Foundation Engineering

SWAYAM Prabha Course Code - C15

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DEPARTMENT	Civil Department
INSTITUTE	Indian Institute of Technology, Roorkee
Course Outline	**1. Soil Exploration and Geophysical Investigation(5lectures)** 1.9 Introduction 1.10 Planning for subsurface exploration1.11 Methods of exploration1.12 Geophysical exploration 1.13 Soil sampling and samplers 1.14 In-situ tests 1.15 Common soil tests 1.16 Soil investigation report **2. Theory of Lateral Earth Pressure (5 lectures)** 2.10 Introduction 2.11 Types of earth pressures 2.12 Different theories of earth pressures 2.13 Displacement-related earth pressure 2.14 Rankine and Coulomb theory 2.15 Friction circle method 2.16 Terzaghi's analysis

	2.17 Development of bearing capacity theory 2.18 Development of uplift capacity theory **3. Methods of Analyses (5 lectures)** 3.7 Introduction 3.8 Different methods of analysis 3.9 Limit equilibrium 3.10 Limit analysis 3.11 Method of characteristics 3.12 Finite element method **4. Design of Shallow Foundations (5 lectures)** 4.8 Introduction 4.9 Different types of foundations 4.10 Calculation of bearing capacity 4.11 Stresses in soil 4.12 Concept of contact pressure 4.13 Calculation of settlements 4.14 Codal provision**5. Design o f Deep Fo undatio ns (5 lectures)** 5.10 Introduction 5.11 Different types of foundations 5.12 Design methodology for piles 5.13 Calculation of pile capacity 5.14 Stresses in pile 5.15 Analysis of pile group 5.16 Settlement of pile group

	5.17 Concept of negative skin friction 5.18 Piles subjected to lateral loads 5.19 Pile load test 5.20 Design and construction of well foundation, piers etc. **6. Design of Retaining Structures (5 lectures)** 6.9 Introduction 6.10 Different types of retaining structures 6.11 Stability analysis of rigid walls 6.12 Design of cantilever sheet piles 6.13 Design of anchored sheet piles 6.14 Bracing system for underground construction 6.15 Failure analysis for bracing system 6.16 Dewatering **7. Foundations in Difficult Grounds (5 lectures)** 7.6 Introduction 7.7 Techniques of ground improvement 7.8 Foundations in swelling soil 7.9 Foundations in collapsible soil 7.10 Use of soil reinforcement **8. Design o f Machine Fo undatio ns (5 lectures)** 8.7 Introduction8.8 Free and forced vibration 8.9 Lysmer's method 8.10 Dynamically loaded foundations 8.11 Dynamic soil properties8.12 Vibration isolation **9. Design of Foundations under Earthquake Conditions (5 lectures)**

	9.5 Introduction 9.6 Different methods of analysis 9.7 Pseudo-static method of design 9.8 Effect of earthquake forces on various foundations

COURSE DETAILS

S. No	Module ID/ Lecture ID	Lecture Title/Topic
1	L1	Shallow Foundation 1
2	L2	Shallow Foundation 2
3	L3	Shallow Foundation 3
4	L4	Shallow Foundation 4
5	L5	Shallow Foundation 5
6	L6	Shallow Foundation 6
7	L7	Shallow Foundation 7
8	L8	Lateral Earth pressure Theories Retaining Walls - 1
9	L9	Lateral Earth pressure Theories Retaining Walls - 2
10	L10	Lateral Earth pressure Theories Retaining Walls - 3
11	L11	Lateral Earth pressure Theories Retaining Walls - 4
12	L12	Lateral Earth pressure Theories Retaining Walls - 5
13	L13	Pile Foundation-1
14	L14	Pile Foundation-2
15	L15	Pile Foundation-3
16	L16	Pile Foundation-4

17	L17	Pile Foundation-5
18	L18	Pile Foundation-6
19	L19	Pile Foundation-7
20	L20	Machine Foundations-1
21	L21	Machine Foundations-2
22	L22	Machine Foundations-3
23	L23	Machine Foundations-4
24	L24	Well Foundations - 1
25	L25	Well Foundations - 2
26	L26	Well Foundations - 3
27	L27	Foundation Engineering -1
28	L28	Foundation Engineering -2
29	L29	Foundation Engineering -3
30	L30	Foundation Engineering -4
31	L31	Foundation Engineering -5
32	L32	Foundation Engineering -6
33	L33	Foundation Engineering -7
34	L34	Foundation Engineering -8
35	L35	Foundation Engineering -9
36	L36	Foundation Engineering -10
37	L37	Foundation Engineering -11
38	L38	Foundation Engineering -12
39	L39	Foundation Engineering -13

40	L40	Foundation Engineering -14

References if Any: