| Department o+A1:J49f Civil Engineering |
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| Govt. Polytechnic for Women Rehan |
| Distt. – Kangra (H.P.) – 176022 |
| LESSON PLAN |

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| Program Name | Civil Engineering |
| Subject Name | Geotechnical Engineering |
| Subject Code | CEPC211 |
| Semester | 3rd Semester |
| Subject Teacher Name | Er. Amish Rehalia |

| Sr. No. | Subject Name | Study scheme (Hrs/Week) | | Marks in Evaluation Scheme | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Internal Assessment | | | External Assessment | | |
| | | Th | DCS | Th | Pr | Total | Th | Pr | Total |
| 1 | Geotechnical Engineering | 3 | 1 | 40 | - | 40 | 60 | - | 60 |
| Reference Books | | (i) Arora K R, Soil Mechanics and Foundation Engineering, Standard Publisher. | | | | | | | |
| | | (ii) Punmia, B.C., Soil Mechanics and Foundation Engineering, Laxmi Publication, Delhi | | | | | | | |

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| CO – 1 | To understand and determine physical and index properties and classification of soil |
| CO – 2 | To estimate permeability and shear strength of soil |
| CO – 3 | To know the load bearing capacity of soil. |
| CO – 4 | To learn various soil stabilization and compaction methods |

| | | Name of Topic | Proposed Date | Actual Date | Remarks |
|---|---|---|---|---|---|
| 1 | Unit -1 Overview of Geology and Geotechnical Engineering | Introduction of Geology Branches of Geology | 01-08-2024 | | |
| 2 | | Importance of Geology for civil engineering structure and composition of earth, | 05-08-2024 | | |
| 3 | | Definition of a rock: | 06-08-2024 | | |
| 4 | | Classification based on their genesis (mode of origin), formation, | 07-08-2024 | | |
| 5 | | Classification, and engineering uses of igneous, sedimentary, and metamorphic rocks | 08-08-2024 | | |
| 6 | | Importance of soil as construction material in Civil engineering structures and as foundation bed for structures | 12-08-2024 | | |
| 7 | | Field application of geotechnical engineering for foundation design | 13-08-2024 | | |
| 8 | | Design of earth retaining structures, | 14-08-2024 | | |
| 9 | | Design of earthen dam. | 19-08-2024 | | |
| 10 | Unit– II Physical and Index Properties of Soil | Soil as a three-phase system, | 20-08-2024 | | |
| 11 | | water content, determination of water content by oven drying method as per | 21-08-2024 | | |
| 12 | | void ratio, porosity and degree of saturation | 22-08-2024 | | |
| 13 | | density index. Unit weight of soil mass – bulk unit weight, | 27-08-2024 | | |
| 14 | | dry unit weight, unit weight of solids | 28-08-2024 | | |
| 15 | | saturated unit weight, submerged unit weight | 29-08-2024 | | |
| 16 | | Determination of bulk unit weight and dry unit weight by core cutter | 03-09-2024 | | |
| 17 | | Determination of bulk unit weight and dry unit weight by sand replacement method | 04-09-2024 | | |
| 18 | | Consistency of soil, | 05-09-2024 | | |
| 19 | | Atterberg limits of consistency: Liquid limit | 09-09-2024 | | |
| 20 | | plastic limit and shrinkage limit | 10-09-2024 | | |
| 21 | | Plasticity index, | 11-09-2024 | | |
| 22 | | Class Test -1 | 12-09-2024 | | |
| 23 | | Particle size distribution test and plotting of curve, | 16-09-2024 | | |
| 24 | | Determination of effective diameter of soil, | 18-09-2024 | | |
| 25 | | well graded and uniformly graded soils, | 19-09-2024 | | |
| 26 | | BIS classification of soil | 23-09-2024 | | |

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| 27 | Unit– III Permeability and Shear Strength of Soil | Definition of permeability, | 24-09-2024 | | |
| 28 | | Darcy's law of permeability | 25-09-2024 | | |
| 29 | | Coefficient of permeability, factors affecting permeability, | 26-09-2024 | | |
| 30 | | determination of coefficient of permeability by constant head | 30-09-2024 | | |
| 31 | | falling head tests | 01-10-2024 | | |
| 32 | | simple problems to determine coefficient of permeability | 02-10-2024 | | |
| 33 | | Seepage through earthen structures, seepage velocity | 03-10-2024 | | |
| 34 | | seepage pressure, phreatic line, | 07-10-2024 | | |
| 35 | | flow lines, application of flow net, (No numerical problems). | 08-10-2024 | | |
| 36 | | Shear failure of soil, concept of shear strength of soil. | 09-10-2024 | | |
| 37 | | Components of shearing resistance of soil – cohesion, internal friction. | 10-10-2024 | | |
| 38 | | Mohr-Coulomb failure theory | 14-10-2024 | | |
| 39 | | *Class Test -2* | 15-10-2024 | | |
| 40 | | Strength envelope, strength equation for purely cohesive and cohesion less | 16-10-2024 | | |
| 41 | | Direct shear and vane shear test – laboratory methods | 17-10-2024 | | |
| 42 | | | 21-10-2024 | | |
| 43 | Unit– IV Bearing Capacity of Soil | Bearing capacity and theory of earth pressure. Concept of bearing capacity, ultimate bearing capacity, safe bearing capacity and allowable bearing pressure | 22-10-2024 | | |
| 44 | | | 23-10-2024 | | |
| 45 | | Introduction to Terzaghi's analysis and assumptions, effect of water table on bearing capacity. | 24-10-2024 | | |
| 46 | | | 04-11-2024 | | |
| 47 | | Field methods for determination of bearing capacity – Plate load and Standard Penetration Test. Test procedures as per IS:1888 & IS:2131. | 05-11-2024 | | |
| 48 | | | 06-11-2024 | | |
| 49 | | Definition of earth pressure, Active and Passive earth pressure for no surcharge condition coefficient of earth pressure | 07-11-2024 | | |
| 50 | | | 11-11-2024 | | |
| 51 | | House Test | 12-11-2024 | | |
| 52 | | House Test | 13-11-2024 | | |
| 53 | | House Test | 14-11-2024 | | |
| 54 | Unit– V Compaction and stabilization of soil | Concept of compaction, Standard and Modified proctor test as per IS code, Plotting of Compaction curve for determining: Optimum moisture content (OMC), maximum dry density (MDD), Zero air voids line. Factors affecting compaction, field methods of compaction – rolling, ramming and vibration | 18-11-2024 | | |
| 55 | | | 19-11-2024 | | |
| 56 | | Suitability of various compaction equipment -smooth wheel roller, sheep foot roller, pneumatic tyre roller, Rammer and Vibrator, Difference between compaction and consolidation. | 20-11-2024 | | |
| 57 | | Concept of soil stabilization, necessity of soil stabilization, different methods of soil stabilization. California bearing ratio (CBR) test - Meaning and Utilization in Pavement Construction | 21-11-2024 | | |
| 58 | | Necessity of site investigation and soil exploration: Types of exploration, criteria for deciding the location and number of test pits and bores. | 25-11-2024 | | |
| 59 | | | 26-11-2024 | | |
| 60 | | Field identification of soil – dry strength test, dilatancy test and toughness test. | 27-11-2024 | | |
| 61 | | Doubt Session | 28-11-2024 | | |
| 62 | | Doubt Session | 02-12-2024 | | |

| Name of test | Syllabus for Tests | Proposed Date | Actual Date | Remarks |
|---|---|---|---|---|
| Class Test -1 | Unit-1 | 12-09-2024 | | |
| Class Test -2 | unit 2 and 3(till date) | 15-10-2024 | | |
| House Test - 1 | unit 1-4 | 12-13-14 nov | | |

(Signature of [illegible])

(Signature of HOD)

Approved

Principal
Govt. Polytechnic for Women
Rehan Distt. Kangra (H.P.)