIFIERS | |
| 5TH | IST | DOUBT OF UNIT 1ST AND 2ND WILL BE TAKEN. | RIVISION OF PRACTICAL NO. 2 |
| | IIND | ROAD PAVEMENTS | |
| | IIIRD | ROAD PAVEMENT: FLEXIBLE AND RIGID PAVEMENT, THEIR MERITS AND DEMERITS, TYPICAL CROSS-SECTIONS | |
| | IVTH | INTRODUCTION TO CALIFORNIA BEARING RATIO, METHOD OF FINDING CBR VALUE AND ITS SIGNIFICANCE | |
| | VTH | SUB-GRADE PREPARATION: SETTING OUT ALIGNMENT OF ROAD, SETTING OUT BENCH MARKS, CONTROL PEGS FOR EMBANKMENT AND CUTTING | |
| 6TH | IST | INTRODUCTION TO SUB BASE COURSE AND BASE COURSE | RIVISION OF PRACTICAL NO. 3 |
| | IIND | GRANULAR BASE COURSE: (I) WATER BOUND MACADAM (WBM) (II) WET MIX MACADAM (WMM) | |
| | IIIRD | BITUMEN COURSES: (I) BITUMINOUS MACADAM (II) DENSE BITUMINOUS MACADAM (DBM) | |
| | IVTH | MEANING, CONDITIONS/SITUATIONS OF OCCURRENCE WITH EMPHASIS ON PRACTICAL SIGNIFICANCE OF | |
| | VTH | *METHODS OF CONSTRUCTION AS PER MORT&H | |
| 7TH | IST | SURFACING: A) * TYPES OF SURFACING | DETERMINATION OF THE CALIFORNIA |

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| | | I) PRIME COAT AND TACK COAT<br>II) SURFACE DRESSING WITH SEAL<br>COAT | BEARING RATIO |
| | II$^{ND}$ | METHODS OF CONSTRUCTIONS AS PER MORT&H SPECIFICATIONS AND QUALITY CONTROL | |
| | III$^{RD}$ | RIGID PAVEMENTS: | |
| | IV$^{TH}$ | CONSTRUCTION OF CONCRETE ROADS AS PER IRC SPECIFICATIONS: FORM WORK LAYING, MIXING AND PLACING THE CONCRETE | |
| | V$^{TH}$ | COMPACTING AND FINISHING, CURING,<br>JOINTS IN CONCRETE PAVEMENT, EQUIPMENT USED | |
| 8$^{TH}$ | I$^{ST}$ | DOUBT OF UNIT 3$^{RD}$ AND 4$^{TH}$ WILL BE TAKEN. | (CBR) FOR THE SUB-GRADE SOIL |
| | II$^{ND}$ | INTRODUCTION: TYPICAL CROSS-SECTIONS SHOWING ALL DETAILS OF A TYPICAL HILL ROAD, PARTLY IN CUTTING AND PARTLY IN FILLING | |
| | III$^{RD}$ | SPECIAL PROBLEMS OF HILL AREAS | |
| | IV$^{TH}$ | ROAD DRAINAGE | |
| | V$^{TH}$ | NECESSITY OF ROAD DRAINAGE WORK, CROSS DRAINAGE WORKS | |
| 9$^{TH}$ | I$^{ST}$ | SURFACE AND SUBSURFACE DRAINS AND STORM WATER DRAINS. LOCATION, SPACING AND TYPICAL | VISIT TO HOT MIX PLANT |
| | II$^{ND}$ | SIDE DITCHES FOR SURFACE DRAINAGE.<br>INTERCEPTING DRAINS, PIPE DRAINS IN HILL ROADS, | |
| | III$^{RD}$ | ROAD MAINTENANCE | |
| | IV$^{TH}$ | COMMON TYPES OF ROAD FAILURES OF FLEXIBLE PAVEMENTS: POT HOLE, RUTTING,<br>ALLIGATOR CRACKING | |
| | V$^{TH}$ | MAINTENANCE OF BITUMINOUS | |
| 10$^{TH}$ | I$^{ST}$ | ROAD SUCH AS SEAL-COAT, PATCH- WORK AND RE CARPETING | DUCTILITY OF BITUMEN |
| | II$^{ND}$ | MAINTENANCE OF CONCRETE ROADS-FILLING CRACKS, REPAIRING JOINTS, MAINTENANCE<br>OF SHOULDERS (BERMS), MAINTENANCE OF<br>TRAFFIC CONTROL DEVICES | |
| | III$^{RD}$ | DOUBT OF UNIT 5$^{TH}$ AND 6$^{TH}$ WILL | |

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| | | BE TAKEN. | |
| | IV$^{TH}$ | TEST OF UNIT 1$^{ST}$ AND 2$^{ND}$. | |
| | V$^{TH}$ | ROAD CONSTRUCTION EQUIPMENT OUTPUT AND USE OF THE FOLLOWING PLANT AND EQUIPMENT | |
| 11$^{TH}$ | I$^{ST}$ | HOT MIX PLANT | PENETRATION OF BITUMEN |
| | II$^{ND}$ | TIPPER, TRACTORS (WHEEL AND CRAWLER) SCRAPER, BULLDOZER, DUMPERS, SHOVELS, GRADER, ROLLER, DRAGLINE | |
| | III$^{RD}$ | ASPHALT MIXER AND TAR BOILERS | |
| | IV$^{TH}$ | ROAD PAVERS | |
| | V$^{TH}$ | DOUBT OF UNIT 7$^{TH}$ AND 8$^{TH}$ WILL BE TAKEN. | |
| 12$^{TH}$ | I$^{ST}$ | TEST OF UNIT 3$^{RD}$ AND 4$^{TH}$. | SOFTENING POINT TEST OF BITUMEN |
| | II$^{ND}$ | AIRPORT ENGINEERING NECESSITY OF STUDY OF AIRPORT ENGINEERING, AVIATION TRANSPORT SCENARIO IN INDIA. | |
| | III$^{RD}$ | DOUBT OF UNIT 9$^{TH}$ WILL BE TAKEN. | |
| | IV$^{TH}$ | TEST OF UNIT 5$^{TH}$ AND 6$^{TH}$. | |
| | V$^{TH}$ | FACTORS TO BE CONSIDERED WHILE SELECTING A SITE FOR AN AIRPORT WITH RESPECT TO ZONING LAWS. | |
| 13$^{TH}$ | I$^{ST}$ | TEST OF UNIT 5$^{TH}$ AND 6$^{TH}$ | VISIT TO HIGHWAY CONSTRUCTION SITE FOR DEMONSTRATION OF OPERATION OF TIPPER, TRACTORS (WHEEL AND CRAWLER), SCRAPER, BULLDOZER, DUMPERS, SHOVELS, GRADER, ROLLER, DRAGLINE, ROAD PAVERS, JCB ETC. |
| | II$^{ND}$ | INTRODUCTION TO RUNWAYS, TAXIWAYS AND APRON | |
| | III$^{RD}$ | DOUBT OF 10$^{TH}$ WILL BE TAKEN. | |
| | IV$^{TH}$ | TEST OF UNIT 7$^{TH}$. | |
| | V$^{TH}$ | REVISION OF UNIT 1$^{ST}$ AND 2$^{ND}$. | |
| 14$^{TH}$ | I$^{ST}$ | TEST OF UNIT 8. | MIXING AND SPRAYING EQUIPMENT |
| | II$^{ND}$ | RIVISION OF UNIT 3$^{RD}$ AND 4$^{TH}$. | |
| | III$^{RD}$ | TEST OF UNIT 9$^{TH}$. | |
| | IV$^{TH}$ | REVISION OF UNIT 4TH AND 5$^{TH}$ | |
| | V$^{TH}$ | OBJECTIVE TYPE QUESTIONS | |
| 15$^{TH}$ | I$^{ST}$ | TEST OF UNIT 10$^{TH}$. | A VISIT TO READY MIX CONCRETE PLANT. |
| | II$^{ND}$ | RIVISION OF UNIT 5$^{TH}$ AND 6$^{TH}$. | |
| | III$^{RD}$ | REVISION OF UNIT 7$^{TH}$ | |
| | IV$^{TH}$ | REVISION OF UNIT 8$^{TH}$ | |
| | V$^{TH}$ | REVISION OF UNIT 9$^{TH}$ AND 10$^{TH}$ | |